ICT TORONTO

AN INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) CLUSTER DEVELOPMENT STRATEGY FOR THE TORONTO REGION

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SUMMARY

This strategy will improve the long-term competitiveness of the Toronto Region's Information and Communication Technology (ICT) sector so that it continues to be a leading source of employment and wealth creation. The project is a joint undertaking of the City of Toronto and the Ontario and federal governments, the ICT industry and municipal governments in the region.

The Toronto Region ICT sector is one of the region's largest private sector employers with a core of around 3,300 firms and 148,000 employees. Annual sales are estimated to be in the $30 to $35 billion range and upwards, with exports in the neighbourhood of $6 billion. It is also the 3rd largest ICT sector in North America, behind San Francisco and New York, based on employment. ICT is a fast-growing industry and an "enabling sector" that allows other industries to improve their productivity and to grow. It makes a substantial contribution to the region's tax base. Cities around the world are embracing information and communication technology, not only as tools to improve their own productivity and service to their citizens, but as key drivers of local economic growth in the knowledge economy.

However, the sector is facing challenges to its future competitiveness. Adapting to rapidly changing business circumstances will be an ongoing challenge for ICT firms, in light of the changing economics of global production, increasing private sector foreign investment, "offshoring" of manufacturing and services, disruptive technologies, new business management methods, changing markets, industry rationalization, and skills availability.

A growing body of research is demonstrating that local government can be an effective force in promoting technology-based economic development. To support the future growth of the cluster, the strategy has adopted 4 goals:

1. Increase collaboration among ICT stakeholders.
2. Increase the profile of the sector within Canada and abroad.
3. Increase the competitiveness of the sector.
4. Retain and attract ICT business in the region.

For each of these goals the strategy identifies a set of strengths, weaknesses, opportunities and threats. The strategy concludes that the Toronto Region ICT cluster represents a mature industrial cluster: it has well-developed vertical and horizontal linkages among original equipment manufacturers, second and third-tier suppliers, service providers, associations, financiers, research organizations, and so forth. However, the cluster is not operating at optimal efficiency. Research leading up to this strategy has found issues that need to be addressed, including:

This strategy will improve the long-term competitiveness of the Toronto Region's ICT sector so that it continues to be a leading source of employment and wealth creation.

- The recognition of the potential of knowledge-based industries by regional/local leaders;
- The identification and support of regional strengths and assets;
- The lack of catalytic influence of local champions;
- The need to encourage entrepreneurial drive and sound business practices;
- Access to various sources of investment capital;
- The need to strengthen both informal and formal information networks;
- The need for expanding educational and research institutions; and,
- The need to have "staying power" over the long term.

Municipal, provincial and federal governments are increasingly attentive to the current and future needs of the sector. They must continue to play a facilitating role to help the cluster organize and market itself.

The strategy's vision is that Toronto Region will strive to be among the top 2 locations in North America and the top 5 in the world for ICT company growth and investment (the region is currently No. 3 in North America)… and keep it there. The region should strive to preserve and add to the current employment base, to increase exports, jobs, new products and services, and leading edge research and development. The strategy begins with a vision of the sector's future:

> **Our vision is that the Toronto Region will become, and be acknowledged globally, as one of the 5 most innovative, creative and productive locations in the world for ICT research, education, business, and investment by 2011.**

This vision builds on the sector's many strengths:

People

- Strong labour pool
- The multinational and linguistic diversity of the ***peoples*** of the region, and a well-educated and skilled workforce.;

Companies

- World-class ICT companies
- Global footprint of Toronto firms
- Strong multinational enterprises (MNEs)
- Vibrant New Media sector
- Strong representation in all ICT sectors
- Extensive, wide-ranging, and world-leading application solutions addressing business needs of other industrial and business sectors

Business Environment

- A well-developed infrastructure for ICT research and manufacturing;
- Nearness to the US market
- Low cost of doing business
- International business connections
- ICT-oriented industry organizations & associations
- University and college research potential
- Emergence of regional innovation networks
- Sources of investment capital
- Market drivers; FIRE (Finance, Insurance, Real Estate) and MUSH (Municipalities, Universities, Schools, Hospitals)
- The quality of life in the region.

To achieve the proposed vision for the sector, stakeholders will need to address a number of identified challenges. One of the challenges is a low level of recognition of the potential of the sector amongst leaders and decision makers in the Toronto Region. Another is that the region's strengths and assets have not, until now, been adequately catalogued. Local ICT champions have not come forward to the extent they have in other cities, such as Ottawa or Waterloo.

While the level of entrepreneurial drive is high in the Toronto Region ICT sector, entrepreneurship is not matched by sound business practice. There appears to be a considerable amount of investment capital in the region, but companies have difficulty accessing it. The Region suffers from a distinct lack of cohesion within the ICT community; its industrial diversity and geographic spread make this difficult to achieve. While there are many islands of excellence in ICT within the Region's educational institutions, there is less support for the sector at an institutional level than in other cities in Canada and abroad. All ICT stakeholders need to make a long term commitment to the vitality of the sector as instant results will be hard to achieve.

As shown in the following table, the strategy puts forward 13 recommendations, 17 actions that are designed to successfully address the many challenges that the sector is facing. It also outlines 17 outcome targets to measure progress.

The report concludes that Toronto Region's ICT sector has done remarkably well. Companies in the sector span all areas of ICT activity, including Manufacturing; Software and Systems Development and ICT Services. The challenge of the Toronto Region ICT Cluster Strategy is to maintain the momentum; to help companies new and old to grow and prosper by nurturing a positive climate or ecosystem for ICT firms in the region, and by promoting the region's accomplishments and potential to the world. The winning conditions are in place. However, the status quo is not an option; a commitment to positive change is needed to keep the region in the forefront.

*a **commitment** to **positive change** is needed to keep the region in the **forefront**.*

TORONTO ICT CLUSTER STRATEGY AT A GLANCE

GOAL 1: INCREASE COLLABORATION

Recommendations	*Actions*	*Targets (2011)*
• Adopt the Vision (R1) • Establish ICT Toronto, a multi-stakeholder partnership to advance the interest of the Toronto Region ICT cluster (R2) • Improve the planning and coordination of government strategies, policies, programs and projects affecting the Toronto Region's ICT cluster. (R3) • Encourage ICT industry cluster growth near existing knowledge nodes across the Toronto Region. (R10)	• Develop a business plan to establish ICT Toronto as a forum where organizations come together to share information and experiences, in support of the Region's ICT cluster initiatives. (A1) • Establish a council of senior managers to improve planning and coordination across the three orders of government in the Toronto Region. (A3) • Explore the potential for the creation of industry co-location in knowledge nodes to take advantage of potential synergies between industry and academe. (A12) • Facilitate and support expanded mandates for existing organizations already offering business support services throughout the region. (A15)	• Establish ICT Toronto, a multi-stakeholder ICT cluster partnership. (T1) • Establish a formal higher education-industry-government ICT discussion within ICT Toronto. (T6) • Increase the number of joint industry/university research and commercialization collaborations by 15%. (T9) • Establish a formal inter-governmental ICT coordinating and planning body. (T16)

TORONTO ICT CLUSTER STRATEGY AT A GLANCE

GOAL 2: INCREASE SECTOR PROFILE

Recommendations	*Actions*	*Targets (2011)*
• Promote the Toronto Region as the place to be, to work and to invest in the ICT industry cluster. (R5)	• Work with regions across the US border to capitalize on the value added by the ICT cluster in those regions to enhance the profile of the entire region on the world stage. (A4) • Develop a promotion and marketing strategy addressing communications, media relations, and increase public awareness. (A6) • Support the Toronto Regional Research Alliance (TRRA) and other organizations and initiatives aiming to improve local research infrastructure and boost research activity. (A11) • Support the Ontario Science Centre through industry sponsorship of a permanent modern interactive exhibit focussing on ICT careers. (A13) • Consider a "Science-Technology-Environment" theme in the preparation of the City's bid to host the 2015 World Fair in Toronto. (A17)	• Develop and implement a regional ICT marketing and communications strategy. (T2) • Be recognized in the international community as a leader in the knowledge economy. (T17)

TORONTO ICT CLUSTER STRATEGY AT A GLANCE

GOAL 3: INCREASE COMPETITIVENESS

Recommendations	*Actions*	*Targets (2011)*
• Leverage the Toronto Region's main economic strengths for the ICT sector's advantage making Toronto an international centre for application development. (R4) • Grow the ICT industry cluster in the Toronto Region by facilitating equal access to federal government support. (R8) • Advocate for one or more leading edge federal or provincial ICT research institutes in the Toronto Region, while supporting existing regional research promotion organizations. (R9) • Develop skills and knowledge to support the ICT cluster. (R11) • Ensure that business support services are available to companies across the Toronto Region. (R12) • Think smart: Take advantage of existing and potential opportunities and/or initiatives to advance the interest of the ICT cluster. (R13)	• Allocate specific financial resources for ICT cluster development at all orders of government. (A2) • Facilitate collaboration between application developers and end users across sectors; Remove local barriers to ICT industry growth (e.g. regulations). (A5) • Develop an ICT labour force development plan for the Toronto Region that will update and build on the IT component of Toronto's Human Resources Labour Force Readiness Plan. (A14) • Identify funding inequities and impress upon the federal government the need to eliminate them; explore the potential of programs to address the specific needs of the ICT cluster in the Toronto Region. (A9) • Advocate for the creation of one or more federal or provincial ICT research and commercialization institutes in the Toronto Region to anchor the ICT cluster. (A10) • Facilitate local firms' access to publicly funded research facilities that are now in the region. (A16)	• Increase the number of Toronto Region ICT companies performing research by 15%. (T3) • Establish at least one major federal ICT research institution in the region. (T5) • Increase investment in ICT research in the region by 25% from 2004 levels. (T4) • Increase ICT sales (currently $30-35 billion per annum) and employment (148,000) in the region by 20%. (T7) • Increase annual ICT investment in the region by 15%. (T11) • Ensure that needed ICT business support services are available to firms throughout the region. (T14) • Achieve parity in Toronto Region ICT firms' access to federal government financial support. (T15)

TORONTO ICT CLUSTER STRATEGY AT A GLANCE

GOAL 4: RETAIN AND ATTRACT ICT BUSINESS

Recommendations	*Actions*	*Targets (2011)*
• Make each of the Region's cities and city governments model users of ICT and facilitators of ICT industry growth. (R6) • Ensure that bandwidth and wireless connectivity infrastructure in the Toronto Region is at the leading edge. (R7)	• Municipal governments should take the lead to facilitate ICT industry growth, by: Removing regulatory barriers; Facilitating the adoption of new technologies; Encouraging public-private partnerships to digitize data; Partnering with local education and/or research institutions; Facilitating the commercialization of innovative technologies developed by the municipality; Enhancing the support for the ICT sector by adding programs and resources (A7) • Cities in the Toronto Region must work together to develop a mechanism to monitor the state of the ICT infrastructure, and to assess needs and emerging issues to ensure that the Toronto Region maintains its status as one of the world leaders in the knowledge economy. (A8)	• Have an internationally-competitive public access wireless Internet service in place. (T13) • Attract 5 new ICT multinational firms to the region. (T10) • Increase the rate of annual new ICT company formation and survival by 10%. (T8) • Reinforce 2 "knowledge nodes" (east, west). (T12)

PURPOSE OF THE STRATEGY

1.0

PURPOSE OF THE STRATEGY

This strategy will improve the long-term competitiveness of the Toronto Region's Information and Communication Technology (ICT) industry cluster[1] so that it continues to be a leading source of employment and wealth creation. The strategy outlined here is part of a wider effort to nurture the growth of the technology-oriented industries that make up a large part of Toronto's regional economy. The project is a joint undertaking of the City of Toronto and the Ontario and federal governments, in consultation with municipal governments in the region and a broad range of stakeholders. The industrial focus of the strategy is the Information and Communication Technology (ICT) industry[2] and the geographic focus is the Toronto Region[3].

1.1 WHY THE STRATEGY IS NEEDED

The ICT sector is one of the region's largest private sector employers[4] with a core of around 3,300 firms and 148,000 employees[5]. It also makes a significant contribution to the municipal tax base throughout the region. ICT is a fast-growing industry in its own right and an "enabling sector" that provides technologies and solutions that allow many other industries to improve their productivity and to provide new goods and services[6].

However, by some accounts in 2003 Canadian companies invested only 42 per cent of what US companies invest per worker in information and communications technology. The Information Technology Association of Canada (ITAC) believes that this dramatic under-investment accounts for a significant part of the growing gap between Canadian and US productivity[7].

For many years the Toronto Region's ICT sector enjoyed solid growth. Growth was rapid in the 1990s, stalled after the "tech bust" of 2000, and has since recovered. However, despite past accomplishments, future success is not guaranteed. Adapting to rapidly changing business circumstances will be an ongoing challenge for ICT firms. In the final analysis it is up to individual enterprises to make the changes they require to compete in the new global economy. And governments can help by establishing a healthy environment for ICT business.

*the proposed strategy **builds** on the most **up-to-date** thinking about how regional economic clusters **develop** and **grow***

Canada's - and Toronto's - ICT sector is facing challenges to its future competitiveness. These challenges include: the changing economics of global production, increasing private sector foreign investment, "offshoring" of manufacturing and services, disruptive technologies, new business management methods[8], changing markets, industry rationalization, and skills availability. In short, these are uncertain times for many companies in the ICT industry. And yet, these are also times of unprecedented opportunity, as new knowledge-based technologies, products and services are developed and as new markets emerge. Experience shows that governments can help industries such as ICT to grow, in a number of ways. They can:

1. Facilitate the establishment of hard and soft infrastructure;
2. Remove unnecessary barriers to industry adaptation and growth;
3. Aid companies currently in the region to expand their businesses within the region;
4. Use their data and information to help launch new information products and services;
5. Use business support tools - for instance startup business incubators - to actively promote new company formation;
6. Promote the benefits of their region on the world stage and attract new investment to the region; and,
7. Establish land and building guidelines that are conducive to the growth of (ICT) clusters.

Cities around the world are embracing information and communication technology, not only as tools to improve their own productivity and service to their citizens, but as key drivers of local economic growth in the knowledge economy. The proposed Toronto Region ICT sector strategy builds on the most up-to-date thinking about how regional economic clusters develop and grow, and in particular, the important role that local governments can play in shaping the economic future of clusters, when they work with the business community, the academic sector, and other orders of government.

1.2 LINK TO TORONTO'S ECONOMIC DEVELOPMENT STRATEGY

In 2000 Toronto adopted its current economic development strategy[9]. Toronto's principal economic development goal is: "to improve the livability and quality of life in the City through economic growth that creates high quality jobs, generates wealth and investment, and helps to ensure the City's long term fiscal health".

Toronto's strategy points out the importance of clusters: "A cluster is a set of inter-linked private sector industries and public sector institutions, whose final production reaches markets outside the region. Clusters represent activities in which a city-region specializes; that is, it has a relative concentration of employment or output in that set of related activities, compared to other cities. If city-regions are the building blocks of the global economy, then clusters are the building blocks of a regional economy". The economic development strategy makes a number of points that are relevant to the ICT strategy:

1. People power the knowledge economy.
2. New ideas and the translation of those ideas into innovative products and services of superior quality are the primary way economic value is added.

3. 'Quality of place' is a critical factor in determining where people, particularly knowledge workers, choose to locate and invest.
4. Sustaining a vital cycle of economic growth and prosperity requires competitive export clusters and a strong local economy.
5. Toronto needs to actively promote and 'brand' itself both locally and around the world as a vital, globally connected, centre of innovation, creativity, excellence and investment opportunities.
6. A big part of the challenge of the City's economic development strategy is to make better use of the considerable resources that exist in the community…to conceive and then act upon a common vision of the City's economic future…(to) create "an alignment of strategic intent" and forge new partnerships to implement this vision.
7. The greatest risk to our future is to do nothing.

Decisions taken (or not taken) today by local government will affect the growth of the ICT industry for decades to come.

A growing body of research is demonstrating that local government can be an effective force in promoting technology-based economic development. Decisions taken (or not taken) today by local government will affect the growth of the ICT industry - and other technology sectors - for decades to come.

This strategy begins by describing the project's strategic goals. It then characterizes the ICT sector in the Toronto Region. It identifies the sector's strengths, weaknesses, opportunities and threats, against the goals. It highlights issues for the future, and proposes a set of strategies and concrete actions that can be taken by government, industry and other partners and stakeholders to create a healthy "ecosystem" for future economic development.

GOALS OF THE STRATEGY 2.0

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2.0

GOALS OF THE STRATEGY

The aim of the strategy is to improve the long-term competitiveness of the Toronto Region's ICT sector so that it continues to be a leading source of employment and wealth creation. As such the ICT strategy will address 4 specific goals. The first 3 goals were included in the original project terms of reference. The 4th goal resulted from input from industry leaders received during the research phase of the assignment. The goals are:

GOAL 1: INCREASE COLLABORATION

International experience shows that active partnerships among (ICT) partners and stakeholders are a pre-requisite for economic growth. Thus, the initial strategy goal is to increase collaboration among they key players in the ICT cluster: companies, governments, research and teaching organizations, industry and professional organizations and other sector partners and stakeholders. Collaboration is not an end unto itself; rather, it is a means of facilitating the other project objectives.

*International experience shows that **active partnerships** among (ICT) partners and stakeholders are a **pre-requisite** for economic growth.*

GOAL 2: INCREASE PROFILE

The strategy's second goal is to improve the profile of Toronto's ICT sector. While it is home to North America's 3rd largest concentration of companies[10], Toronto's ICT sector does not enjoy the recognition of such internationally-recognized locales as Silicon Valley, Austin, Boston or Bangalore. Raising the profile of the sector will help attract new firms to the region. It can also help companies now doing business in the region to improve their business prospects, by associating them and their products and services with a "brand-name" regional economic cluster. In the same way that a "Bay Street" or "Wall Street" address is perceived to accord credibility and prestige to a law firm or an investment firm, the strategy will strive to brand Toronto as a prestigious address for ICT firms worldwide.

GOAL 3: INCREASE COMPETITIVENESS

Strengthening the ICT sector has many dimensions. One dimension is to reinforce the supplier linkages among firms in the region so that they can do more business with one another. Another is to broaden and deepen the relations among companies and academic and government research organizations in order to improve innovation and product and service development.

Related to this is the challenge of ensuring a steady supply of qualified personnel for industry. A further aim is to examine the measures that the local, provincial and federal governments could take to remove barriers to growth and to facilitate industry competitiveness. An important element of the strategy is to facilitate the growth of new small and medium size ICT companies - the industry leaders of tomorrow.

GOAL 4: RETAIN AND ATTRACT ICT BUSINESSES

This is a period of rapid change for the ICT sector. In many parts of the industry there is mounting pressure for firms to expand their businesses outside of Toronto and Canada - particular in South Asia and Asia - at the expense of investing in Canada. Many of the multinational companies located in Toronto are in an ongoing battle to make the case to their headquarters, to invest in their Canadian operations; for example, by obtaining world product mandates. Toronto and Canada offer many advantages for companies abroad that are looking to expand their businesses, but international (and domestic) competition for those investments is strong.

Taken together, the foregoing 4 project goals will help local governments in the Toronto Region to attract ICT business investment to the region and aid existing enterprises to grow and prosper here. Attracting and retaining ICT businesses is needed to maintain and expand the critical mass and growth trend of the sector; in essence, to preserve and improve its international competitive position. Businesses (and economic development organizations) know that it is far easier - and less expensive - to retain a current customer than to recruit a new one. So, to counter trends affecting many ICT business now located in the region, the strategy needs to address the needs of existing firms.

*Attracting and **retaining** ICT businesses is needed to maintain and expand the **critical mass** and growth trend of the sector; in essence, to **preserve** and **improve** its international competitive position.*

BACKGROUND 3.0

3.0

BACKGROUND

The ICT strategy project was commissioned by the City of Toronto, working in partnership with the Province of Ontario and the Government of Canada, and in consultation with municipal governments in the region. It is one of a series of City-led initiatives intended to develop sectoral growth strategies for the knowledge-based industries in the Toronto Region. (Other strategies are being developed, for example, for the financial services and aerospace sectors.) In 2004, the Greater Toronto Marketing Alliance partnered with the City of Toronto, the provincial government's Ministry of Economic Development and Trade (MEDT) and the federal government's Program for Export Market Development-Investment and retained E&B Data to conduct a comprehensive profile study of the Toronto and Greater Toronto Area's (Toronto Region) ICT sector[11].

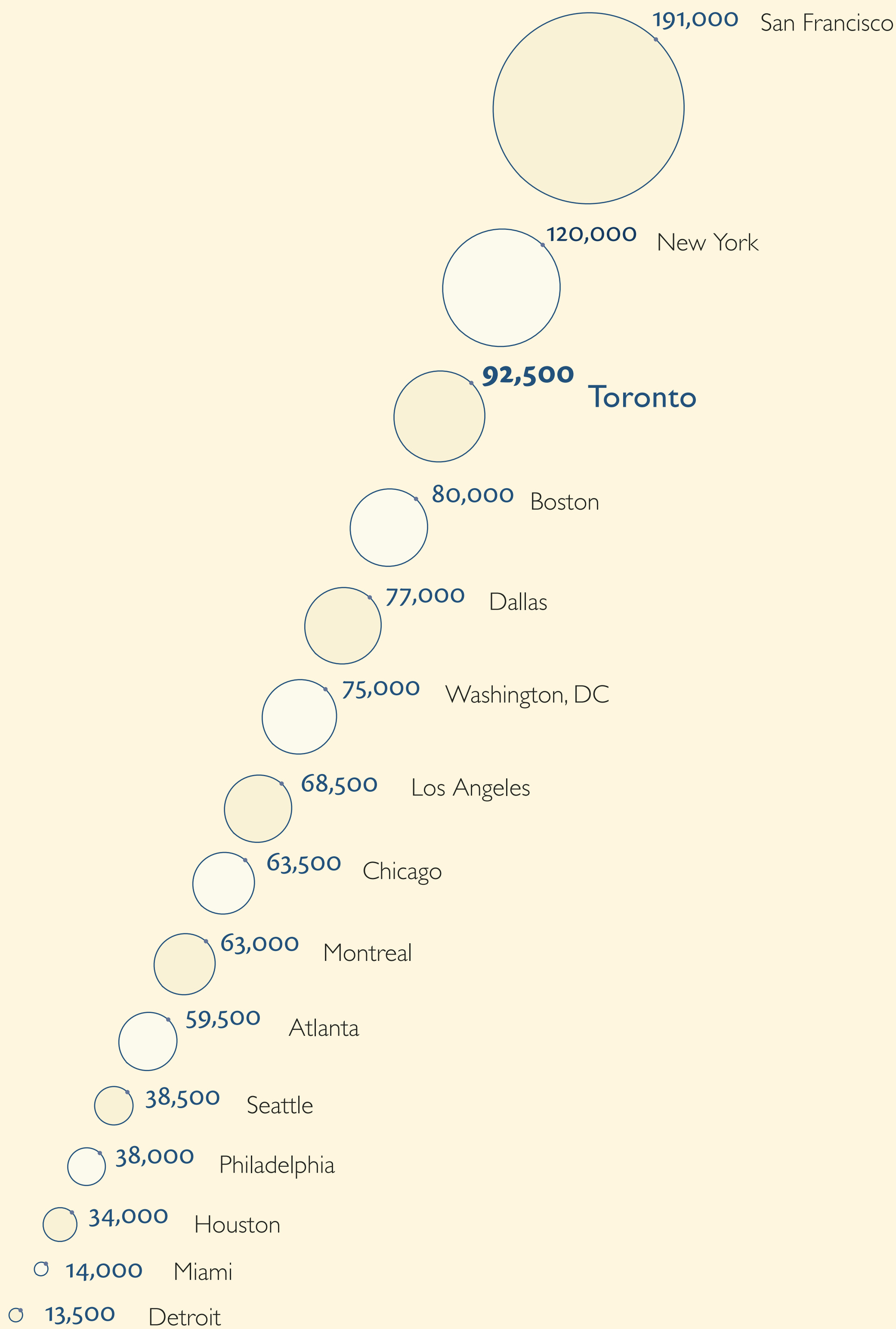
As a follow-up to the 2004 study, Toronto City Council adopted a draft report recommending the creation of an ICT industry advisory committee to advise on ways to ensure the ICT industry remains competitive. (Appendix I contains a list of the advisory committee members who participated in the strategy). It was determined that there is a need for a comprehensive strategy to grow the ICT cluster in the Toronto Region.

A vibrant Information and Communication Technology (ICT) industry is one cornerstone of the Toronto Region's economic present and future. The E&B Data report found that the ICT sector in the Toronto Region is currently North America's third-largest[12], behind San Francisco and New York, as measured by employment levels, containing the largest concentration of medium and large private ICT companies in Canada (Figure 1).

FIGURE 1

Rankings of Top North American Metropolitan Areas by Size of ICT Industry, 2003 - Employment Index

Source: E&B Data



The Toronto Region's ICT industry has a strong base in all key sectors: Manufacturing, Software and Systems Development, as well as ICT Services.

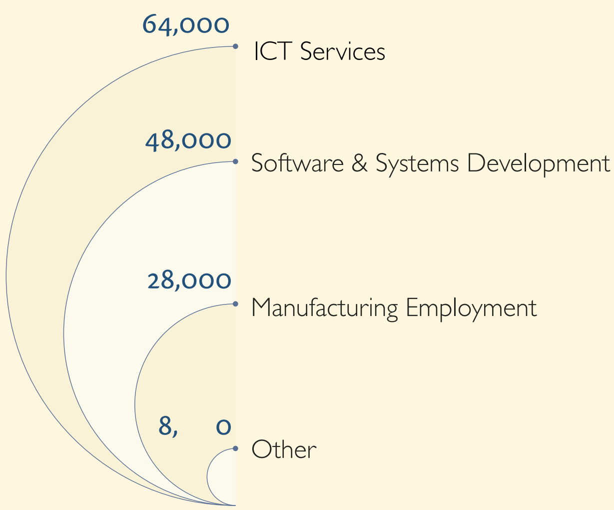
Overall employment within private sector businesses (Figure 2) totals 148,000 in upwards of 3,300 dedicated facilities, including:

- 28,000 jobs in over 260 Manufacturing sector facilities (e.g. electronic components manufacturing, computer and communications equipment manufacturing);
- 48,000 jobs in over 1,300 Software and Systems Development sector facilities;
- 64,000 jobs in over 900 ICT Services sector facilities (e.g., telecommunication services).

FIGURE 2

Toronto Region ICT Employment

Source: E&B Data



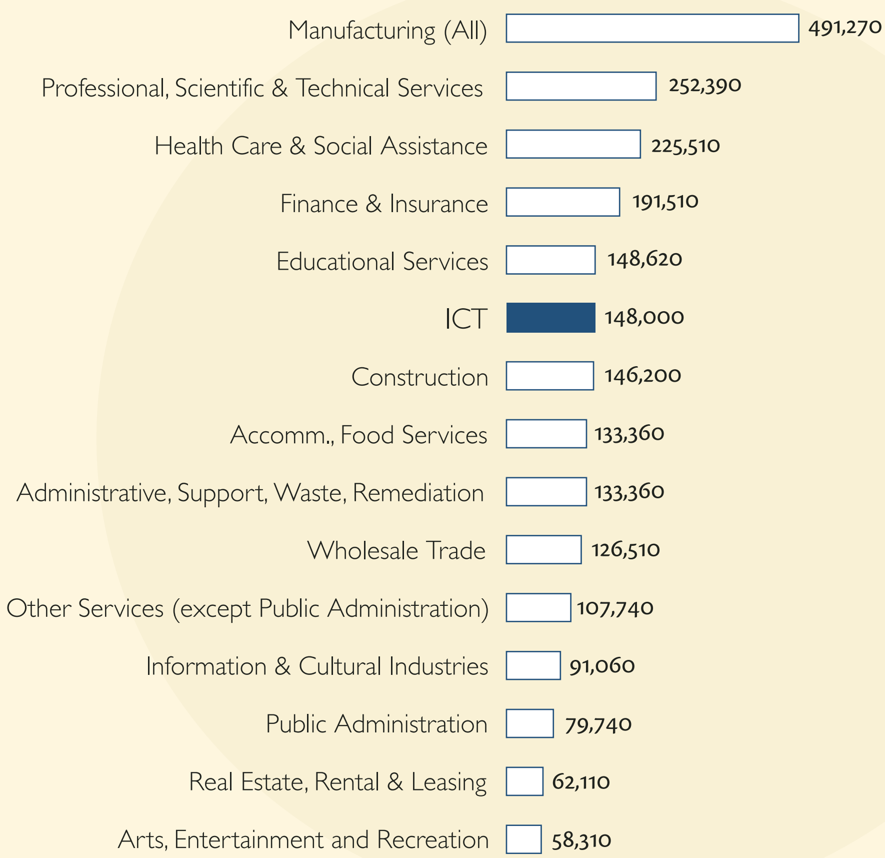
In addition, 40,000 ICT specialists (e.g. programmers, analysts) work in key user sectors such as Finance & Insurance and Healthcare. Overall, the Toronto Region employs 29,000 analysts, 22,000 programmers, 19,000 technicians, and 16,000 ICT engineers. Annual sales are estimated to be in the $30 to $35 billion range and upwards, with exports in the neighbourhood of $6 billion. Furthermore, the industry is spread out across the Toronto Region, reflecting its vast economic and demographic base.

The Toronto Region ICT sector is the 5th largest industry and makes a significant contribution to overall employment in the region (Figure 3).

FIGURE 3

Industry Employment: Toronto CMA (Selected Sectors)

Source: Statistics Canada, Labour Force Survey 2004



Employment and employment growth in the Toronto Region ICT sector has been strong (Figure 4)[13]. The Toronto Region's ICT sector contributes heavily to local employment and makes a major contribution to the municipal tax base. It exports its goods and services around the world. It provides productivity enhancement tools to companies and organizations (e.g. hospitals) in many other industry sectors. The Toronto Region ICT cluster represents a mature industrial cluster: it has well-developed vertical and horizontal linkages among OEMs[14], second and third-tier suppliers, service providers, associations, financiers, research organizations, and so forth. However, the cluster is not operating at optimal efficiency; research leading up to this strategy has found many issues that need to be addressed. Municipal, provincial and federal governments are attentive to the current and future needs of the sector and, through this project, are taking a facilitating role in helping the cluster to organize and market itself.

FIGURE 4

ICT Establishment and Employment Growth

Source: Gertler et all. 2004

Despite its size and importance the sector in the Toronto Region has failed to develop either the same level of local business cohesion or international "brand awareness" as other regions in Canada or abroad. Awareness abroad (and, we suspect, in Canada) of the Toronto Region as an international ICT powerhouse is comparatively low. This inevitably puts Toronto at a disadvantage with respect to attracting foreign and domestic investment in the sector. It also puts a damper on the ability of companies in the sector to market their capabilities; possibly because companies headquartered in the Toronto Region do not have the caché of being associated with a world-renowned "high tech cluster" in the way that their competitors do in (say) Silicon Valley, Austin or even Ottawa. From an international investment and regional marketing standpoint, the whole is currently *less* than the sum of its parts.

Paradoxically, the size, diversity and geographic spread of the ICT sector in the Toronto Region makes it difficult to bring companies and organizations in the region together in a coordinated effort to improve the business environment and to establish the same level of brand awareness that their counterparts have achieved in other cities, ranging from Ottawa to Bangalore. As a result, the international investment community may be passing Toronto over in favour of other locales. A low awareness level also means that municipal economic development officials have a harder job in marketing the region's combined ICT capabilities further afield, because there is no single point of contact ("one voice") for the sector in the region.

*companies in the Toronto Region **do not** have the caché of being **associated** with a world-renowned "high tech cluster" in the way that their competitors do in (say) Silicon Valley, Austin or even Ottawa.*

In comparison with other regions Toronto is characterized by the presence of a number of organizations addressing the needs of parts of the region (e.g. York Technology Association, Mississauga Technology Association) or parts of the industry (e.g. new media, e-business, etc.). Other regions also have single points of contact for their ICT sector (e.g. OCRI in Ottawa and Communitech in Kitchener-Waterloo.) Thus, the Toronto Region ICT Strategy aims to find measures to transcend the geographic and specialized focus of the present organizational infrastructure.

CLUSTER DEVELOPMENT OVERVIEW 4.0

4.0

CLUSTER DEVELOPMENT OVERVIEW

The Toronto ICT strategy is a cluster ***development*** strategy: it seeks to reinforce an already large agglomeration of ICT companies, researchers, industry and professional associations, and the local, provincial and federal government departments concerned with the sector, all of which constitute the existing industry cluster critical mass. In essence, it is a strategy for building on the region's current ICT strengths; for helping the cluster operate more efficiently and effectively, for creating a whole that is larger than the sum of its parts.

Chapter 5 of the strategy assesses a number of strengths, weaknesses, opportunities and threats characterizing the Toronto Region's ICT sector, against the key project objectives. This section of the strategy assesses the situation of the ICT sector against 8 "cluster success factors". These factors have been shown to differentiate successful clusters from less successful ones[15]. The eight characteristics are;

- Recognition of the potential of knowledge-based industries by regional/local leaders;
- Identification and support of regional strengths and assets;
- Catalytic influence of local champions;
- Need for entrepreneurial drive and sound business practices;
- Availability of various sources of investment capital;
- Cohesion provided by both informal and formal information networks;
- Need for educational and research institutions; and most importantly,
- Need to have "staying power" over the long term.

The findings can also be presented to illustrate the dynamics of the Toronto Region ICT cluster. The framework used for this is composed of eight characteristics of success that are the result of the study of some 100 clusters worldwide over the last 20 years[16]. This robust framework has been used in several recent studies of Canadian clusters.

*it is a strategy for building on the region's current ICT **strengths**; for helping the cluster operate more **efficiently** and **effectively*** *recognition of the ICT sector is on the rise amongst political leaders and within the policy community*

4.1 RECOGNITION OF POTENTIAL

Recognition by regional/local leaders of the potential of knowledge-based industries, is an important starting point for a successful cluster strategy. Cluster strategies require partnerships among government, industry and the academic sector. All three need to be at the table and committed to the strategy for it to work.

On the plus side it is clear that recognition of the ICT sector is on the rise amongst political leaders and within the policy community in the Toronto Region. Toronto's economic development strategy recognizes the ICT sector as important to the city's future. The provincial government is putting ICT back on its growth agenda by including ICT as a target industry for support through its Regional Innovation Networks. And at the federal level, Industry Canada is developing strategies that will affect the sector. But recognition challenges remain.

One challenge is that in the main Canadian political leaders are not focussed on Toronto's, Ontario's or Canada's future economic agenda. Among the political class, social development issues[17] are taking precedence over economic issues. In this climate it will be difficult for any cluster strategy - whether ICT, financial services or aerospace - to capture the requisite attention of political leaders. An exception is that when industries experience difficulty - as has happened recently with steel, aerospace, financial services - they inevitably capture greater political attention than when things are running smoothly. A related consideration is that Canada's economy is currently performing well overall, and in this climate it is hard to focus attention on tomorrow's issues.

A second challenge is that there inevitably is a certain degree of competition amongst different technology sectors for political attention. ICT finds itself competing against biotechnology, nanotechnology, aerospace, financial services and other clusters to gain political recognition and support. There is undoubtedly an element of "fashion" when it comes to recognizing the potential of new technologies. At the present time biotechnology, nanotechnology and to a certain extent materials science are in fashion; those sectors are capturing political leaders' attention - and more importantly, their support.

A third constraint on recognition is that the ICT sector failed to meet the expectations of many observers in recent years. In Toronto, a number of promising experiments in local cluster development did not achieve their original optimistic objectives[18]. Furthermore, the sector underwent a severe retrenchment in 2000. Simply stated, strong support for ICT that had been present among business and government leaders in the late 1990s, diminished significantly following the tech bust.

The ICT industry must share some of the responsibility for the difficulty it has had gaining recognition for its current and future contribution to the local (as well as the provincial and national) economy. ICT organizations that are active in the region have tended to work in isolation, and they have found it hard to work with one another. And the organization sector has been fragmented: some ICT organizations focus on different ICT sub-industries (e.g. software, new media, e-business), and others focus on different geographies (York Region, Mississauga, national). Although the Toronto Region has many excellent individual ICT researchers in the academic sector, academic institutions have also not taken a leadership position with respect to ICT.

4.2 REGIONAL STRENGTHS AND ASSETS

Knowing a region's strengths and assets is clearly prerequisite for an effective cluster development strategy. Thanks to earlier work (the E&B Data study) there is now an excellent statistical profile of where the Toronto Region's strengths and assets lie. The research phase of the strategy development project has added qualitative information about the region's strengths and assets. We know that the ICT sector in the Toronto Region is a "full-service" sector. It contains a significant number of companies in all segments of the industry. In this report we have identified a number of qualitative ICT strengths and assets:

- *World-class ICT companies*
- *Global footprint of Toronto firms*
- *Strong MNEs*
- *Strong representation in all sectors*
- *Nearness to the US market*
- *ICT-oriented industry organizations & associations*
- *Low cost of doing business*
- *University, college research potential*
- *Market drivers; FIRE (Finance, Insurance, Real Estate) and MUSH (Municipalities, Universities, Schools, Hospitals)*
- *Strong labour pool*
- *Investment capital*
- *Depth and breadth of activity*
- *Vibrant New Media sector*
- *Many international business connections*
- *Multicultural ICT business community*
- *University and college interactions*
- *Regional innovation networks emerging*

With the Toronto Region's quantitative and qualitative strengths and assets identified it should be easier to promote the sector and coordinate the various elements.

4.3 CATALYTIC INFLUENCE OF LOCAL CHAMPIONS

What the most successful industrial clusters have in common is that local champions - business leaders, elected officials, and academic leaders - banded together to effect change: to make things happen in their community. Often, they did this in the face of adversity. For example, Sunderland (England), a nominee for the *Intelligent Community of the Year* in 2005, had witnessed the decline of its traditional shipbuilding industry. By the 1980s unemployment was a massive 30%. Local champions launched a multi-pronged initiative to create a new knowledge-based economy. In the process:

- The city persuaded a real estate developer to build the first, speculative building of what is now Doxford International, an award-winning office park. In 1999, Teleport House opened at Doxford as a multi-partner venture undertaken by the city and local colleges, universities and businesses.
- Sunderland used funding from the European Community and the national government to rebuild its waterfront and create a new home for Sunderland University.
- The city created a Telematics strategy in order to ensure that citizens benefited from the new economy. A second Telematics strategy, covering the 1999-2003 period, set new goals, including development of a publicly-owned ISP and e-government hub called the Sunderland Host, expansion of the high-speed network to businesses and community centres, and created a one-stop Sunderland Portal for citizens, business and government users.
- In 2004, a new business park, Rainton Bridge, began development and is expected to generate more than 4,000 jobs when completed.
- A dedicated E-Government team is implementing a strategic change program called "peoplefirst" that aims to adopt technology-based approaches to delivering government services.

***successful** industrial clusters have… **banded together** to effect change: to **make things happen** in their community.*

As a consequence the efforts of local champions Sunderland reduced its unemployment rate to a 25-year low of 4% and more than halved the number of long-term unemployed since 2000. Sunderland recently won the "Beacon Status for Social Inclusion" from the UK's Local Government Association, while a 2004 study by KPMG ranked Sunderland as one of the top five most competitive business locations in the UK.

*champions need to come **forward** to create the badly needed **voice** for the ICT cluster in the Toronto Region.*

In Canada we have similar examples of local champions leading the charge for economic development in their communities. Ottawa (Ottawa Centre for Research and Innovation) and Waterloo (Communitech) are leaders in municipal economic development. The challenge for the Toronto Region's ICT strategy is to secure the same level of involvement of local champions as the most successful communities, in the absence of a crisis situation. For this strategy to succeed, champions need to come forward to create the badly needed voice for the ICT cluster in the Toronto Region. This will be one role for the proposed ICT Toronto.

4.4 ENTREPRENEURIAL DRIVE AND SOUND BUSINESS PRACTICE

Toronto's ICT businesspeople have no lack of entrepreneurial drive or skills. And the Toronto Region attracts a large number of entrepreneurial immigrants each year, adding to the pool of entrepreneurs. Toronto supports startup business through such events as the annual Small Business Forum. Last year's event attracted 3,000 participants and brought together all levels of government, the private sector, business associations and agencies to assist businesses and aspiring entrepreneurs.

One advantage the region does enjoy is that there are many large ICT firms doing business here. Those firms are important because they train their employees in modern business practices; in effect, the act as "finishing schools" for businesspeople. Frequently, successful entrepreneurs have learned the business ropes by working in these large firms, before venturing out to establish their own businesses.

A frequent criticism is that entrepreneurs' technical skills tend to be well developed, but their business skills - sales, marketing, teamwork - often need further development. There is a growing appreciation that providing startup business support services is an important role that municipalities can provide. For example:

- ***MaRS*** recognizes that successful entrepreneurs require more efficient access to capital, readily available business support tools and resources, and networks of like–minded peers at their fingertips. MaRS is building a sophisticated incubator and mentoring space for startup companies. It will help startup firms with business planning, financing, intellectual property, international marketing, etc.
- ***Innovation Synergy Centre in Markham (ISCM)*** is a business advisory "hub" designed to accelerate the development of thriving enterprises with 10 to 50 employees. The mission of the ISCM is to spur the growth of these companies to the next business level through access to comprehensive resources, services and expertise. The Synergy Centre is not a business incubator; instead, ISCM partners with qualified companies to support their development into larger, more prosperous organizations that will expand our economic base.

- ***Enterprise Toronto*** is a public and private sector alliance created to provide one-stop sourcing of services and programs tailored to meet the needs of the Toronto's Entrepreneurs and small businesses. Enterprise Toronto helps entrepreneurs and start-up businesses to develop their management capabilities as their business venture grows. Enterprise Toronto offers services and programs in the areas of Small Business and Local Partnerships, Business Development and Retention, Investment Marketing, Economic Research and Business Information. Its goal is to help entrepreneurs, although it has no special focus on technology businesses.

- ***Toronto Venture Group (TVG)*** bridges the Gap between entrepreneurs and capital through education, communication and networking events. It provides investment ready-entrepreneurs with presentation opportunities to qualified investors. For example, TVG developed the Toronto Angel Group (TAG), a member-based organization which offers a forum for Angel investors to increase their exposure to quality, pre-screened investment opportunities and expand their network of like-minded investors. TAG also provides qualified entrepreneurs the opportunity to approach a community of active investors. TVG will soon be opening a new office at MaRS.

Toronto is the hub of Canada's venture capital industry.

- ***Toronto Business Development Centre*** - through the Toronto Economic Development Corporation (TEDCO) - assists entrepreneurs in the formation and development of enterprises so that those enterprises grow into successful job-creating businesses. The Centre meets its mandate through three operating divisions: The Business Incubator provides office space and business advisory services to early-stage ventures. Entrepreneurial Training Programs assist and advise entrepreneurs during the research, planning and start-up phases of their businesses. Community Programs - the Centre has expertise available to assist other not-for-profit organizations with the development and delivery of entrepreneurial training programs.

While the Toronto Region ranks high on entrepreneurship, more work is needed to put in place a region-wide system that will provide a consistent high level of support for ICT businesses. The new Ontario Research Commercialization Program, which will be managed by the Ministry of Research and Innovation, promises to help in this regard.

4.5 AVAILABILITY OF INVESTMENT CAPITAL

Institutional investment capital fuels the growth of technology-based businesses once they have used up their initial (angel) financing. Toronto is the hub of Canada's venture capital industry, which in principle should bode well for entrepreneurs here seeking institutional investment.

But because Toronto investment firms tend to be larger, they also tend to look for larger deals in order to cover their high overheads and transaction costs. This often means that entrepreneurs seeking smaller amounts of financing are shut out of the institutional scene. Undoubtedly, for many entrepreneurs the Toronto Region's rich concentration of financing sources must often appear to be a mirage - so near yet so far. The Toronto situation is different to that in smaller communities.

In smaller communities there are fewer sources of investment capital and fewer funds available for investment. On the other hand those funding sources tend to be more open to smaller deals, and entrepreneurs typically find management to be more approachable.

Canada's venture financing industry experienced a substantial downsizing following the 2000 tech bust. In 2004 the industry invested only half of the amount of money as it did in 2001[19]. Figures 5, 6, and 7 indicate that the IT sector received a good share of all VC investment in 2004, but that there was little or no growth from the year prior.

FIGURE 5

Number of Financings by Industry Sector

Source: Canadian Venture Capital Association

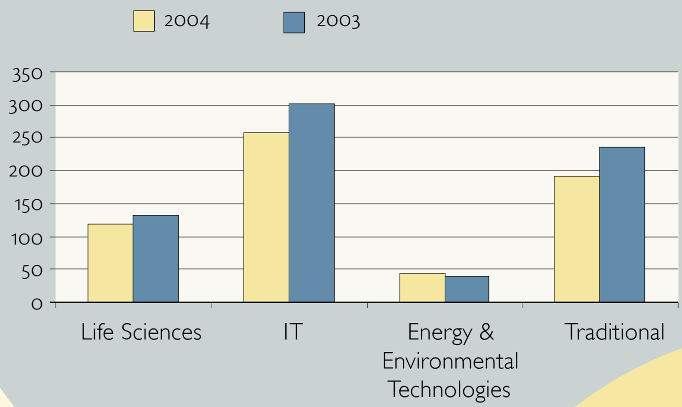


FIGURE 6

Number of Investments by Industry Sector

Source: Canadian Venture Capital Association

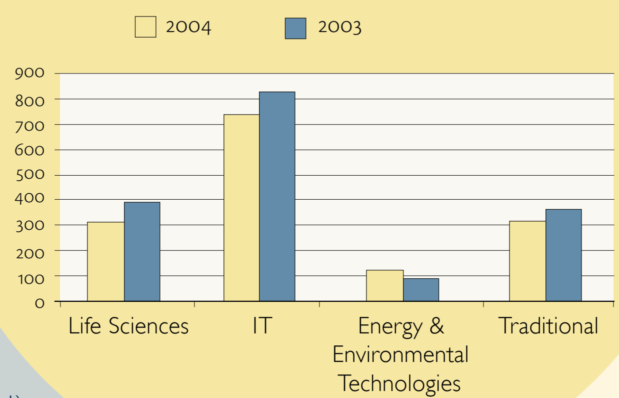
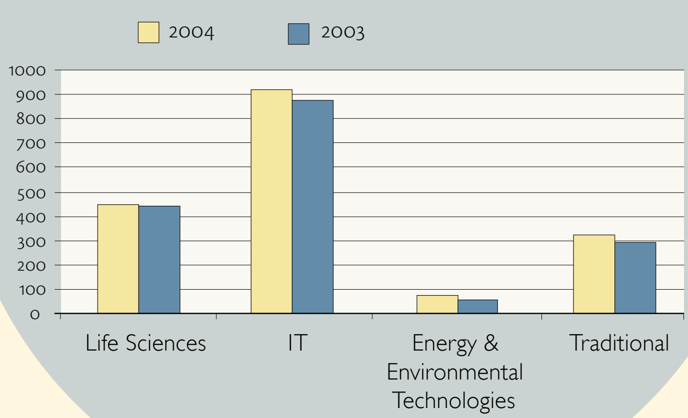


FIGURE 7

Value of Investments by Industry Sector ($MILLION)

Source: Canadian Venture Capital Association



On the positive side, over 42% of all venture capital deals were in the ICT field (versus about 22% in life sciences). However, a considerable amount of the available money is targeted to buyouts, as opposed to mezzanine financing, which does little to help the newer business entrants[20]. The participation of the Toronto Venture Group (TVG) on the ICT strategy advisory committee is a positive step.

4.6 COHESION PROVIDED BY INFORMATION NETWORKS

Another mark of successful industrial clusters is that they are characterized by informal and formal information-sharing networks. The venues range from conferences and meetings to coffee shops and gyms. Business lore extols the virtue of the now-shuttered Wagon Wheel Restaurant in Silicon Valley, reportedly the scene of many multimillion dollar handshake investment decisions. In Ottawa, the Starbucks at the Pinecrest Mall served as the informal office for ICT workers who were downsized after the tech bust. Many a new business was formed over coffee and muffins. Washington business writer Ronald Fraser recently said of networks:

> Networks - the sine qua non of the computer age - are vital to the success of emerging technology regions and the Washington area is no exception. Our best bet for linking the region's entrepreneurs is to rely on a variety of old and new style person-to-person and machine-to-machine networks to guide us into the future. Old style networks already in use in Washington's technology sector include exclusive private clubs, such as the Tower Club at Tysons Corner, the Northern Virginia Technology Council, a membership trade group, and chambers of commerce. More recent digital-era networks also have made their debut, including elite, global gatherings such as the World Congress on Information Technology held in 1998 at George Mason University, local and wide area computer networks and, of course, the Internet[21].

Networks - the sine qua non of the computer age - are vital to the success of emerging technology regions.

In Canada, successful cluster cities such as Ottawa, Waterloo, Calgary and Markham thrive on networks and networking. They use breakfast meetings, guest speakers, "pitch sessions", seminars, luncheons and a host of other techniques to bring communities together to make personal contacts and share information. As people who have attended these sorts of sessions know, most of the information sharing takes place in the hallways during coffee breaks. Where else would a budding entrepreneur have the chance to corral the CEO of a multinational ICT company to pitch a new product or service?

The Toronto Region has a number of mitigating factors that make it difficult to establish strong networks. The region is vast and travel is difficult. There is no geographic centre for ICT; unlike in Ottawa where Kanata is the focal point for business, ICT exists throughout the Toronto Region. The ICT industry contains many sub-industries that on the surface may have little in common; for example, microchip design and telecommunication services. There are a number of different industry associations - traditionally the strongest promoters of networking - serving different elements of the community, and no single acknowledged organization with the mandate, resources, or desire to bridge the Toronto Region's many divides. A mechanism is needed to overcome these barriers and establish an effective system of information sharing; Recommendations 2 and 7 address this issue.

4.7 NEED FOR EDUCATIONAL AND RESEARCH INSTITUTIONS

Educational and research institutions lie at the heart of the knowledge economy. Their most important role is to educate young people; to provide them with up-to-date knowledge and skills. A secondary role is to perform research that may lead to new science and technology. University graduates transmit ideas developed in universities, colleges and research institutes to the business sector. The business sector adapts the ideas and turns them into marketable products and services.

Toronto is well-served by excellent universities and colleges, many of them with strong teaching and research activities that are relevant to the ICT sector. However, discussions with individuals in the business community indicate that these capabilities are not well linked to firms in the sector. Whether the cause lies with the academic sector or the business sector is not really the issue. What matters most is how to bridge the gap.

*Toronto is well-served by **excellent** universities and colleges, many of them with **strong teaching** and research activities that are **relevant** to the **ICT** sector.*

One area where the Toronto Region's ICT sector is noticeably weak is in not having any major federal or provincial research institution that acts as an "anchor" for the region's ICT cluster. Public sector labs play a unique role, bridging the academic and industrial worlds. In recent years federal labs have spun off many businesses. The activities of public sector labs also provide the glue that often binds diverse players in a sector together.

The Toronto Regional Research Alliance (TRRA) has been formed to attract new public and private sector research investment to the region. TRRA reports that "The region is leveraging about half the public research dollars per capita of provinces like Alberta, BC and Quebec". TRRA will attempt to attract research driven companies to the region, focussing initially on the ICT and bio-pharma sectors. At the same time, the TRRA will work with leading companies in key sectors that have already chosen to locate here, in order to expand their regional presence. If it succeeds, over time it should be an effective organizing for kick-starting new research institutions in Toronto. TRRA will also implement "a strategic, high level recruitment campaign targeting 10-20 high-growth, international, R&D-based companies likely to be seeking a North American R&D location in the next 5 years". TRRA has developed support and momentum for its plans, and should be a valuable ally in the Toronto Region ICT Strategy.

a long term issue that needs to be addressed is Canada's supply of workers with the requisite math, science and engineering skills

Another long term issue that needs to be addressed is Canada's supply of workers with the requisite math, science and engineering skills that will allow us to succeed in the future, against growing competition from other countries. The Toronto Region ICT Strategy can help to lay the groundwork for tomorrow's workforce.

4.8 NEED FOR "STAYING POWER" OVER THE LONG TERM

A Toronto Region ICT Strategy can be developed quickly, but it will take time to implement. Stakeholders will need to make a long term commitment to the strategy if it is to succeed. Long term commitment is another feature of successful cluster strategies. The Toronto Region has the depth, diversity and scale to weather economic cycles.

4.9 CLUSTER ISSUES IN PERSPECTIVE

The study findings illustrate the dynamics of the Toronto Region ICT cluster. The framework used for this is composed of eight characteristics of success that are the result of the study of federal agencies led by Industry Canada, 2004 some 100 clusters worldwide over the last 20 years[22]. The eight characteristics have to work together for a cluster's performance to be effective.

Qualitatively, the characteristics of the Toronto Region ICT cluster can be summed up as shown in the chart below:

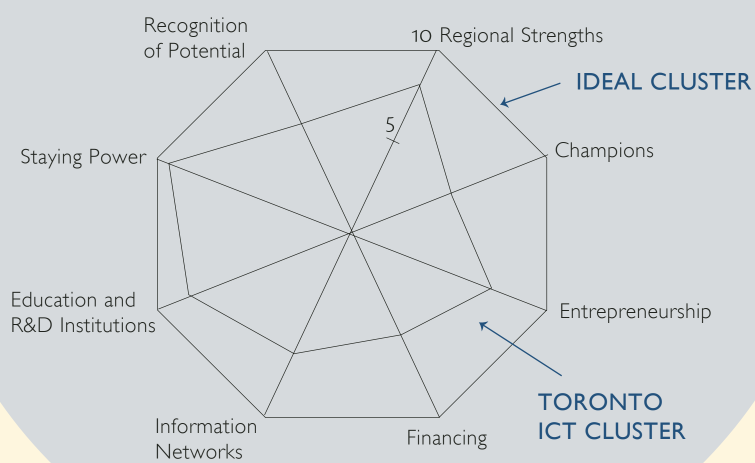
Characteristic	*Toronto Region Score*
The recognition of the potential of knowledge-based industries by regional/local leaders	Low
The identification and support of regional strengths and assets	High
The catalytic influence of local champions	Low
The need for entrepreneurial drive and sound business practices	Medium to High
The availability of various sources of investment capital	Low
The cohesion provided by both informal and formal information networks	Low
The need for educational and research institutions	High
The need to have "staying power" over the long term	High

Quantitative values can be assigned to the qualitative findings (say a rating on a 0 to 10 scale). Such a quantification would resemble that found in a recent study of the Toronto Region ICT Sector undertaken by Graytek Management Inc[23] (Figure 8).

FIGURE 8

Qualitative Assessment of the Toronto Region ICT Cluster

Source: Graytek Management



In sum then, while the Toronto Region ICT cluster has significant strengths, excellent educational and research institutions, a reasonable level of entrepreneurship and excellent staying power due to the depth and diversity of its ICT resources, it faces major challenges as regard to the recognition of the potential by the political leadership, the identification of champions, financing, and the development of information networks.

KEY ISSUES AND OPPORTUNITIES 5.0

5.0

KEY ISSUES AND OPPORTUNITIES

This section synthesizes the findings of the background study, executive interviews and Advisory Committee meetings. It addresses 3 initial project goals - Increase the competitiveness of the sector; Improve the sector's profile; and, Increase collaboration among stakeholders - as well as the 4th goal that emerged during the research phase - Retain and attract ICT businesses and investment. For each goal we characterize the Toronto Region's strengths and weaknesses. It also identified the opportunities and threats to the ICT sector.

Collaboration is not an end unto itself, but a necessary condition for achieving the other strategy objectives; in particular, to increase the competitiveness and profile of the industry.

5.1 INCREASE COLLABORATION

The initial goal of the ICT strategy is to increase collaboration among businesses, industry and professional associations, academic institutions and governments. Collaboration is not an end unto itself, but a necessary condition for achieving the other strategy objectives; in particular, to increase the competitiveness and profile of the industry.

5.1.1 Strengths

Sector representation • One important strength of the ICT industry in the Toronto Region is that all industry sectors are present in the region. There are a number of effective industry and professional organizations serving these groups that want to take up the collaboration challenge. Best of all, collaboration is now on peoples' agenda and there is a desire to do something. This adds up to a promising start for increased collaboration.

Strong MNEs • Multinational enterprises (MNEs) are important to the growth and development of any industry sector, no less ICT. Toronto is home to the Canadian headquarters of many important MNEs, which bodes well for efforts to improve collaboration within the sector. These firms tend to operate on a world stage and have a good appreciation of the strengths and weaknesses of the ICT industry in different parts of the world. They draw in and help to develop a local supplier community. They tend to have well developed relations with academic and research organizations. They have a long-term outlook. MNEs tend to be leading members of key industry associations and take an active role in promoting the industry as a whole.

University interactions • There is a history and tradition of collaboration between industry and universities in the Toronto Region[24]. However, these relationships have more often operated at the level of the individual company and individual researcher, rather than at an institutional level. As a result, (institutional) interactions between academic institutions and industry are not as strong as industry would like to see. This is one issue that can be reinforced through this strategy.

Regional innovation networks emerging • The Province of Ontario has designated a set of Regional Innovation Networks (RINs) across the Province. The mandate of these networks is to facilitate the growth of the biotechnology and ICT sectors in particular. Several of the networks are located in the Toronto Region. These include the MaRS initiative, which will be expanding its activities into information and communication technologies (from its core biotechnology/life sciences mandate). Regional innovation networks such as MaRS provide an excellent focal point for increasing collaboration within the sector.

5.1.2 Weaknesses

There a number of apparent weaknesses that will need to be addressed if efforts to increase collaboration among ICT stakeholders in the Toronto Region are to succeed.

Local communication barriers • The fact that the ICT sector is spread throughout the Toronto Region, combined with the region's traffic and parking problems, means that it is increasingly difficult to convene face-to-face meetings in locations that are convenient to everyone. Paradoxically, the use of information and communication technologies to surmount this problem is not as advanced or routine as might be expected from the ICT industry. ICT is an important complement and supplement to face-to-face communications, and each has its place. That is why the ICT strategy also needs to reinforce mechanisms for personal communications among stakeholders.

Industry associations • Industry associations play a critical role in improving collaboration among their members, and with other ICT industry associations and stakeholders. Until now there is no organization that has the mandate (or desire) to take the lead in bringing various industry and professional associations together with government and academic stakeholders to identify and act on issues of mutual concern. In addition, several ICT industry associations operating in the Toronto Region are struggling to keep their heads above water financially, and are necessarily focussed more on survival than on outreach.

Industry associations play a critical role in improving collaboration among their members, and with other ICT industry associations and stakeholders.

Political interest • At the present time - possibly because the economy is performing well and unemployment is comparatively low - economic development issues are not high on municipal, provincial or federal political agendas. A corollary is that they are not especially concerned with the situation of particular industry sectors such as ICT. Experience in many other cities is that political leadership is an important ingredient for local economic development. At the present time there is no identifiable institutional champion for ICT in the Toronto Region; no research centre, university, college, or other institution that is championing the ICT sector. This continues to be a weakness of the Toronto Region and inevitably has a bearing on prospects for collaboration within the region.

Public sector R&D node • Although the Toronto Region contains Canada's largest concentration of ICT companies and academic researchers, there is no public sector ICT research institution of any significance - for example a National Research Council laboratory, or a counterpart to MIT's New Media Lab - with significant operations in the region[25]. Around the world, public sector research institutions lie at the heart of technology clusters. The fact that there is no such institution in the Toronto Region is an important barrier to the growth of the sector.

5.1.3 Opportunities

There are number of opportunities on the horizon which, if properly capitalized on, could lead to improved collaboration within the ICT sector.

Growing policy awareness • Prior to 1999, when the worldwide technology bubble burst, there was considerable policy interest in the ICT industry, both as a fast-growing industry in its own right and as an enabler of growth in other industries and sectors, including: government, health, finance, and many others. This interest retreated significantly in the years after 1999 and is only now beginning to make a comeback. (The commissioning of the Toronto Region ICT Strategy is a good example of the renewed interest in the sector.) Since 1999 it has taken some time for municipal, provincial and federal governments to come to grips with the local nature of technology-based economic development, and what governments could do to encourage growth.

For example, although they were originally conceived strictly as biotechnology initiatives, the Ontario government's Regional Innovation Networks (RINs) have now been given a mandate to enter into other technology fields; in particular ICT and materials science. Similarly, the Toronto Regional Research Alliance (TRRA) is getting on its feet, with corporate and government support. TRRA will be actively promoting Toronto as a destination for private and public R&D investment. Like MaRS, over time TRRA will become an important institution for increasing collaboration within the sector.

At the federal level, Industry Canada is currently developing industry sector strategies which, if adopted by the government, could give a renewed boost to the sector. It is important that cities such as Toronto make their (ICT industry) needs known so that the eventual strategy can address them.

Expand industrial R&D • Many Toronto Region multinational companies - both foreign- and Canadian-owned - have active research and development programs. Most universities and colleges in the region are also active in ICT research. However, many companies - often small and medium-size enterprises - perform research only occasionally or on an informal basis. There is a consensus within the industry that more could be done to improve collaboration between academic (and government) institutions and ICT companies in the region. Also, there is a need for better baseline information about the region's ICT sector; for example, the level of private sector investment, new company formation, and so on.

There is a consensus within the industry that more could be done to improve collaboration between academic (and government) institutions and ICT companies in the region.

Work with new Ontario Ministry of Research and Innovation (MRI) • The Ontario government has recently announced the formation of a new ministry for research and innovation. Although responsibility for industry sector planning will continue to reside with MEDT, there is an opportunity to forge relations with MRI to reinforce the research-related aspects of the Toronto Region ICT Strategy.

Establish Pan-Toronto Region ICT partnership • As evidenced by the fragmented nature of the ICT scene in the Toronto Region, there is a need to launch a pan-Toronto Region mechanism to bring disparate elements of the sector together - to create a whole that is larger than the sum of its parts. Discussions with organizations in many parts of the region indicate there is a need and a will to create such a mechanism. A multi-stakeholder partnership for the ICT Cluster in the Toronto Region is highly desirable and it is recommended by this Strategy.

5.1.4 Threats

Increasing collaboration among ICT stakeholders in the Toronto Region will need to resolve a number of perceived threats.

Involvement of senior leaders • Senior leaders from business, government and the academic sector need to make technology-oriented economic growth in general, and ICT growth in particular, higher priorities than they are at present. Without the involvement of senior leaders it will be difficult to successfully implement the Toronto Region ICT Strategy.

Cross-sectoral outreach - Missed opportunities • The ICT industry has the potential to support productivity and expanded production in many other sectors of the economy. However there are opportunities yet to be explored in furthering working relations between ICT and other sectors such as financial services, health and environment. A private sector effort is needed to uncover potential for the ICT industry growth.

there are opportunities yet to be explored in furthering working relations between ICT and other sectors such as financial services, health and environment.

Anti-Toronto economic development bias • Long perceived as Canada's economic "fat cat", it has been difficult for the Toronto Region to attract attention and support from the provincial and federal governments. For example, whereas other of Canada's big cities fall under the umbrella of one or other federal regional development agency (WED, FedNor, DEC, ACOA), no such entity is charged with economic development in the Toronto Region. Nor do Toronto Region companies have the same access to federal government support as their counterparts in nearly every other part of the country. In addition, provincial governments in British Columbia and Quebec are offering generous tax credits to high tech companies[26]. There are signs that political leaders are beginning to pay attention to the various needs of Canada's large cities, but their attention has been largely restricted to (public) transportation issues and not to economic development. This situation needs to change if political leaders want Toronto to maintain its standing as an international-calibre location for investment - whether in ICT or any other high tech sector.

Government support programs • Even in situations where municipal, provincial or federal governments want to support economic development at a local level, they often encounter difficulties because there are no approved programs that can be tapped into to help. In general, it appears as though other orders of government have been slow to recognize the importance of local economic development, and slower still to put programs in place that would address local needs. Interestingly, there are exceptions to the rule.

In 2003 the Ontario government announced funding for 11 regional consortia under the Ontario government's Biotechnology Cluster Innovation Plan (BCIP). The aim of BCIP was to make the Province one of the top three biotech centres in North America. The goal of the $30 million program was to accelerate the development of Ontario's biotechnology clusters by supporting commercialization infrastructure projects such as research parks and other initiatives that promote entrepreneurship and innovation, ultimately building a globally competitive network of biotechnology clusters across the Province. In the Toronto Region, funding was provided to Toronto, Mississauga and York to develop and implement biotechnology strategies. The BCIP recipients form the core of what are now called the Regional Innovation Networks. The RINs have now been mandated to address ICT issues, and a key component of the Toronto Region ICT Strategy will involve expanded collaboration with local RINs. In addition, the new Ministry of Research and Innovation has been established to coordinate various local and regional technology initiatives.

There are approximately 400 biotechnology companies in the whole of Canada, compared with a core of over 3,300 ICT companies in the Toronto Region alone. Most of the biotech companies are early-stage firms with little or no revenue and small employment. As the public sector is investing major resources in biotechnology, a parallel effort is needed to stimulate ICT.

5.2 INCREASE SECTOR PROFILE

The second major focus of the Toronto Region ICT Strategy is on improving the profile of the sector, which is the largest in Canada.

5.2.1 Strengths

The sheer size and diversity of the Toronto Region ICT sector provides an excellent foundation for promoting the region in other parts of Canada and abroad. Following are the acknowledged strengths of the region.

The Toronto Region is home to a large New Media sector that includes animation, game development and advertising-oriented firms.

Depth and breadth of activity • The 2004 E&B study found that a core of over 3,300 private sector ICT enterprises were located in the Toronto Region, including: 260 in manufacturing, 1,300 in software and systems development, and an additional 900 providing ICT services. The Toronto Region's ICT employment rivals that of New York, which has a much larger population base. Toronto ICT firms are active in every ICT sub-sector - approximately 60 different subsets of the industry. From the standpoint of improving profile, Toronto has a large pool of ICT companies ready to be profiled. However, this is little known beyond specialized circles. There is an urgent need for good ICT stories to be told.

Vibrant New Media sector • The Toronto Region is home to a large New Media sector that includes animation, game development and advertising-oriented firms. These firms tend to be small, young, owner-operated operations that do not have the visibility of their more established counterparts in other ICT sectors. Nevertheless, these firms best express the spirit of creativity that characterizes the ICT sector more broadly. Visualization technologies lie at the core of the New Media sector, and visual products have inherent appeal when it comes to profiling an industry.

Many international and multicultural business connections • Because many firms in the Toronto Region ICT sector operate internationally, the sector enjoys ready-made business connections around the world. ICT business leaders travel the world and are in a position to act as representatives for the Toronto ICT sector. Also, Toronto's multicultural business makeup should give the region a head start in promoting the region abroad; especially in countries where the demand for ICT products and services is growing quickly. A number of immigrant-owned and operated companies have their base in the Toronto Region. These firms are well-positioned to spread the word about the strengths of Toronto.

5.2.2 Weaknesses

Balanced against the strengths of the Toronto Region, there are a number of weaknesses that make it challenging to improve the profile of the region's ICT sector.

Maintaining up-to-date information • The sheer size and dynamism of the Toronto Region's ICT sector makes it difficult for any organization to keep abreast of the latest developments. To date, there has been no business case for the private sector to develop information products (e.g. databases, reports) highlighting the ICT sector, on an ongoing basis[27]. The public sector[28] has made a renewed effort to develop an up-to-date database of Toronto Region ICT firms. However, the databases contains different levels of information about the companies, and there is a challenge to keep the databases current. A useful database would need to be updated at least annually, and preferably, semi-annually. It also needs to include a certain amount of confidential information about companies: employees, sales, R&D, products, etc.

New Media: "Underground" sector • Although Toronto's New Media sector is fast-growing and creative, it also tends to be "underground". Firms are small and do not have the resources needed to market their capabilities on a world stage. New companies are continually being formed and old companies are dissolving, making it difficult to keep track of the sector. New Media industry associations tend to live from hand to mouth because their members cannot afford to pay the large membership fees that are needed to maintain a robust industry association that can profile its members' activities.

Focal point for promotion • One challenge that has plagued Toronto's ICT sector for several years now is that there is no unambiguous focal point for promotion; in other words, no single organization that has the mandate and resources to promote ICT in the Toronto Region both domestically and abroad. The Greater Toronto Marketing Alliance (GTMA) aggressively markets the Toronto Region ICT sector abroad, although it could do more with additional resources. The GTMA has leveraged considerable matching dollars and in-kind and other support and has built relationships with all of the ICT associations. What is missing is an organization that can handle local promotion activities. The fact that previous organizations that would have been natural focal points for local industry promotion - Smart Toronto is an obvious example - could not be sustained and have subsequently closed down, has compounded the problem of finding a focal point for promotion.

Funding for promotion • A further weakness when it comes to promoting the Toronto Region's ICT capabilities - apart from there being no organization with the requisite mandate - is the lack of dedicated funds for promotion. Economic developers in Toronto, Markham and Mississauga manage as best they can with limited resources, but with their limited taxation base they have no significant resources for industry promotion. Neither do other orders of government have programs that are dedicated to promoting local ICT strengths. Industry associations could take on a more active promotion role, but many struggle to keep their doors open using member fees. Situations such as this often call for organizations to pool their limited resources for larger effect.

Promotional strategies, tools, activities • One consequence of the absence of a designated organization to promote Toronto's ICT sector, combined with lack of funds for promotion, is that the promotional "toolkit" is almost empty. The existing tools (videos, brochures, websites, special events, etc.) are spread through different municipal offices and trade associations, etc. The GTMA has made an effort to put together power point presentations about the region's ICT cluster, and this is available on its website. There is no strategy or marketing plan developed to promote Toronto's ICT capabilities. Recommendation 5 addresses this issue.

"Showcase" project • One approach to raise the profile of the Toronto Region ICT sector that was tested with stakeholders who participated in the research phase of this assignment, was to develop a "showcase" project (or projects) that would garner international attention. However, discussions with ICT companies and others indicated that because of the diversity of the ICT sector it has become apparent that it would be difficult to find a single project - or even a coherent group of projects - that would fit the bill. (Recommendation 5 addresses this issue as well.) Also, the creation of a new partnership could help this to happen. The notion of the Ontario Science Centre being used to showcase the ICT industry is also being considered.

5.2.3 Opportunities

A number of opportunities for raising the profile of Toronto's ICT sector emerged during the study. If properly exploited, these could help to promote the Toronto Region's ICT capabilities more widely.

Marketing and Awareness Strategy • The initial profile-raising opportunity is to develop an in-depth marketing and awareness strategy for the Toronto Region ICT sector. There is clearly an appetite among ICT stakeholders to launch such an initiative at this time. This strategy should identify: goals, objectives, messaging, tools, budgets, responsibilities, etc.

Toronto ICT "brand" • The marketing and awareness strategy should "brand" Toronto's ICT sector by providing a slogan or theme that captures the spirit and uniqueness of the region's ICT sector. The brand should clearly indicate the factor(s) that differentiate the ICT sector and that make it an exciting locale for business growth and investment. Ideally, the brand will also appeal to young people considering their future (ICT) career options.

Engage leaders • One of the most important current opportunities is to engage business, government and academic leaders (champions) in the Toronto Region ICT initiative. We sense a strong willingness of ICT stakeholders to rally together and "put the Toronto Region on the world ICT map". There is an opportunity to establish a forum for ongoing dialogue among leaders about how to accomplish this objective.

Toronto Ambassadors • As indicated earlier in this report, business people from the region's ICT sector travel the world. In the same way that business leaders are helping to promote Toronto as a tourist destination, business leaders in the Toronto Region's ICT community can act as "ambassadors" for the sector.

Marshall the Multicultural Community • It should also be possible to build on the strengths of Toronto's multicultural ICT business community to spread the word about the region's strengths. The marketing and awareness strategy should give some thought as to how to muster this potential resource.

5.2.4 Threats

There are two main threats to the goal of promoting the Toronto Region's ICT sector.

New competitors • An obvious threat to our ability to promote the Toronto Region's ICT sector is the attention being accorded to the growth of ICT in Korea, China and India. The business and popular media are filled with news and analysis of the rise of the ICT sector in these countries, and it will be challenging to make headway against this trend.

Competition from other technology sectors • Although it is the largest single technology sector by far, ICT is only one of the Toronto Region's technology strengths. The region also has strengths in biotechnology, materials science, nanotechnology, and other fast-growing fields. It will be challenging to find a way to promote ICT without diminishing Toronto's many strengths in other fields of science and technology.

5.3 IMPROVE SECTOR COMPETITIVENESS

A major objective of this strategy is to help local ICT companies to become more competitive. The Toronto Region's ICT sector is among the largest and most diverse in North America. From a competitiveness standpoint the Toronto Region has many strengths.

5.3.1 Sector Strengths

World-class ICT companies • The Toronto Region hosts the Canadian headquarters of a large number of multinational ICT companies, including foreign-subsidiaries and domestically-owned firms; for example, Motorola, IBM and Nortel. In fact, most of the world's best-known ICT companies have a presence in the Toronto Region. In addition to their large direct employment, companies such as these provide an important market for smaller local product and service suppliers.

most of the world's best-known ICT companies have a presence in the Toronto Region

Global footprint of Toronto firms • Many of Toronto's ICT firms have not only a national, but an international footprint. Many of them - particularly in the manufacturing sector - are highly export-oriented, and derive a significant portion of their sales from abroad. A large number of companies have subsidiary manufacturing, sales, or service operations in other countries. Often, they hold world product or research mandates.

Nearness to US market • The US is the world's largest and most dynamic market for ICT products and services. Canadian firms' proximity to this market gives them an inherent advantage, for example in: marketing and sales, access to highly qualified personnel, and their ability to tap into R&D. Canada's lower business cost structure also makes Canada an ideal location for so called "near-shoring" activities; especially those that require a familiarity with the US business culture, such as call centres. Furthermore, the Toronto Region is part of an emerging region bordering Lake Ontario and the lower St. Lawrence River valley. This region, which is comparable in size to California, constitutes one of the largest critical masses of North American technology firms and research institutions, and is truly a technology mega cluster.

ICT-oriented industry organizations and associations • A large number of industry and professional associations serve member companies in the Toronto Region. These associations provide the "glue" that brings companies in their industry sector together, and create linkages to the academic and government sectors.

Cost of doing business • International studies[29] regularly report that Toronto is one of the lowest-cost major cities in which to do business. This is an underlying strength of the region that needs to be nurtured, in order to compensate for our relatively small customer base. Toronto frequently trades off low costs against a small customer base in attracting foreign investment.

Researchers at Toronto's universities and colleges are some of the best in the world in their different fields.

University, college research potential • Researchers at Toronto's universities and colleges are some of the best in the world in their different fields. They develop innovative technologies and train a large number of students, many of whom graduate and take jobs in ICT companies. Some professors and students start companies of their own, based on their university research.

Market drivers; FIRE and MUSH • Toronto's economy is unique in Canada because the city is Canada's financial services capital. Most of the country's leading finance, insurance and real estate (FIRE) companies are headquartered here. The large FIRE (finance, insurance, real estate) and MUSH (municipalities, universities/colleges, schools and hospitals) sectors in the Toronto Region provide important markets for many ICT companies. Their specialized needs drive companies to develop innovative applications that can be re-sold in other industries, and often, in other countries. It should be possible to develop better linkages between local ICT firms and the institutions that constitute a large market for innovative solutions.

Labour pool • Thanks to its excellent post-secondary education system and its ability to attract highly qualified immigrants, Toronto enjoys an excellent pool of ICT labour. Companies interviewed in the course of the study pointed to the breadth and depth of the ICT labour pool in the Toronto Region as being one of the region's major advantages. The fact that the ICT immigrant workforce retains close relations with its home countries is seen to be an additional advantage.

Investment potential • Toronto is Canada's investment capital. It is the headquarters for most of the country's major investment companies. Research indicates that investors prefer to invest locally, which should bode well for ICT companies in the Toronto Region seeking funds to grow their business.

5.3.2 Sector Weaknesses

The Toronto Region's strengths in ICT need to be balanced against a realistic appraisal of the region's weaknesses.

Senior government ICT strategies • In a perfect world the Toronto Region's ICT strategy would mesh with corresponding provincial and federal government strategies. However to date neither the Ontario nor the federal governments have developed explicit strategies to support the country's or the Province's ICT sector. Thus the Toronto Region ICT Strategy will necessarily be a stand-alone initiative[30]. The difficulty is that the federal and provincial governments have access to much larger financial and programmatic resources to directly support the ICT sector than local governments. Municipal governments have comparatively fewer and smaller tools and resources to directly nurture or promote the sector. However, there are encouraging signs that the Province's support for ICT will expand in the future. One example is that the provincial government has mandated that the Province's Regional Innovation Networks expand their activities into the ICT realm[31].

Major public R&D institutions • Although Toronto contains North America's third largest concentration of ICT companies, there is no major national ICT laboratory located in the region. The success of many ICT clusters around the world is linked to the presence of one or more major public sector research organizations. For example, many observers have linked Ottawa's successful ICT cluster to the business sector's proximity to the National Research Council of Canada's laboratories and the Communications Research Centre; these laboratories have been instrumental in developing and transferring key technologies to industry, providing procurement support for leading-edge products and services, and contributing to the region's skilled workforce.

University, college linkages • While Toronto Region colleges and universities have many fine ICT researchers working in their midst, a number of companies interviewed during this study pointed to weak links to this important source of innovation. Although a few large firms enjoy well developed working relations with the university and college sector, those relations are not the norm[32]. Many local firms feel they are disconnected from the higher education sector. Part of the reason is attributed to the absence of world-class research institutes - comparable, for instance, to MIT's New Media Laboratory - within the region's colleges and universities. Another problem is that some of the excellent facilities - for example CMC Microsystems' new microelectronics testing facility at the University of Toronto - are not currently accessible to industry, while others may be only partially accessible[33].

ICT investment • Even though Toronto is home to the largest single pool of investment capital in Canada, it is not clear that the region's ICT companies that require external investment to grow are able to effectively access that capital. Especially startup and early stage companies. There are many reasons for this - e.g. reduced investment pool following the "tech bust", small size of the deals, etc. - but the bottom line is that Toronto is not leveraging its investment potential to maximum effect. However, we are encouraged that individuals and organizations from the investment sector are participating in the Toronto ICT strategy process. Recommendation 6 addresses this issue.

Supplier linkages • The export orientation of many ICT companies - in particular in the manufacturing sector - means that their supplier and customer relationships tend to be stronger abroad than at home. Many manufacturers rely on components that come from offshore rather from domestic sources. The result is that linkages with local suppliers are sometimes underdeveloped. Thus local suppliers often find it difficult to do business with local manufacturers. There is a need for better information and awareness of the capabilities of the local supplier community.

*The export orientation of many ICT companies - in particular in the **manufacturing** sector - means that their supplier and customer **relationships** tend to be **stronger abroad** than at home.*

ICT markets and marketing • The large number of businesses and governments in the Toronto Region provide a strong market for ICT services and development enterprises, especially of the business-to-business type (e.g. telecommunications, consulting, software development, etc.). However, local and regional domestic markets for manufactured products are comparatively small, and manufacturers tend to rely on export markets instead. That is a natural consequence of the mass-market, global nature of manufacturing and the customized, local nature of services (services are more difficult to export on a large scale).

Although the Toronto Region contains a number of ICT-related industry and professional associations, these are fragmented along geographic lines (e.g. York Technology Association, Mississauga Technology Association) and along (sub-)industry lines (e.g. new media, e-business, software). There is no single organization that speaks for the entire ICT sector. As such, Toronto lacks an organizational "crossroads" where different facets of the industry meet. In part, this is because the ICT sector in the Toronto Region is so diverse - ranging from microchip design to computer game development - and in part because previous efforts to bring organizational coherence to the sector (for example the Smart Toronto initiative of the 1990s) did not to be prove sustainable.

Investment attraction tools • At the present time no organization has the mandate or resources to promote the Toronto Region's ICT cluster in a dedicated way. Furthermore, at the present time there are few if any public sector programs that are targeted specifically at promoting Toronto's ICT strengths.

The absence of a region-wide organization that speaks on behalf of the entire ICT industry also means that no organization is mandated to promote ICT in Toronto and beyond. Groups such as the Greater Toronto Marketing Association do an excellent job with the limited resources available to them, but ICT is only one of many industries that the GTMA must promote.

Many firms would welcome closer cooperation among Toronto Region colleges and universities and industry to ensure that curricula and educational delivery systems better meet the needs of employers and employees.

Supplier development • Toronto ICT companies with innovative but un-proven product or service offerings find it difficult to sell their wares to public sector customers. The public sector is often reluctant to adopt technologies which are not in widespread use elsewhere. Also, recent procurement scandals have made the public sector even less open to innovation in procurement. Also, international trade agreements limit governments' ability to "buy Canadian" or "buy Toronto". As an alternative, governments in the region might want to explore opportunities to exploit value-added municipal information and data sources, in partnership with business.

Graduate business skills • Employers rank college and university graduates high on technical skills, but less so on business skills such as marketing, sales, communications, teamwork and customer relations. This is not simply a Toronto phenomenon, but is typical of graduates from technical disciplines in other parts of Canada and abroad. Many firms would welcome closer cooperation between and among Toronto Region colleges and universities and industry to ensure that curricula and educational delivery systems better meet the needs of employers and employees. The strategy will call for a forum in which issues such as this can be discussed on a formal basis with the higher education sector.

Long term labour force supply • Although the supply of skilled labour for the Toronto Region's ICT sector is adequate at present, there are worrying signs for the long term. Enrolments in university and college ICT programs has been dropping for a number of years, and in the medium term there may well be shortages of skilled labour in certain sectors of the industry. This is part of a North American trend, and steps need to be taken now to increase youth awareness and interest in science and technology careers generally, and in ICT careers specifically.

Cost base • Toronto offers a competitive international business climate. On an international scale business costs in the Toronto Region are low. However, there are important cost disparities - in particular in commercial and industrial tax rates - between Toronto and surrounding municipalities. These disparities distort business investment decisions and put Toronto at a disadvantage. *Enhancing Toronto's Business Climate - It's Everybody's Business* is a recent staff report from the City of Toronto that is aimed at eliminating these artificial distortions. The City and Province should seriously address this report and its recommendations.

5.3.3 Opportunities

ICT is a vibrant industry that continues to drive economic growth in Canada and abroad. For example, in Canada between 1997 and 2003 the ICT sector grew 9.0% versus 3.7% for the Canadian economy as a whole. ICT employment grew by 3.4% versus 2.3% for the total economy. Approximately 40% of all private sector R&D is conducted by the ICT sector, and the sector employs more than half of all R&D scientists and engineers, at salaries that are 47% more than the national average[34]. ICT can help Canada to close the productivity gap, but only if the business sector embraces the potential. The future promises similar levels of ICT industry growth, especially if Toronto's ICT sector can capitalize on a range of opportunities.

Build on the experience and success of leaders • Toronto is home to a number of ICT companies that are world leaders in their field. There is considerable potential to transfer the experience, methods and business contacts of these firms to other companies in the region. Some Toronto ICT companies are already participating in information-sharing networks (e.g. lean manufacturing, supply chain management) that allow them to benchmark themselves against industry leaders. Successful domestic firms and subsidiaries can form the backbone of a broader effort to improve the competitiveness of Toronto ICT firms.

Investment opportunities • The Toronto Region has Canada's largest pool of investment capital in its backyard. There are opportunities to facilitate improved linkages between investors and ICT companies.

Industry and professional associations • In recent years the Toronto Region's ICT sector has been characterized by fragmented industry and professional associations. Organizations interviewed for this project expressed a strong desire to bring some coherence to the association sector - to help the sector "get its act together". The good news is that there seems to be a desire among different organizations to bring the ICT community together and create a whole that is larger than the sum of its parts. We believe that there is scope to establish a partnership of existing organizations that will take a cross-industry approach - a self-help approach - to improving the competitiveness of their various member companies.

Enabling technologies/convergence • Many observers believe that the convergence of information and communication technologies with other technologies (e.g. biotechnology, nanotechnology, materials technology) will open the door to new products, services, industries and jobs. With its breadth and depth of research and technology expertise, the Toronto Region is well placed to capitalize on convergence. Mechanisms to accelerate convergence would help Toronto firms and research organizations be at the forefront of new technology.

National strategies • National strategies which may affect the ICT sector (e.g. photonics strategy, commercialization strategy) are currently under development at Industry Canada. Ideally, these strategies will include a component that addresses the needs of local technology cluster development, such as the Toronto Region ICT cluster. Early dialogue with the federal government would help to ensure that the fully developed strategies include local economic developers as part of the strategies. Recommendation 3 is aimed at improving policy coordination.

*Mechanisms to **accelerate convergence** would help Toronto firms and research organizations be at the **forefront** of new technology.*

Knowledge nodes • With major knowledge-generating institutions (universities, colleges, research hospitals) spread around the Toronto Region, there is an opportunity to build on these nodes to create "knowledge crossroads" - areas where research, knowledge and production can be co-located to facilitate economic growth.

5.3.4 Threats

There are a number of circumstances that threaten the future health of the Toronto Region ICT sector.

Complacency • A consistent theme that emerged from our research is that complacency among government, business and academic leaders over the future prospects of the Toronto Region ICT sector is one threat to the sector's future. Because the ICT sector has been so successful in recent years there is a tendency to believe that its growth and development are assured. There is a need to know more about the rate of growth of the sector, as well as the rate of new company formation. Also there is a need to create a mechanism to monitor industry growth as well as a mechanism *complacency among government, business and academic leaders over the future prospects of the Toronto Region ICT Sector is one threat to the sector's future.*

to keep up to date on the state of the art of this industry cluster. This strategy recognizes the need for such research and monitoring mechanisms.

But continued ICT growth is by no means assured. Stakeholders tend to overlook the challenges that the sector is facing, and its need to continually adapt to changing business and economic circumstances. Many stakeholders are calling for a concerted partnership that will attend to the needs of the ICT sector so that it continues to grow and prosper.

The novelty of emerging technologies • Emerging technologies - for example biotechnology and nanotechnology - are the current "darlings" of government and the investment community. While these new technologies will undoubtedly form the basis for industries of the future, at the present time their economic impact is negligible. Policymakers and investors need to develop a renewed confidence in the ICT sector and maintain their focus on supporting and investing in a proven winner - ICT.

Business focus on offshore markets, investment • Many Toronto Region ICT companies - especially those in the manufacturing sector - are deeply concerned about their prospects for survival, as the international competitive landscape evolves. Multinational corporations are devoting considerable management attention and in many cases, financial resources, in an effort to respond to international competition. Often, this means they will expand their operations outside of Canada rather than at home. In many instances they are not looking to grow their Canadian base of operations; instead, they trying simply to preserve their current activity levels. An ICT sector that is not growing is in fact losing ground, because the industry worldwide is expanding and (Canadian) companies will have a declining market share.

The threat is that ICT companies will cut back on their domestic investment and shift their business focus offshore.

Border issues • Business leaders are anxiously monitoring trends in US-Canada relations. The US constitutes the largest single market for ICT goods and services that are produced in the Toronto Region. Any restriction of cross-border trade would have negative consequences for many firms that are export-oriented.

Land base • Toronto's industrial land base has been shrinking for decades. Heavy industry, which was once a dominant force in the local economy, has virtually disappeared and light industry has largely moved to the suburbs and beyond. It is foreseeable that in a few decades there will be no industrial land left in central Toronto. That means that the only businesses that will be able to afford central locations are those that can afford to pay top-dollar for their space - primarily service industries. Even research-oriented businesses - startup and early stage companies - will have nowhere to locate in central Toronto. Certainly, there is little space available near major centres of knowledge production (universities, colleges) for manufacturing-oriented businesses to become established. We are already seeing that office-type businesses are migrating from the central core, leaving Toronto as a bedroom community to the suburbs. The problem is that no city can sustain itself without a robust commercial and industrial tax base, and on present trends Toronto may be left with neither.

Health market drivers • Ontario's single-payer health care delivery system constitutes an enormous potential market for made-in-Canada ICT products and solutions. To date, however, many businesses have been disappointed that the potential of this market to spur domestic ICT products and services has not been well exploited. Structural impediments built into the Canadian healthcare market have so far prevented the healthcare system from acting as an engine for the growth of Canadian ICT companies.

Competition from other North American jurisdictions and beyond • Within North America competition is fierce for new business investment. US state and local governments aggressively court new investment. They have a much larger toolbox of incentives than their Canadian counterparts can offer. Traditional Ontario investment advantages - such as cheap energy - are of less concern to those in the ICT sector than in many other industries - and in any event some of these advantages are in decline.

Emerging countries such as Singapore and Korea are investing heavily in their research and human resource infrastructure (for example their production of Ph.D.s in math and science). So, not only is the Toronto Region vying for investment with new competitors in Asia, but it is in competition with state and local economies in the US, our largest trading partner.

creating a positive business environment will make Toronto a locale that companies perceive to be a "happening place" and where companies want to do business.

5.4 RETAIN AND ATTRACT ICT BUSINESS

This 4th project goal emerged in the course of the study, in interviews with business leaders and government officials. The challenge is two-fold. First, to ensure that ICT firms now in the Toronto Region remain here, grow and prosper, and use the region as the base to expand their businesses. Secondly, to attract new firms from other parts of Canada and abroad to choose Toronto as their preferred investment destination.

For the most part, successfully retaining and attracting ICT business depends on creating a positive business environment - making Toronto a locale that companies perceive to be a "happening place" and where companies ***want*** to do business. This in turn has two key elements. The first is establishing and maintaining a competitive business environment, one in which companies can be innovative and profitable. In this regard the Toronto Region already enjoys a number of built-in advantages, which have been discussed elsewhere in this report, for example: a large local customer base, easy access to US markets, skilled workforce, excellent communications infrastructure, leading universities and colleges, low business costs, and so forth.

Retaining and attracting ICT businesses also depends on promoting the region's strengths. A number of individuals and organizations interviewed during the project believe that Toronto is hiding its (ICT) light under a bushel; that stakeholders need to do a better job in promoting the region's advantages both to firms now doing business here and to companies who might consider expanding their operations here.

The Toronto Region also needs to be vigilant that its ICT infrastructure is at the forefront. The world's leading ICT keep ahead of the others. For example, Philadelphia, and San Francisco will both transform into seamless WiFi hot spots by the end of 2006. Singapore is already there. Seamless WIMAX is now being implemented in a number of Korean communities and Yokusuka's terabit network in Japan has already attracted a research branch of Beijing University. If we are leaders in broadband infrastructure it will increase our attractiveness for new public and private research institutions.

In other cities these kinds of municipal broadband strategies have often raised objections from the traditional communications service providers. But the success of the greater community has won the day in all cases. The Toronto Region ICT Strategy should address this potential conflict up front and then seek to find win-win solutions for all participants as a proactive element of the strategy

The same weaknesses that were identified in connection with the 3 initial project goals (see the preceding discussion) - for example, weak coordinating mechanisms, small markets for manufactured products, poor research alignment, and so forth - inevitably affect the region's potential to retain and attract business. So, retaining and attracting business also requires that the identified weaknesses be addressed.

Retaining and attracting business requires the government organizations whose mandate this is, to interact with individual companies and industry associations to continually monitor their needs and, when appropriate, to assist them in their dealings with the public sector; for example for such matters as permitting, zoning, on-the-job training, etc.

Also, long term skill and occupational needs - especially graduates in math, science and engineering - need to be addressed to ensure that industry has the labour force it will need to compete in the future.

Toronto must not hide its ICT light under a bushel.

Finally, the Toronto Region's ICT cluster has to have a high level of collaboration among the various stakeholders. It is this ongoing collaboration that creates the elusive but nonetheless real sense of togetherness that binds companies to their communities. Thus, if the Toronto Region's ICT sector is competitive, is promoted well and works together, then most of the work of retaining and attracting business is already done.

TOWARDS A TORONTO REGION ICT STRATEGY

6.0

6.0

TOWARDS A TORONTO REGION ICT STRATEGY

6.1 VISION STATEMENT

The Toronto Region has many positive attributes to offer the world of ICT.

> **Our vision is that the Toronto Region will become, and be acknowledged globally, as one of the 5 most innovative, creative and productive locations in the world for ICT research, education, business, and investment by 2011.**

6.2 A VISION FOR THE TORONTO REGION ICT CLUSTER

The central aim of this strategy is to position the Toronto Region among the top 2 locations in North America and the top 5 in the world for ICT company growth and investment.

The central aim of this strategy is to position the Toronto Region among the top 2 locations in North America and the top 5 in the world for ICT company growth and investment and keep it there[35]. The region should strive to preserve and add to the current employment base, to increase exports, jobs, new products and services, and leading edge research and development.

With a core of around 3,300 firms employing 148,000 personnel and selling $30-35 billion of goods and services annually, the Toronto Region's ICT cluster is strong and vibrant. To maintain and improve its standing the sector needs to look to the future; to constantly adjust to changing circumstances, and capitalize on new opportunities as they emerge. ICT companies must keep adapting to evolving technologies, customer needs and business conditions. New companies need to be created, and new investors and new investment need to be attracted to the region, to develop the critical mass that makes an industry cluster competitive in the global market place.

Businesses investment and ICT industry growth takes place in locations perceived to be "happening places" and where they are made to feel welcome. Hence, a large part of the success of places such as Austin, Silicon Valley, Silicon Valley North (Ottawa), Saskatoon, and Canada's Technology Triangle (Cambridge, Guelph, Waterloo). These locales have developed - and nurtured - their reputation as "happening places" for ICT.

The Toronto Region needs to convey the fact that it too is a "happening place" for ICT companies, because: it leads the world in its use of ICT; has an advanced "hard" and "soft" ICT infrastructure; is a premiere location for ICT R&D and commercialization; is a hub for ICT financing; has a skilled workforce; and, so forth. Not only must these conditions be in place, the region needs to promote its advantages farther afield.

The basic infrastructure is already in place to position the Toronto Region as a world leader. The challenge is to take advantage of this infrastructure, to exploit the region's potential and adopt a model that will accelerate the region's ICT cluster growth and prosperity.

The Toronto Region's ICT vision is based on the region's strong people's foundation, its science and technology achievements, its quality of life and its open business environment which together define its capacity to make the region as the best place to live, play and do business.

This vision builds on:

- The multinational and linguistic diversity of the ***peoples*** of the region, together with their wide range of technical and business skills. A well-educated and skilled workforce.;
- A high degree of ***creativity***, including extensive R&D conducted by corporations, universities and the public sector, the continuing emergence of large numbers of innovative SMEs, a vibrant new media business community, and highly regarded educational institutions;

- A wide range of ***technologies*** (both established and emerging) across all industries within the ICT sector, and in related industries, as well as in convergence with bio-technology and new media;
- Extensive, wide-ranging, and world-leading ***solutions*** addressing business needs of other industrial sectors, particularly those with a major presence in the region (e.g. finance, manufacturing, retail and financial services). Customer focus and a high standard of service delivery;
- A well-developed ***infrastructure*** for ICT research and manufacturing;
- A competitive ***business environment***; and,
- The ***quality of life*** in the region. Its attractiveness as a place to ***meet***, live, work and do business for both existing individuals and businesses as well as those seeking to expand/locate in North America.

The basic infrastructure is already in place to position the Toronto Region as a world leader. The challenge is to take advantage of this infrastructure, to exploit the region's potential and adopt a model that will accelerate the region's ICT cluster growth and prosperity.

RECOMMENDATIONS 7.0

7.0

RECOMMENDATIONS

The following 13 recommendations address the 4 project goals:

- Increase collaboration among ICT stakeholders
- Increase the profile of the sector within Canada and abroad
- Increase the competitiveness of the sector; and,
- Retain and attract ICT business in the region.

The recommendations also provide strategic directions for the ICT cluster and outline potential action areas for their implementation. The recommendations are the outcome of a thorough analysis of the cluster, a review of relevant literature, personal interviews with key industry stakeholders, as well as input received through an extensive consultation process involving a multiple-stakeholder Advisory Committee, led by the City of Toronto's Chair of the Economic Development Committee, Ms. Gloria Lindsay Luby, meetings with an industry-government working group, discussions with Toronto participants at the 2005 Intelligent Communities Forum, and staff from all orders of government. Throughout the strategy process we identified 3 main areas where the Toronto Region ICT Cluster Strategy should focus and provide direction to accomplish its objectives. These areas are:

1. **Partnerships and Collaboration;**
2. **Promotion and Marketing; and**
3. **Business Growth**

While Recommendation 1 is general, the remainder of the recommendations address one or more of these 3 areas.

7.1 PARTNERSHIPS AND COLLABORATION

The initial goal of this strategy is to advance the interest of the industry in the region, as well as to increase information sharing and collaboration among stakeholders in the sector. Companies, governments, research and teaching organizations, industry and professional organizations and other sector partners and stakeholders must make a concerted effort to strengthen the cluster and create a cohesive and unified voice in and for the Region. The Toronto Region is so large and diverse that in many industry sectors - ICT is a prime example - it has traditionally been difficult to create a unified community. The strategic aim here is to provide mechanisms and for a for increased information sharing and collaboration among the key ICT organizations.

*The private sector needs to be **pro-active** and work closely with government and academia to **grow** and **advance** the interest of the cluster.*

7.2 PROMOTION AND MARKETING

The second major goal of the Toronto Region ICT strategy is to increase the profile of the sector among decision makers and the global investment community and position it to become one of the 5 top global leaders. Improving the sector's profile has at least three benefits: help local firms to brand their products, services and capabilities[36] in national and international markets; raise public awareness about the sector, and yield more investment in the Toronto Region. The Toronto Region ICT cluster excels in its design and manufacturing capabilities, leading-edge research and research infrastructure; first-rate education and training; creative, skilled, connected, multilingual and internationally-oriented workforce; full range of ICT support services; positive business environment (ecosystem), etc. However, the cluster's talent base and achievements are little known outside the cluster. What is now needed is a plan and mechanism to actively profile the region's ICT accomplishments, strengths, and potential; to showcase the Toronto Region as a happening place for ICT investment. A side benefit of an effective marketing and promotion program is that it will also help to raise the profile of the sector within the region, within Canada and internationally.

7.3 BUSINESS GROWTH

The Toronto region needs to continually attract and retain ICT business in order for the sector to maintain its critical mass and growth profile. The recommendations of this strategy will help to lay the foundation for a healthy ICT business "ecosystem"; one that naturally encourages existing firms to grow and expand here, and that attracts new ICT investment to the region.Many of these are aimed at the public sector, whose primary job is to establish the right conditions for business, however, the private sector needs to be pro-active and work closely with government and academia to grow and advance the interest of the cluster.

In addition, municipal governments in the region should coordinate their efforts and give serious consideration to pooling the funds and human resources they currently devote to support and promote ICT to give their work greater impact.

RECOMMENDATIONS 1-13

1 *Adopt The Vision*

We recommend that ICT stakeholders in the Toronto Region adopt the vision statement for the strategy:

> **The Toronto Region will become, and be acknowledged globally, as one of the 5 most innovative, creative and productive locations in the world for ICT research, education, business, and investment by 2011.**

2 *Establish ICT Toronto*

Establish ICT Toronto, a multi-stakeholder partnership to advance the interest of the Toronto Region ICT cluster. An ICT multi-stakeholder partnership could serve as an Advisory/Reference group and potential ICT Think Tank, an information sharing forum, as well as a "clearing house". Such a group would be of immense value to the sector in the Toronto region. ICT Toronto would facilitate and support the work of existing organizations and will draw the diverse elements of the Toronto Region's ICT sector together; for example, the GTMA could act as the international marketing arm of ICT Toronto. The model being proposed is a partnership of organizations active in the Toronto Region, representing the diverse aspects of the industry across the region - companies, industry and professional associations, universities and colleges, and governments, and interested stakeholders.

*The model being proposed is a **partnership** of organizations active in the Toronto Region, representing the **diverse aspects** of the industry across the region.*

Action I • ICT Toronto could operate as follows:

Roles And Functions

- A forum where organizations come together to share news and information;
- An Advisory/Reference/Think Tank group in support of current or future ICT cluster initiatives;
- Meet regularly and establish ad-hoc sub-committees for special projects such as:
  - An industry-academia forum to promote dialogue on issues of common interest,
  - A media-industry-education think tank to review technology-oriented programming, and
  - Initiatives under the provincial ORCP program, amongst others;
- Promote the needs and interests of the Toronto Region ICT sector:
  - Facilitate and support promotion initiatives by others,
  - Oversee the development of a communication and marketing strategy for the ICT sector,
  - Engage in a media relations strategy that will highlight individual company success stories and local talent, as well as raise public awareness about the sector;
- Raise business awareness about available innovation and business support programs and services available from government and the private sector;
- Act as an ICT point of contact and reference (gateway) for companies and organizations outside of the region;

- Host an annual event that will showcase regional ICT products and services and foster business-to-business contacts, in consultation with or in association with established trade organizations;
- Work with the 3 orders of government to support their efforts to align their science and technology policies and programs with the needs of ICT companies in the Toronto Region; Support the efforts by existing organizations to deliver or expand their ICT support activities to companies throughout the region;
- Inform local politicians about the sector infrastructure and needs: e.g. assist with the organization of tours of local ICT firms and research organizations for elected officials, briefing sessions, etc;
- Work with agencies such as the GTMA to attract overseas investors to the ICT sector;
- Liaise with the Toronto Financial Services Alliance (TFSA) to establish business linkages between the Toronto Region ICT sector and the financial services sector, to achieve business growth, productivity and commercialization in both sectors;
- Explore the potential to develop either a physical or virtual permanent "showcase" to promote local innovative products which denote the capabilities of the region's ICT firms and organizations;
- Help to develop and promote industry/sector "champions";
- Support existing and/or potential peer-to-peer networks (e.g. a Toronto ICT web "radio station");
- Conduct research and assemble statistical information on ICT activities in the region; and,
- Facilitate production partnerships between industry and academia.

Membership • The initial membership of ICT Toronto should include members of the Toronto Region ICT Cluster Strategy Advisory Committee, who have made a substantial contribution to this initiative, as well as other stakeholders who might have an interest in implementing aspects of this strategy. The Toronto Region ICT Cluster Strategy Advisory Committee (see listing in Appendix 1) includes representatives from: Key ICT industry and professional associations; Local, regional and federal governments; Leading ICT companies; Universities and colleges;

Private not-for-profit ICT research and commercialization organizations; and, Local and regional business economic development organizations. ICT Toronto's membership may include (but not be limited to) the organizations listed in Appendix 1.

Funding • To fulfill its roles and functions, ICT Toronto must have adequate resources, either in the form of financial support and/or equivalent in-kind resources. It must be independent and have its own budget. For this partnership to succeed, moneys would have to be pooled from different sources, which might include, but not be limited to the following:

- Municipal, provincial and federal support in the form of in-kind collaborations, program funding and senior government's regional innovation strategies and programs,
- Membership fees,
- Special activities and events organized or co-sponsored by ICT Toronto, and
- Private sector contributions

ICT Toronto must take care not to compete with its partners for limited public or corporate support, rather work together with its partners to enhance the interests of the sector and to enhance opportunities for joint programming.

Administration • Over the past few years, the City of Toronto has been committing significant resources to support the ICT sector, including funding for this strategy. It has also been providing the logistical and staff support to maintain the operation of the ICT Advisory Committee. Although the City of Toronto is prepared to continue its commitment to this sector by continuing staff and resources allocation to this initiative, ICT Toronto will need a separate secretariat to manage its activities. This implies office space and a full time staff position, to start.

Governance • ICT Toronto has to develop its own governance model, which should take into consideration its mandate as well as the resources available to it. To maintain the continuity of the work already undertaken by the ICT Advisory Committee, it is proposed that the first interim Chair, Vice-Chair and Treasurer for ICT Toronto be selected from this Committee until a decision is made about a governance model. Meanwhile, the City of Toronto has committed to continue providing meeting space, logistics and in-kind facilitation support until ICT Toronto is fully established.

3 *Improve Government Coordination*

Improve the coordination of government strategies, policies, programs and projects affecting the Toronto Region's ICT cluster.

The key challenge of the Toronto Region ICT Strategy is to improve the industry's long term competitiveness. It is the job of individual businesses and business managers to improve the competitiveness of their enterprises. But by the same token business will grow and prosper where the conditions are right - where there is a favourable "business ecosystem". Local economic clusters are increasingly recognized as engines of economic growth. ICT clusters such as those in Toronto Region, Ottawa, Saskatoon, Vancouver and Waterloo are acknowledged to be successful growth poles.

A coordinated multi-government effort to nurture these economic clusters will further enhance their business ecosystem. Although provincial and, in particular, federal government policies are broader in scope (for instance a policy about building the knowledge economy would include policies affecting the ICT sector), they need to recognize local needs and opportunities. To be successful, the Toronto Region ICT Strategy needs to be supported by all orders of government. Policies and programs need to be coordinated and resources should be made ready available. At the present time the

***ICT Toronto** must take care not to compete with its partners for **limited** public or corporate support, rather **work together** with its partners to enhance the **interests** of the sector.*

proposed Toronto Region ICT Cluster Strategy stands alone, as current provincial and federal policy frameworks do not explicitly address the specific needs of the Toronto Region.

Action 2 • Allocate specific financial resources for ICT cluster development at all orders of government.

Action 3 • Establish a council of senior managers (ideally at the Assistant Deputy Minister level or equivalent) to improve planning and coordination across the three orders of government in the Toronto Region. The primary role of this Council is to improve public sector planning and programming for the ICT sector in the Toronto Region and ensure cross-linkages among the different sectors to stimulate future growth. This Council will meet regularly.

Action 4 • Work with regions across the US border to capitalize on the value added by the ICT cluster in those regions to enhance the profile of the entire region on the world stage. Seek opportunities to undertake joint activities with organizations across the US border.

Leverage the Toronto Region's ***main economic strengths*** *for the* ***ICT*** *sector's advantage making* ***Toronto*** *an* ***international*** *centre for application development.*

4 Leverage Toronto Region's Strengths

Leverage the Toronto Region's main economic strengths for the ICT sector's advantage making Toronto an international centre for application development.

ICT is only one part of the picture. The Toronto Region is home to key economic strategic clusters, including aerospace, automotive, bio-tech, food and financial services, all of which are receiving government attention and support. All of these sectors are important to the future of the region. The ICT sector can increase its growth potential and benefit from reaching out to these sectors. Furthermore, other sectors such as government, health and energy, are big users of ICT products and services. Tremendous business opportunities are yet to be tapped which would benefit all of these sectors, including ICT. More needs to be done to help the ICT sector to develop applications for these other economic sectors. ICT plays a unique role among the different technologies because it is a technology that underpins the growth of nearly every other industry. Much can be accomplished by bringing the ICT sector closer to sectors such as FIRE (Finance, Insurance, Real Estate) and MUSH (Municipalities, Universities/Colleges, Schools and Hospitals), so that they can better understand their application development needs. Municipal governments, through their Economic Development operations can take the lead to facilitate and explore opportunities for collaboration across sectors. For instance, the notion of a centre of excellence combining the ICT and the financial services sectors, is being explored and should be given consideration.

Action 5 • Municipal governments, through their Economic Development operations should take the lead to facilitate and explore opportunities for collaboration between application developers and end users across sectors.

5 *Promote the Toronto Region*

Promote the Toronto Region as the place to be, to work and to invest in the ICT industry cluster. With the creation of ICT Toronto, there is an opportunity to develop a promotion and marketing strategy for the region's ICT sector.

Action 6 • Develop a promotion and marketing strategy to identify the potential for:

- A media relations strategy to profile the sector, along with individual companies, products, services, entrepreneurs, capabilities and young talent;
- Public awareness and education program about technology to encourage innovation and the embracement of new technologies;

- Complement GTMA efforts to target international investors to attract investment to the ICT cluster;
- A communications program involving a variety of media i.e. print, internet, radio, etc, to reach a broad audience;
- Toronto Region participation (cf. *Team Toronto*) in major Canadian and international ICT events (conferences, trade shows, etc.);
- An "ICT Ambassadors" program to equip business and government leaders - including those from multicultural communities - with tools to promote the region's ICT sector while they are doing business abroad;
- A database of regional ICT products, services and capabilities to promote the Toronto Region ICT cluster in Canada and abroad;
- Special events and awards that will profile the sector;
- Production partnerships with academia;
- Establish a permanent portal (e.g. www.icttoronto.com);
- Advance and promote industry achievements and local talent i.e. case studies, testimonials, etc.
- Major ICT projects that will showcase the region;
- Sponsor an ICT labour force development plan, and strategies for increasing youth awareness of and participation in ICT careers;
- A permanent display of leading edge products and services developed in the region; and,
- Other promotion and marketing opportunities

*Toronto **needs to be** - and be seen to be - among the world's **most advanced** municipal governments in **embracing** new technologies.*

6 *Make Model Users*

Make each of the Region's cities and city governments model users of ICT and facilitators of ICT industry growth.

To make the Toronto Region a "happening place" for ICT, Toronto Region governments need to be - and be seen to be - among the world's most advanced municipal governments in embracing new technologies both for their day-to-day administration and their provision of services to their citizens. The Toronto Region also needs to be a champion and facilitator of an advanced ICT infrastructure for the region, including broadband wireless. A number of initiatives are either taking place or being considered by the City of Toronto. These include:

- Increased public access to information about the City's services;
- Internet public consultation i.e. parking by-law
- 311 initiative;
- GIS and other information services

However, more can be done to embrace the commercialization and use of new technologies as well as to support the ICT cluster.

Action 7 • The following are a few examples of how municipal governments could facilitate ICT industry growth:

- Remove barriers by eliminating or amending regulations to facilitate the adoption of new technologies;
- Encourage public-private partnerships to digitize data;
- Partner with local education and/or research institutions to facilitate the testing of new ICT products and services;
- Facilitate the commercialization of innovative technologies developed by the municipality; e.g. technology that warrants intellectual property protection;
- Enhance the support for the ICT sector by adding programs and resources.

7 *Ensure Leading Edge Infrastructure*

Ensure that bandwidth and wireless connectivity infrastructure in the Toronto Region is at the leading edge.

The Toronto Region is doing well in most aspect of ICT technology and services. However, one area where the Toronto Region is currently behind compared with the leading world cities is in providing public wireless Internet access points. As matters currently stand, the Toronto Region cannot boast the same level of wireless access as competing jurisdictions in the world[37]. Some in the ICT community are also concerned that bandwidth is not keeping pace with the best cities in the world. With the establishment of ICT Toronto there is an opportunity for it to work with municipalities in the region and with industry to facilitate the necessary actions to ensure that the Toronto Region remains competitive. These may include, for instance, extending existing WiFi networks[38].

> ***Action 8*** • Cities in the Toronto Region must work together to develop a mechanism to monitor the state of the ICT infrastructure, to assess needs and address emerging issues to ensure that the Toronto Region maintains its status as one of the world leaders in the knowledge economy.

8 *Facilitate Equal Access*

Grow the ICT industry cluster in the Toronto Region by facilitating equal access to federal government support.

Companies located in the Toronto Region are at a distinct disadvantage compared with their competitors in other parts of Canada. Through the federal government's 4 regional development agencies, ICT companies in every major city outside of southern and eastern Ontario have access to a wide range of high tech support programs that are not available to Toronto Region companies. In effect, Toronto Region ICT firms' tax dollars are being utilized to subsidize their competitors in other parts of the country. The federal government needs to establish a level playing field for company ICT support, one that does not depend on the company's postal code, as this situation is hurting companies that want to either locate or grow in the region. Furthermore, as ICT companies are very sensitive to economic downturns, keeping (or attracting) a company in the region becomes a challenge when incentives are ready available in other jurisdictions that distort the operation of markets, even within the Province.

Action 9 • Toronto Region governments must work together to identify funding inequities and to impress upon the federal government the need to eliminate them, as well as to explore the potential for programs to address the specific needs of the ICT cluster in the Toronto Region.

9 *Advocate for Research Institutes*

Advocate for one or more leading edge federal or provincial ICT research institutes in the Toronto Region, while supporting existing regional research promotion organizations.

Public sector research institutes are important growth poles for technology-based business and industries. The private sector has been making investments in Toronto's research institutions (e.g. Bell University Research Labs), however the Toronto Region is unique among major cities in Canada in not having any major federal or provincial ICT or any other advanced technology research institute located here[39]. This, despite the fact that the region is Canada's leading location for ICT (and other fields of technology).

Action 10 • Advocate for the creation of one or more federal or provincial ICT research and commercialization institutes in the Toronto Region to anchor the ICT cluster.

Action 11 • Support the work of the recently-created Toronto Regional Research Alliance (TRRA) and other organizations and initiatives whose aim is to improve local research infrastructure and boost research activity.

(10) *Encourage Knowledge Nodes Growth*

Encourage ICT industry cluster growth near existing knowledge nodes across the Toronto Region.

Successful ICT development occurs at what might be termed knowledge "crossroads" - locales that are often anchored by universities, colleges, research institutes, and similar organizations and that act as growth poles for companies. Much as villages, towns and cities tend to grow around geographic crossroads, ICT clusters grow around knowledge crossroads - places where education, research, production, and financing intersect and reinforce mutual strengths. Knowledge crossroads combine aspects of physical infrastructure and a knowledge-generating institution. By locating near knowledge centres, ICT firms can benefit from the natural synergy that co-location creates. This synergy will add to create a stronger business-academia co-operative environment that will benefit both. An example of this type of synergy is the City of Oshawa where the automotive industry works closely with the University of Ontario Institute of Technology.

*By locating near **knowledge** centres, ICT firms can benefit from the **natural synergy** that co-location creates. This synergy will add to create a **stronger** business-academia co-operative environment that will benefit both.*

The Toronto Region has begun to exploit the knowledge resources and commercialization potential of local universities and colleges. The MaRS Discovery District is an excellent example of an effort to establish a knowledge crossroad that links the University of Toronto, the hospital sector, and other innovation stakeholders in the University Avenue area[40].

There are other opportunities across the region to capitalize on the universities and community colleges growing research activities, not only by encouraging working links between industry and academia, but helping to locate them close to each other.

By legislation, municipalities have the ability to define "areas" in the city which could be eligible for investment attraction mechanisms such as tax increment financing. As employment space is being depleted across the region due mainly to residential conversion, a concerted effort to reserve space for the location of ICT firms seems a reasonable alternative, in particular if this happens in the vicinity of centres of knowledge.

Action 12 • Explore the potential for the creation of industry co-location in knowledge nodes. Such "areas" could be created around existing "knowledge nodes" such as York University (north) and University of Toronto Scarborough Campus with Centennial College (east). A west Toronto Region node (e.g. Sheridan College or UofT Mississauga campus) would also be valuable. These nodes would complement other strong nodes such as the one at University of Toronto downtown and MaRS. The Province's Regional Innovation Networks - RIN's - (of which MaRS is one) can form the basis for the other regional knowledge nodes. This is a long term proposal which is most deserving of consideration by municipalities in the Toronto Region.

11 *Develop Skills and Knowledge*

Develop skills and knowledge to support the ICT cluster. The current and future success of the ICT sector in the Toronto Region depends on firms in the region having access to a top-quality labour force, creative and skilled in all aspects of ICT: scientific, technical, business and management, applications, etc. Regrettably, in the wake of the technology downsizing that occurred in 1999, enrolments in many college and university ICT-related programs is trending downward. Immigration will only partly offset these declines. Although the Toronto Region still counts a technically skilled and creative labour force among its strengths, steps need to be taken now to ensure anew generation of workers, leaders and champions.

Building a top-quality ICT labour force is a long-term process that starts with children and youth and their parents. Schools, colleges and universities also play a part, as does the private training industry. So too do ICT employers, through their in-house training programs. Recent improvements in the performance of Ontario youth on international tests of math and science are encouraging. However, fewer youth are opting for careers in ICT related science, technology and engineering.

Action 13 • Support the Ontario Science Centre, a facility devoted to the dissemination of scientific and technological knowledge, through industry sponsorship of a permanent modern interactive exhibit focussing on ICT careers. This complements the call for enhancing education and public awareness as per Recommendations 2 and 5.

Action 14 • Develop an ICT labour force development plan for the Toronto Region. This initiative could be spearheaded by ICT Toronto. The labour force development plan should update and build on the IT Human Resources Labour Force Readiness Plan[41].

12 *Ensure Business Support Availability*

Ensure that business support services are available to companies across the Toronto Region.

A number of organizations are successfully providing business support services in different parts of the Toronto Region. ICT firms across the region could benefit from the services offered by organizations such as the Toronto Venture Group, Toronto Angel Network, MaRS, Innovation Synergy Centre in Markham, and others. Due to scarce resources (and in some cases restricted mandates) availability of these services is limited. Rather than duplicate successful organizations operating in one part of the region by establishing parallel ones in other parts, a better approach is to provide sufficient resources and expanded mandates for the existing organizations to extend their service offerings throughout the region.

Action 15 • Facilitate and support expanded mandates for existing organizations already offering business support services throughout the region, prior to creating new organizations offering the same service.

Action 16 • Facilitate local firms' access to publicly-funded research facilities that are now in the region. Through its industry-academia forum, ICT Toronto should determine whether more can be done to make research and training facilities in the region's universities and colleges more accessible by firms[42].

13 *Think Smart*

Take advantage of existing and potential opportunities and/or initiatives to advance the interest of the ICT cluster.

If it wants to be internationally competitive, the Toronto Region needs to think smart when it comes to ICT and related areas of knowledge-based economic development. Cities such as Montreal (Technopole), Pittsburgh (Pittsburgh Technology Center), Brooklyn (Metrotech Centre), Kansai (Science City), Singapore (Biopolis) have made concerted efforts to establish major knowledge-based urban technology centres (crossroads) to anchor their future economies. These developments typically combine research, commercialization and appropriate manufacturing facilities. Closer to home, McMaster University is proceeding with plans for a research park that will draw on that university's knowledge assets to spur economic development. In the Toronto Region, the MaRS Discovery District project is an effort to create knowledge crossroads joining University of Toronto, area research hospitals, and industry. This is a landmark development which symbolizes the City's move towards a knowledge base economy.

The Toronto Region could further its image of technological leadership by taking advantage of existing or potential high profile initiatives such as the City of Toronto's application to host the 2015 World Fair. This presents an opportunity to profile the region's ICT cluster as well as to promote public awareness about technology and science.

Action 17 • Consider a "Science-Technology-Environment" theme in the preparation of the City's bid to host the 2015 World Fair in Toronto.

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TARGETS 8.0

CONCLUSION 9.0

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TARGETS

The Toronto Region ICT Cluster Strategy proposes the following targets, by 2011:

1	Establish ICT Toronto, a multi-stakeholder ICT cluster partnership;
2	Develop and implement a regional ICT marketing and communications strategy;
3	Increase the number of Toronto Region ICT companies performing research by 15%;
4	Increase investment on ICT research in the region by 25%;
5	Establish at least one major federal ICT research institution in the region;
6	Establish a formal higher education-industry-government ICT discussion within ICT Toronto;
7	Increase ICT sales (currently $30-35 billion per annum) and employment (148,000) in the region by 20%;
8	Increase the rate of annual new ICT company formation and survival by 10%;
9	Increase the number of joint industry/university research and commercialization collaborations by 15%;
10	Attract 5 new ICT multinational firms to the region;
11	Increase annual ICT investment in the region by 15%;
12	Reinforce 2 "knowledge nodes" (east, west);
13	Have an internationally-competitive public access wireless Internet service in place;
14	Ensure that needed ICT business support services are available to firms throughout the region;
15	Achieve parity in Toronto Region ICT firms' access to federal government financial support;
16	Establish a formal inter-governmental ICT coordinating and planning body; and,
17	Be recognized in the international community as a leader in the knowledge economy.

CONCLUSION

The Toronto Region's ICT sector has done remarkably well. It is North America's 3rd largest and a major presence on the international scene. Companies in the sector span all areas of ICT activity, including Manufacturing; Software and Systems Development and ICT Services. The challenge of the Toronto Region ICT Cluster Strategy is to maintain the momentum; to help companies new and old to grow and prosper by nurturing a positive climate or ecosystem for ICT firms in the region, and by promoting the region's accomplishments and potential to the world. The winning conditions are in place. The status quo is not an option; a commitment to positive change is needed to keep the region in the forefront.

ENDNOTES 10.0

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ENDNOTES

[1] The scope of the study is the ICT sector as defined by the NAICS codes used by Statistics Canada in producing special aggregations for the ICT sector. Thus the ICT component of the study includes such industries as computer hardware and software, telecommunications equipment manufacturing, telecommunications service providers and ICT professional services. It also includes the software, infrastructure, and content side of new media.

[2] "The industries that produce the products (goods and services) that support the electronic display, processing, storage, and transmission of information" - source: Statistics Canada

[3] The Toronto Region includes Toronto, York, Peel, Durham and Halton.

[4] The ICT cluster accounts for about 5.5% of employment within the Toronto CMA (Statistics Canada 2001 Census). Over 300 foreign companies have subsidiary operations in the Toronto region. Annual sales for the ICT cluster amount to over $32.5 billion, while the annual exports for this cluster is over $6.2 billion - source: City of Toronto

[5] E&B Data. Greater Toronto Area Information and Communications Technologies Study. 2004.

[6] The E&B study found another indication of the pervasive nature of ICT. This report found that "more than 30% of the ICT specialists in the Toronto Region are working in non-ICT sectors such as banking and insurance, manufacturing (not related to ICT), education and health care. The depth of the labour force in the Toronto Region is therefore suggested by the additional 39,000 ICT specialists working outside the ICT industry proper".

[7] Source: Information Technology Association of Canada. News Release: ITAC launches study to understand why Canadian business under-invests in ICT. Ottawa. July 26, 2005.

[8] For example supply chain management.

[9] Toronto Economic Development Strategy. July 2000.

[10] As measured by employment. Source: E&B study.

[11] Greater Toronto Area Information and Communications Technologies Study 2004" (the study can be found at www.toronto.ca/business).

[12] It has the third largest concentration of private ICT facilities amongst top North American metropolitan areas. The indicator is based on the employment level of medium-to-large businesses, a key indicator of the size of ICT sectors in metropolitan areas.

[13] Source: Analytical Measures to Assess and Evaluate Clusters. Meric Gertler, Greg Spencer, Tara Vinodrai, David Wolfe. Program on Globalization and Regional Innovation Systems. Munk Centre for International Studies University of Toronto. October 21, 2004.

[14] Original Equipment Manufacturers

[15] Voyer, Roger; Knowledge-based Industrial Clustering; International Comparisons, in Local and Regional Systems of Innovation, edited by John de la Mothe and Gilles Paquet, Kluwer Academic Publishers 1998, p. 81

[16] Voyer. op. cit.

[17] Health, education, homelessness, public transport, minority rights, etc.

[18] For example, Liberty Village, SMART Toronto.

[19] Private Equity Canada: An in-depth review. Goodman and Carr LLP. Toronto. 2004

[20] In a typical year buyout financing consumes upward of 75% of all available VC funds.

[21] Washington Technology. Tuesday June 28, 2005

[22] Voyer. op. cit.

[23] Graytek Management Inc., ICT/Life Sciences Converging Technologies Cluster Study, undertaken for a consortium

[24] For example, the Bell University Research Laboratory at the University of Toronto, MICRONET Network of Centres of Excellence.

[25] For example, the closest NRC laboratory is situated in London, 90 miles from Toronto. Also, the CMC test facility at University of Toronto is not available to industry users.

[26] A recent newspaper report (Globe and Mail, 15 September) says that "the rate of the Quebec tax credit for multimedia titles can be as high as 37.5% toward labour costs".

[27] Companies such as E&B conduct company surveys on an ad hoc basis.

[28] Industry Canada has a current company database that contains basic contact information. So too does the Innovation Synergy Centre.

[29] See, for example, KPMG's 2004 Competitive Alternatives report.

[30] That said, it should be recognized that the other orders of government have taken an active role in providing financial and policy support to the Toronto ICT strategy.

[31] The original mandate of the Regional Innovation Networks was to focus on biotechnology. This has now been broadened to include ICT.

[32] One excellent example of cooperation is the Bell University Laboratories at the University of Toronto.

[33] For example, competitors to Bell Canada may be reluctant to establish working relations with the Bell University Laboratories.

[34] Information Technology Association of Canada. ITAC's Response to the Telecommunications Policy Review. Ottawa. August 2005.

[35] The region is currently No. 3 in North America and likely among the top 10 in the world.

[36] As, for example, a Silicon Valley address helps firms there to market their capabilities.

[37] In fact, there are still pockets in the Toronto Region where high speed Internet connectivity is not yet available.

[38] We note that Bell Mobility, Fido, Rogers Wireless and TELUS Mobility have announced the launch of inter-carrier Wi-Fi service, with more than 500 Hotspot locations. Cities in the region should get behind this project.

[39] One important research network, the Micronet Network of Centres of Excellence is being wound down.

[40] We note that MaRS also has a broader province-wide mandate.

[41] Toronto Economic Development. Labour Force Readiness Plan. IT Human Resources: Meeting the Challenges of Growth. 2003. http://www.toronto.ca/business_publications/tlfrp/labour_force_IT_screen.pdf.

[42] For example CMC Microsystems' Advanced Digital Laboratory, a facility that will be used to validate microprocessor prototypes and proof-of-concepts is only available to U of T students and alumnae.

APPENDICES

Appendix I • Project Participants

ADVISORY COMMITTEE MEMBERS

Name	*Title*	*Organization*
Allen, Greg	VP & General Manager	Canada Celestica
Armstrong, John T.	Director, Municipal & Industry Relations	Rogers Cable Communications
Berry, Rob	Manager, Sector & Strategic Partnerships	City of Toronto
Bulwik, Alicia	Sector Advisor, Innovation & Business Development	City of Toronto
Chagnon, Nina	Director, Business Development	MaRS Discovery District
Eng, Daniel	President (2003-2005)	Canadian Information Processing Society (CIPS)
Felepchuk, Carol	Government Programs Executive	IBM Canada
Forde, Dave	General Manager	Association of Internet Marketing & Sales (AIMS)
Foreman, John	VP Application Services	CGI
Glandfield, Bob	Industrial Technology Advisor	York Technology Association
Havva, Estelle	Venture Capital Consultant	Estelle Havva
Hayashi, Craig	Chairman	eBiz Toronto
Holmes, Brian	Senior Associate	IBI Group
Horowitz, Nate	Dean, Centre for Creative Communications	Centennial College
Horwood, Robert	Executive VP	Information Technology Association of Canada (ITAC)
Hutchison, William	President	Hutchison Management International
Johnston, John	Director, IT Planning	City of Toronto
Jung, John	VP International Marketing	Greater Toronto Marketing Alliance (GTMA)

ADVISORY COMMITTEE MEMBERS

Name	*Title*	*Organization*
Kanji, Aleem	Senior Advisor ICT	Ministry of Economic Development and Trade (MEDT)
Kirkpatrick, Norm	Executive Director	Canadian Advanced Technology Alliance (CATA
Lindsay Luby, Gloria.	Councillor, Chair of the Economic Development & Parks Committee	City of Toronto
Mac Neal, Dawn	Member Services Coordinator	Toronto Board of Trade (BOT)
Mabrucco, Vito	President & CEO	IDC Canada
Maw, Frank	President	Alexander and Associates
McDermott, Jerry	Manager, Real Estate Development	SAS Institute
McGregor, Ross	President & CEO	Toronto Regional Research Alliance (TRRA)
Milrad, Lou	Partner	Gardiner Roberts LLP
Paterson, Chris	Manager	ICT Ministry of Economic Development and Trade (MEDT)
Proietti, Adolfo	President	Mississauga Technology Association (MTA)
Rauth, Sue	Trade Commissioner	International Trade Canada (ITC)
Seibert, Erica	Executive Director	Toronto Venture Group (TVG)
Sheridan-Simzer, Andrea	Senior Economist	ICT Industry Canada
Simcoe, Tim	Professor, Strategic Management	Rotman School of Business (U of T)
Sullivan, Mike	President,	Alliance Technologies
Warburton, Kim	Director, Government Relations	Bell Canada
Webb, Kathleen	Director, Programs & Development	New Media Business Alliance (NMBA)
Wolfe, David	Professor IT	University of Toronto (Munk Centre)

WORKING COMMITTEE MEMBERS

Name	*Title*	*Organization*
Armstrong, John	Director, Municipal & Industry Relations	Rogers Cable Communications
Berry, Rob.	Manager, Sector & Strategic Partnerships,	City of Toronto
Bulwik, Alicia	Sector Advisor, Innovation & Business Development	City of Toronto
Chagnon, Nina	Director, Business Development	MaRS Discovery District
Eng, Daniel	President (2003-2005)	Canadian Information Processing Society (CIPS)
Forde, Dave	General Manager	Association of Internet Marketing & Sales (AIMS)
Glandfield, Bob	Industrial Technology Advisor	York Technology Association
Hayashi, Craig	Chairman	eBiz Toronto
Horowitz, Nate	Dean, Centre for Creative Communications	Centennial College
Kanji, Aleem	Senior Advisor	ICT Ministry of Economic Development and Trade (MEDT)
Mac Neal, Dawn	Member Services Coordinator	Toronto Board of Trade (BOT)
Maw, Frank	President	Alexander and Associates
Paterson, Chris	Manager	ICT Ministry of Economic Development and Trade (MEDT)
Proietti, Adolfo	President	Mississauga Technology Association (MTA)
Rauth, Sue	Trade Commissioner	International Trade Canada (ITC)
Seibert, Erica	Executive Director	Toronto Venture Group (TVG)
Sheridan-Simzer, Andrea	Senior Economist	ICT Industry Canada
Simcoe, Tim	Professor, Strategic Management	Rotman School of Business (U of T)
Warburton, Kim	Director, Government Relations,	Bell Canada

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Appendix III • Organizations Interviewed

Hardware	*Software/Applications*
Xiris Automation	Alias Wavefront
Nortel	Psion Teklogix
Celestica	IBM Software Lab
ATI	Hummingbird
Xerox	

Service Providers	*Content Developers*
Q9 Networks	Nelvana
Bell Canada	
Rogers	
EDS Canada	

Academic	*Industry Associations*
University of Toronto	ITAC Ontario
Ryerson University	Toronto Venture Group
MICRONET Network of Centres of Excellence	eBiz Toronto
Centennial College	CATA
	Mississauga Technology Association
	New Media Business Alliance

Research Organizations	*Public Sector*
Photonics Research Ontario	Ontario Ministry of Economic Development and Trade
MaRS	Ontario Ministry of Research and Innovation
CITO	Industry Canada
Toronto Regional Research Alliance	NRC/IRAP
ORION	City of Toronto

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