

KNOWLEDGE ENTERPRISES BRANCH
STRATEGY

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EXECUTIVE SUMMARY

This strategy deals with the actions required by the Knowledge Enterprises Branch (KE) to assist in the development of the ICT sector in Manitoba. The strategy focuses on key objectives with tactics that have measurable outcomes ensuring performance accountability.

ICT's Importance to Manitoba

In Manitoba the ICT sector is primarily comprised of a growing number of SME's augmented by several large multinational ICT companies. The sector is strongly export oriented with the United States being the primary destination.

The ICT sector in Manitoba is comprised of 1549 enterprises, with just over 80% of these businesses located in Winnipeg. Those employed in ICT industries rose from 11,900 in 1987 to 15,000 in 2003, an increase of 26%.

The ICT workforce is not limited to companies in the ICT sector. IT workers are found in every industrial sector. The number of ICT workers is lower than the number of persons employed by ICT companies, because many of the workers in ICT companies do not work in ICT occupations, but in occupations such as human resources, accounting, sales and marketing etc.

In 2001, the ICT workforce in Manitoba consisted of 12,005 workers of which just under 90% worked in Winnipeg. Over 65% of IT workers were between the ages of 25 and 44 years old, as compared to 47% of the overall labour force in Manitoba.

The average employment income of ICT workforce in Manitoba for 2001 was 51% higher than for the overall labour force. The average ICT employment income was \$41,080 per annum as compared to \$27,178 for the overall labour force.

Every ICT occupation has a high percentage of workers with post-secondary/university education with the overall rate for all ICT occupations at 81.5%, as compared to 47.6% for the Province's overall labour force. Nearly a third of all ICT workers have a University degree as compared to 16.6% of the overall labour force.

Key Strengths of the ICT Sector in Manitoba

The Manitoba ICT industry has internationally competitive expertise and products. The Province produces world-class ICT graduates, is a growing hub for research and development, has several emerging clusters of ICT excellence, and has the existing advantage of a skilled workforce and the presence of global companies. Manitoba offers a unique combination of competitive advantages including:

- A productive and well-educated ICT workforce available at favorable wage rates.

- An estimated 2,886 students were enrolled in ICT related programs in the province in 2003/2004.
- An extensive network of R&D facilities supporting ICT innovation and technology diffusion.
- An emerging cluster of research expertise at the intersection of ICT and Life Sciences, specifically in health informatics, bioinformatics, and medical imaging.
- An advanced telecommunications infrastructure with high-speed access becoming the norm.

Key ICT Sector Development Issues

As illustrated above, Manitoba has many ICT related strengths. However, to enable the ICT industry to take up future growth opportunities, many challenges must still be addressed. Key objectives can be divided into four distinct categories.

Business development

- Encourage coordination and collaboration amongst ICT industry, government, educational institutions and other stakeholders.
- Ensure that government's approach to ICT procurement is consistent, coordinated and inclusive of an economic development focus.
- Equip small companies with the business and/or technical skills to develop, plan, assess and export ICT products or services.
- Ensure the Aboriginal community is positioned to play a meaningful role in the sector through Aboriginal owned ICT company activity.
- Strengthen the capacity for Manitoba companies to access venture capital at all levels, but particularly at the seed level.
- Support the emerging Digital Media/New Media sub-sector in Manitoba in order to facilitate future growth.

Research and Technology Commercialization

- Increase applied R&D capacity
- Increase the rate of technology commercialization.
- Increase R&D activity in key emerging areas of economic importance.

Marketing and Investment Attraction.

- Effectively market the ICT sector inside and outside Manitoba and attract ICT investment to Manitoba.
- Assist Manitoba communities in their efforts to attract customer contact centres.

Workforce

- Ensure the availability of a highly qualified pool of knowledge workers and top tier managers.
- Work with the Aboriginal community to ensure it plays a meaningful role in the sector through employment.

Strategy Summary

The following tables provide a synopsis of the Knowledge Enterprises Branch strategy to achieve key objectives identified above. Each objective has a series of tactics. Each tactic has a single corresponding numbered evaluation metric.

Goal 1: Create an environment fostering ICT business development

Objective	Tactics	Metrics
Encourage coordination and collaboration amongst ICT industry, government, educational institutions and other stakeholders.	<p>1) Work at the board level to assist ICTAM in delivering on its mandate and accomplishing the milestones established in its business plan.</p> <p>2) Establish a Ministerial ICT Advisory Group to foster communication and community-wide approaches to issues confronting the sector.</p>	<p>1) Report back to Treasury Board the association's performance achieving milestones in January 2005, and provide the Deputy Minister and Minister with annual performance updates beginning in August 2005.</p> <p>2) Ministerial ICT Advisory Group established by March 2005.</p>
Ensure that government's approach to ICT procurement is consistent, coordinated and inclusive of an economic development focus.	<p>1) Present the strategy to the Premier's Economic Advisory Committee (PEAC), its taskforce on ICT Procurement, and the Community and Economic Development Committee of Cabinet, (CEDC), making the required amendments at each approval step.</p> <p>2) Assist Manitoba Information & Communications Technologies (MICT) in its efforts to implement the strategy after final approval.</p>	<p>1) Strategy approved by PEAC taskforce by October 2004, PEAC by November 2004 and CEDC by January 2005.</p> <p>2) Enter into discussion with MICT about a vendor relations role.</p>
Equip small companies with the business and/or technical skills to develop, plan, assess and export ICT products or services.	<p>1) More aggressively market the TCP and FSP programs utilizing our website, and public events to communicate with interested parties.</p> <p>2) In partnership with Manitoba Trade, continue to meet with industry to introduce vehicles for trade show assistance, marketing material development and other trade related assistance.</p>	<p>1) Website marketing in place by January 2004. Two speaking engagements undertaken by March 2005.</p> <p>2) In person meetings with 30 ICT companies to introduce programs and explore options for trade development by April 2005. Provide links to Manitoba Trade and trade assistance programs through our website.</p> <p>3) Attendance and participation in the recruitment of companies for all identified ICTAM missions to Minneapolis, the first of which is scheduled for November 2004.</p>

	<p>3) Participate in the recruitment and facilitation of selected outgoing ICT missions.</p> <p>4) Work with Manitoba Trade to structure an incoming mission program, leveraging relationships with Industry Canada/DFAIT.</p> <p>5) Facilitate trade related information sessions for industry.</p> <p>6) Attend/Exhibit at relevant ICT Trade Shows.</p>	<p>4) Comprehensive sector information to Canadian Embassies, Consulates and/or High Commissions in the top 5 export markets by April 2005. One incoming mission from the UK, Mexico or Australia by April 2005.</p> <p>5) Facilitate TechMadness luncheon featuring Export Development Canada and other provincial trade programs by November 2004.</p> <p>6) Leverage ICTAM's presence at Tech 2004 in Brandon in November.</p>
<p>Ensure the Aboriginal community is positioned to play a meaningful role in the sector through Aboriginal owned ICT company activity.</p>	<p>1) Continue to facilitate partnerships between Aboriginal owned ICT businesses and other ICT businesses through informal relationship meetings.</p> <p>2) Work with Procurement Services Branch to schedule an event or publication to showcase the capabilities of Aboriginal owned ICT companies.</p>	<p>1) Aboriginal owned ICT businesses winning or participating as a partner in two winning ICT bids by August 2005.</p> <p>2) An event held and or a publication produced profiling Aboriginal owned ICT companies capabilities by March 2005.</p>
<p>Strengthen the capacity for Manitoba companies to access venture capital at all levels, but particularly at the seed level.</p>	<p>1) More aggressively market the short term accelerator program. The objective of the program is to better position small and medium ICT and New Media enterprises to attract early stage financing.</p> <p>2) Work with partners to sponsor two educational seminars on investing in local ICT companies to provide both knowledge and understanding of the financial process from the companies and the investors prospective.</p>	<p>1) Website marketing in place by February 2004.</p> <p>2) Two venture capital educational seminars held by August 2005.</p>
<p>Support the emerging Digital Media/New Media sub-sector in Manitoba in order to facilitate future growth.</p>	<p>1) Facilitate greater communication and collaboration among stakeholders in the Digital Media sector, including brokering dialogue between potential users and providers of technology.</p>	<p>1) By the end of March 2005, facilitate or lead four strategic meetings among industry stakeholders to begin the process of exploring new opportunities for collaboration.</p> <p>2) A Digital Media sector strategy completed by August 2005.</p>

	2) Develop a New Media sector strategy including an inventory of the sector's strengths and identifying areas of opportunity for Manitoba.	
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Goal 2: Increase ICT research activity and the rate of technology commercialization.

Objective	Tactics	Metrics
Increase applied R&D capacity.	<p>1) Work with the University of Manitoba and other stakeholders to create a comprehensive directory of existing ICT research capacity.</p> <p>2) Consult with MTS, CanWest Global and other large ICT firms to identify R&D opportunities.</p> <p>3) Continue to work with TRLabs to maximize the value that the Manitoba lab delivers to the local ICT sector. Undertake an international peer review of TRLabs' operations in coordination with other Provincial Government sponsors. Continue to work with TRLabs to ensure that TRNet becomes operational in the near future.</p>	<p>1) ICT R&D directory prepared by August 2005.</p> <p>2) Meetings held with companies and analysis of R&D opportunities undertaken by March 2005.</p> <p>3) International Peer Review of TRLabs operations complete by March 2005. TRNet operational by November 2004.</p>
Increase the rate of technology commercialization.	<p>1) Engage a consultant to assess the operations of Incubat at the University of Manitoba SMARTpark and recommend actions to increase its ability to incubate and graduate successful new ventures.</p>	<p>1) Incubat assessment report complete by April 2004.</p>
Increase R&D activity in key emerging areas of economic importance.	<p>1) Discussions held with the University of Manitoba Scanning Probe Microscopy and Nanofabrication Laboratory staff to assemble material for marketing the lab.</p> <p>2) Continue ongoing discussions with TRLabs and other stakeholders regarding the formulation of a Digital Media Lab proposal.</p> <p>3) Engage a consultant to develop a bioinformatics sector business plan in consultation with other funders.</p> <p>4) Receive consultants report investigating R&D opportunities associated with telehealth in Manitoba. Assess findings and create action plan.</p>	<p>1) The University of Manitoba Scanning Probe Microscopy and Nanofabrication Laboratory capabilities profiled on KE website by December 2004.</p> <p>2) Digital Media proposal received by Spring 2005. Analysis of proposal and recommendation to Government regarding funding complete by Summer 2005.</p> <p>3) Development of a bioinformatics sector business plan by June 2005.</p> <p>4) Telehealth report received by November 2004. Action plan in place by March 2005.</p>

Goal 3: Market the Manitoba ICT sector and attract ICT investment to Manitoba.

Objective	Tactics	Metrics
Effectively market the ICT sector inside and outside Manitoba and attract ICT investment to Manitoba.	<p>1) Develop a branch website to profile the sector and showcase the capabilities of Manitoba ICT companies, and promote Manitoba as a great place for ICT companies to invest.</p> <p>2) Develop a suite of printed materials for promotion of the sector outside of Manitoba.</p> <p>3) Explore opportunities for a Virtual Trade Show function on the web in concert with Manitoba Trade.</p> <p>4) Create & leverage relationships with external governments and organizations to promote MB companies and their capabilities.</p> <p>5) In-house proposal updated and complementary PowerPoint presentations developed to enable timely and effective response to Investment RFPs/RFIs.</p> <p>6) Selected prospecting of ICT investment projects, including possible joint prospecting program with MB Hydro.</p>	<p>1) Website in place by January 2004.</p> <p>2) Make marketing materials available to the local ICT community to support their internal marketing & trade efforts. Notice of availability distributed by April 2005.</p> <p>3) Preliminary discussions around the development of a Virtual Trade Show finished by November 2004.</p> <p>4) Provide comprehensive sector information to Canadian Embassies, Consulates and/or High Commissions in the top 5 export markets identified by the sector, which are the US, UK, Mexico, Germany and Australia by April 2005.</p> <p>5) Update in-house proposal to enable timely and effective response to RFPs/RFIs by August 2005.</p> <p>6) Specific business opportunities to be identified with MB Hydro (ie. Data storage etc.) and a complementary framework for action to be developed by April 2005.</p>
Assist Manitoba communities in their efforts to attract customer contact centres.	<p>1) Continue to assist communities seeking to attract customer contact centre investment.</p>	<p>1) Annual feedback sought from communities regarding satisfaction with Provincial assistance commencing August 2005. Status report prepared for Deputy Minister and Minister.</p>

Goal 4: Foster a knowledgeable and growing ICT workforce.

Objective	Tactics	Metrics
Ensure the availability of a highly qualified pool of knowledge workers and top tier managers.	<p>1) In partnership with other stakeholders, engage ICTAM to assess the state of the ICT workforce in Manitoba and identify key issues requiring attention.</p>	<p>1) ICT workforce study completed by April 2005.</p>
Work with the Aboriginal community to ensure it plays a meaningful role in the sector through employment.	<p>1) Establish relationships with key stakeholders to devise strategies addressing key issues.</p>	<p>1) Stakeholders formally engaged by November 2004.</p>

INTRODUCTION

In the last 50 years advances in ICT have changed the world; the silicon based integrated circuit, the microprocessor, the personal computer and the Internet have changed all aspects of our lives including the way we do business, how we interact, how we spend our leisure time and how we access services such as health and education.

Innovation, productivity and export orientation are widely recognized as fundamental to economic success. The ICT sector is at the forefront of industrial innovation providing a rapidly expanding range of services and products that deliver productivity improvements and compete in a global market that demands international competitiveness and an export orientation.

This strategy deals with the actions required by the Knowledge Enterprises Branch (KE) to assist in the development of the ICT sector in Manitoba. It is based on an approach that combines community economic development principles with the development of critical-mass geographical clusters of companies, supported by local infrastructure.

This document sets out the strategic priorities and associated actions, and consolidates actions into a set of substantive initiatives.

This strategy has been shaped by key Government strategy documents and tools providing the vision driving provincial economic development activities in Manitoba. These documents include:

- Manitoba at the Forefront of Innovation Report
- Manitoba's Action Strategy for Economic Growth
- The Community Economic Development Policy Framework and associated Community Economic Development Lens tool.

The 2002 Information Communication Technology Association of Manitoba commissioned report "*Conditions for Growth, Retention, and Attraction in Manitoba's ICT Sector*" has been a key resource for identifying issues confronting the sector. This analysis has been strengthened by regular discussions with key stakeholders in the sector.

In September 2002, the Manitoba government created the new department of Energy, Science and Technology. The department has eight branches and divisions including:

- Knowledge Enterprises
- Life Sciences
- Broadband Project Office
- Climate Change
- Energy Development
- Coordinated Services Unit
- Strategic Planning and Analysis
- Manitoba Information Technology and Communication

EST VISION STATEMENT:

Manitoba is the place where innovation flourishes, ideas grow and people prosper.

EST MISSION STATEMENT:

We build the **capacity** for Manitobans to prosper through innovation by:

- Creating strategic partnerships;
- Encouraging investment;
- Enabling equitable access to the right tools,
- Promoting awareness and knowledge,
- Championing critical policy development

The department of Energy Science and Technology is carrying forward the vision contained within the *Manitoba: at the Forefront of Innovation* report. The report contains 11 concrete targets, six of which are directly related to KE sectors:

- Establishing new incubation facilities by 2005.
- Creating a digital media development centre by 2007.
- Doubling the level of available venture capital by 2007.
- Creating one spin off company for every \$10 million spent on research and development.
- Raising the number of New Media and ICT companies by 25% by 2007.
- Doubling Provincial research investments by 2010.

ICT'S IMPORTANCE TO MANITOBA

Technology is one of the central pillars of civilization. New ways of shaping, arranging and combining matter have brought about the development of the wheel, the plow, sailing ships, municipal water systems, the telegraph, electricity, the internal combustion engine, penicillin and the internet. Each age of civilization takes the technological achievements of prior eras and builds on them, creating new wealth. Economic development has been technology led for thousands of years.

To succeed in the 21st century, Manitoba must embrace the global challenges and opportunities presented by:

- Rapidly intensifying competition.
- Accelerating technological change.
- The growing importance of knowledge, entrepreneurship, creativity and innovation.
- Increasing complexity of the national and international business environment.

The main driver of future economic growth is the ability of an economy to innovate. Manitoba's economic performance will increasingly be determined by our ability to develop knowledge, generate new ideas and successfully market them.

Developed economies are making the transition from industrial models with an emphasis on capital, machinery and natural resources to knowledge-based models driven by innovation, technology, entrepreneurship and sustainability. Much of the economic growth of the last 20 years in developed countries is attributable to the production of packaged intelligence with minimal physical content such as software, web applications and pharmaceuticals. The value of these knowledge-based products greatly exceeds the actual costs of the physical materials from which they are made. World trade is changing from commodities based to value-added manufacturing and services. Competitive pressures require nimble companies that respond rapidly to market developments with ready access to a deep pool of knowledge workers immersed within an innovative entrepreneurial environment.

Another challenge facing Manitoba is the transition of industries, both established and emerging, to higher levels of productivity and value adding to sustain their global competitiveness. ICT is acknowledged as an essential tool that can drive productivity gains across all industry sectors.

Initially productivity gains driven by ICTs were derived simply from introducing technologies into current practice. With the advent of on-line applications enabled by networks it is clear that process and organizational changes is the real leverage for productivity improvement.

A strong local ICT sector drives competitive pressures ensuring that local companies are receiving services and products at a fair price and in a timely manner. A dynamic local ICT industry with distinct groups of competing and cooperating firms, suppliers, service providers and research institutions is essential to all industry sectors. It provides access to more suppliers and customized support services, to experienced and skilled labor pools and to the inevitable transfer of knowledge that occurs when people casually meet and talk business. In addition, novel applications of ICT developed to enhance productivity in other industry sectors often result in the formation of new niche focused ICT companies.

Manitoba needs to build its innovative capacity within existing strengths and also develop new strengths in expanding industries of the future like ICT.

The ICT sector includes both manufacturing and service companies that electronically capture, transmit, manipulate and display data and information. The Statistics Canada definition of the ICT sector is employed here. Statistics Canada's definition is based on the North American Industry Classification System (NAICS). A detailed breakdown of the NAICS classification of ICT is in Appendix A. Statistics Canada is the source of all data presented in this document.

In Manitoba the ICT sector is primarily comprised of a growing number of SME's augmented by several large multinational ICT companies. The sector is strongly export oriented with the United States being the primary destination.

The ICT sector experienced a frenetic period of growth in the lead up to 2001. The subsequent decline in the sector was significant. However, the industry has recovered and the outlook for the ICT sector remains positive, as industry analysts agree that ICT will continue to be a key area of industrial activity, as its rate of growth, research activity and employee wage levels are projected to outstrip the economy as a whole for the foreseeable future.

As the table below illustrates, the ICT sector in Manitoba is comprised of 1549 enterprises, with just over 80% of these businesses located in Winnipeg. Businesses in the computer systems design and related services sub-sector accounted for 49% of all ICT firms in Manitoba.

Manitoba - Number of ICT firms - 2003	<i>1998</i>	<i>2003</i>
Computer and Electronic Product Manufacturing	80	77
Electrical Equipment, Appliance and Component Manufacturing	55	49
Information Services and Data Processing Services	92	*
Telecommunications	35	70
Internet Service Providers, Web Search Portals and Data Processing	*	51
Other Information Services	*	70
Computer and Communications Equipment and Supplies Wholesaler	160	139
Specialized Design Services	134	221
Computer Systems Design and Related Services	458	758
Electronic and Precision Equipment Repair and Maintenance	98	114
Total ICT	1,112	1,549
* Data was reclassified into other ICT sub sectors.		

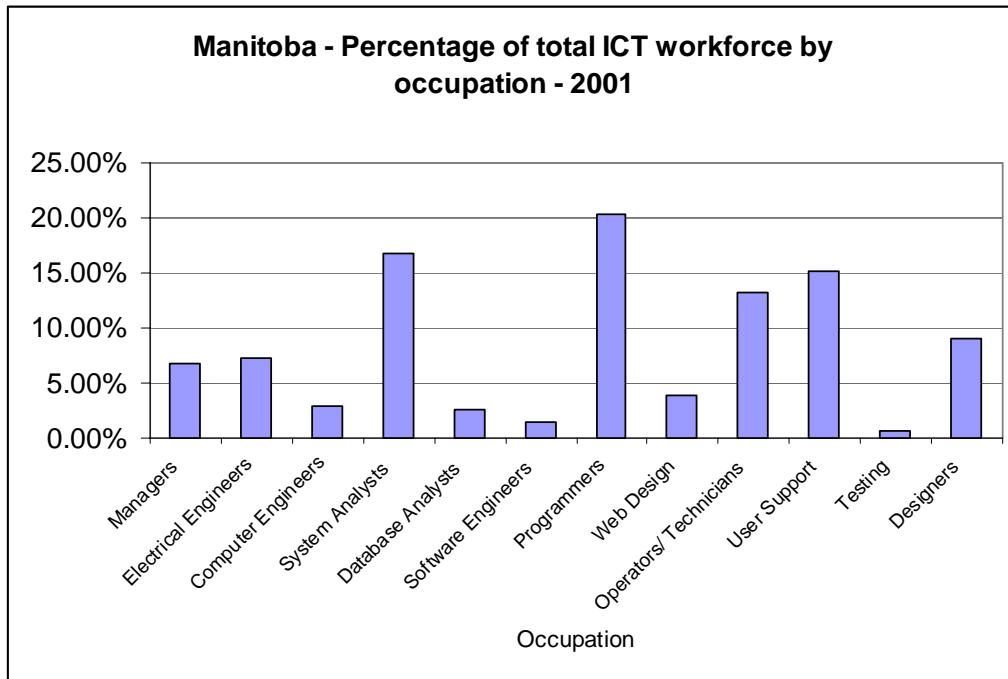
Employment in the ICT sector in Manitoba has also experienced strong growth. Those employed in ICT industries rose from 11,900 in 1987 to 15,000 in 2003, an increase of 26%. Between 1997 and 2003 the computer systems and data processing services sub-sector increased from 1,500 to 4,000 employees.

Manitoba – Number of People employed in ICT firms – 2003 (in thousands)	<i>1987</i>	<i>2003</i>
Computer and Electronic Manufacturing	1,800	1,600
Electric Equipment appliance Manufacturing	1,200	1,500
Computer & Comm. Equip. & Supplies Whol Distr.	0	500
Telecommunications	5,800	4,800
Information Services and Data Processing Services	900	500
Specialized Design Serv.	700	1,600
Computer Systems Design & Related Serv.	1,500	4,000
Electronic & Precision Equip. Repair & Maintenance	0	500
Total ICT Industry	11,900	15,000

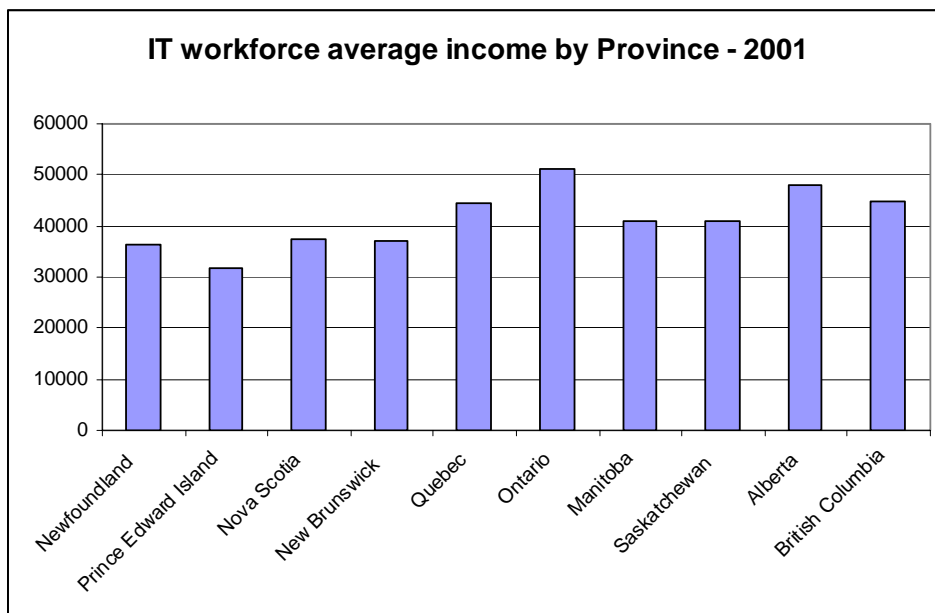
The ICT workforce is not limited to companies in the ICT sector. IT workers are found in every industrial sector. For example, Great West Life employs over 200 people in ICT occupations in Manitoba. The number of ICT workers is lower than the number of persons employed by ICT companies as presented earlier. This is because many of the workers in ICT companies are not employed in ICT occupations, but in occupations such as human resources, accounting, sales and marketing etc.

The Statistics Canada definition based on the National Occupation Classification (NOC) Codes is employed in the following data. A detailed breakdown of the NOC codes for ICT is presented in Appendix B.

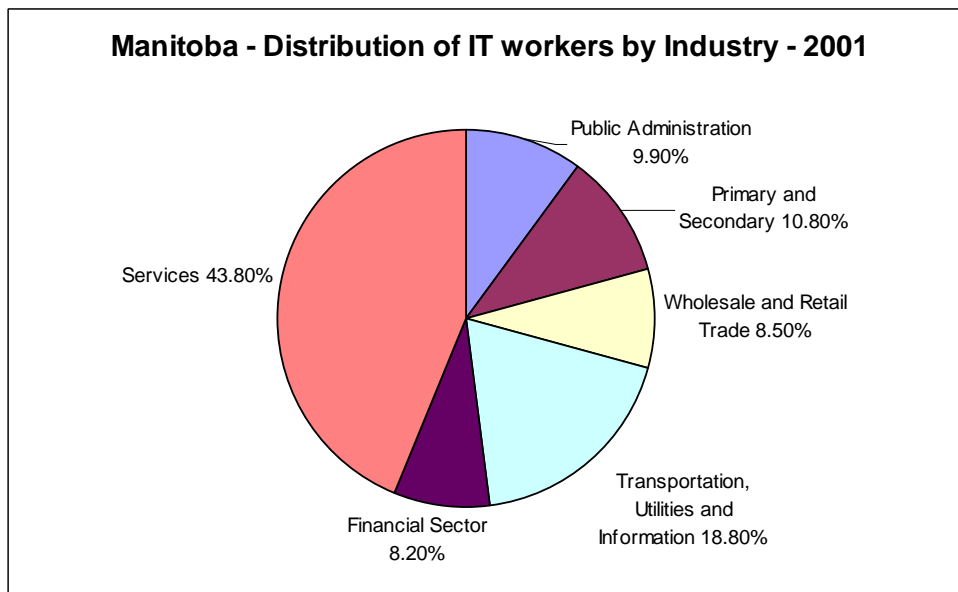
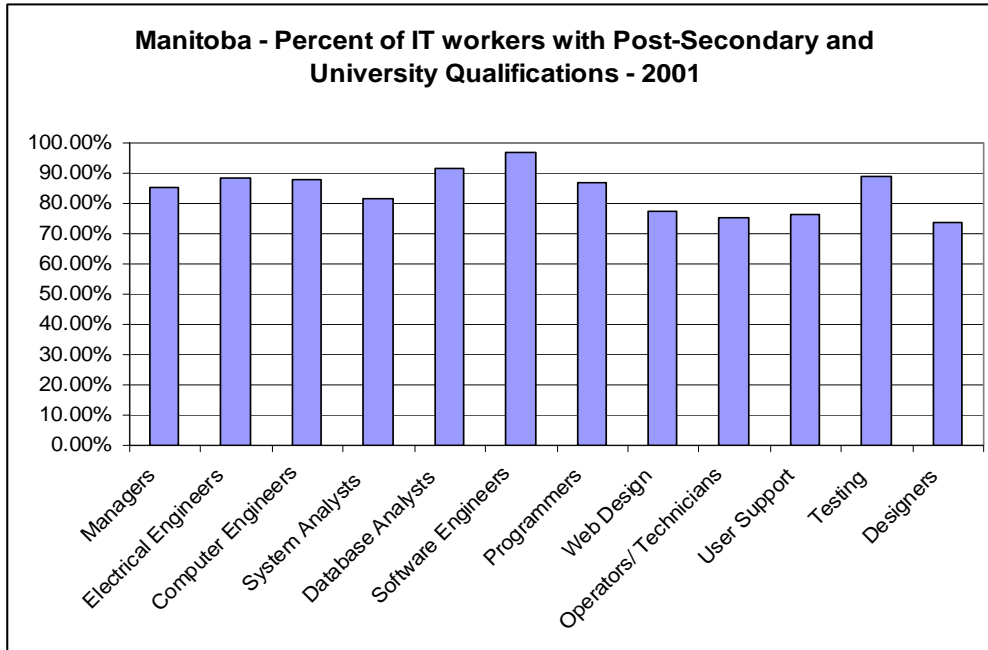
In 2001, the ICT workforce in Manitoba consisted of 12,005 workers of which just under 90% worked in Winnipeg. Over 65% of IT workers were between the ages of 25 and 44 years old, as compared to 47% of the overall labour force in Manitoba. Systems analysts, programmers and user support were the three occupations with the highest percentage of ICT workers in Manitoba accounting for 16.5%, 20.4% and 15.4% of the total workforce.



Employees in this sector are also well rewarded. The average employment income of ICT workforce in Manitoba for 2001 was 51% higher than for the overall labour force. The average ICT employment income was \$41,080 per annum as compared to \$27,178 for the overall labour force.



A high level of education characterizes employment in the Manitoba ICT sector. Every ICT occupation has a high percentage of workers with post-secondary/university education with the overall rate for all ICT occupations at 81.5%, as compared to 47.6% for the Province's overall labour force. Nearly a third of all ICT workers have a University degree as compared to 16.6% of the overall labour force.



KEY STRENGTHS OF THE ICT SECTOR IN MANITOBA

The Manitoba ICT industry has internationally competitive expertise and products. The Province produces world-class ICT graduates, is a growing hub for research and development, has several emerging clusters of ICT excellence, and has the existing advantage of a skilled workforce and the presence of global companies. Manitoba offers a unique combination of competitive advantages including:

- A productive and well-educated ICT workforce available at favorable wage rates.
- An estimated 2,886 students were enrolled in ICT related programs in the province in 2003/2004.
- An extensive network of R&D facilities supporting ICT innovation and technology diffusion.
- An emerging cluster of research expertise at the intersection of ICT and Life Sciences, specifically in health informatics, bio informatics, and medical imaging.
- An advanced telecommunications infrastructure with high-speed access becoming the norm.

Innovative Companies

Manitoba boasts a diverse array of ICT companies including two large Manitoba based multinationals; Manitoba Telecommunication Services and Can West Global. This core strength is bolstered by the local operations of several ICT multinationals like IBM with over 500 employees and EDS with over 300 employees servicing the Manitoba market and clients across North America and further a field.

The vast majority of ICT firms in Manitoba are Small and Medium Enterprises (SME). There are many success stories in this group of companies including EISI-Naviplan, the North American leader in software solutions for financial advisors and enterprises.

MTS is Canada's third-largest communications provider, generating over a billion and a half dollars in revenue and employing over 7000, 3200 resident in Manitoba. Through its Manitoba division, MTS serves enterprise and residential customers in Manitoba with a suite of services ranging from wireline voice and high-speed data services, to next-generation wireless services, to MTS TV. Its Allstream division serves its national business customers with a suite of services ranging from connectivity, infrastructure management and IT Services. Spanning more than 18,800 kilometres, MTS has an extensive broadband fibre-optic network and the greatest reach of any competitive communication solutions provider in Canada.

CanWest Global Communications with its corporate head office located in Winnipeg, is one of Canada's leading international, diversified media companies, which employs over 1200 people in its Manitoba operations and generates revenue in excess of \$2.2 billion globally. CanWest owns and operates the coast-to-coast Canadian broadcasting network, Global Television, CanWest Entertainment and CanWest Interactive. A digital Broadcast

Centre is located in downtown Winnipeg that is home to CanWest's digital specialty TV channels.

Vansco Electronics began operations as a start-up company in 1978 and has grown to employ over 600 Manitobans. Vansco specializes in the design and manufacture of custom electronic, electro-mechanical, and electro-hydraulic products. Examples of products include transmission controllers, monitoring systems, wire harnesses, sensors, and test tools for service and manufacturing. Some of its customers include John Deere, Caterpillar, and Volvo.

Momentum Healthware is a software solutions provider specializing in designing and delivering seamless information technology solutions for the acute and long term care segments of the health care industry. Momentum was incorporated in 1995, and has grown to employ over 60 staff. Momentum offers a range of comprehensive scalable software solutions including a Healthware Financial Management suite, a Dietary Management suite and a Care Management suite.

Online Business Systems is a Winnipeg-based company founded by Chuck Loewen in 1986, Online has expertise with application development, portal development, B2B integration, enterprise application integration, and IT training for Agricultural business, Financial Services, Forestry and Healthcare as well as Internet-based solutions for e-commerce clients. Online has over 160 employees and four offices in North America.

EISI – Naviplan was founded in 1990 by Dr. Mark Evans. Emerging Information Systems Inc. is a pioneer in developing productive software solutions for financial advisors and enterprises. The NaviPlan system is a flexible, goal-based financial planning tool designed for advisors who deal with clients in the wealth accumulating, emerging affluent, and mass affluent market segments. EISI's staff of 230 is solely committed to the NaviPlan product line, which is licensed to more than 70,000 financial services professionals across North America.

Protegra Technology Group Inc. was incorporated in 1995. Its 45 staff have demonstrated experience developing and integrating enterprise software solutions. Protegra clients are found in an array of industries, from financial services sector to government, agriculture and healthcare. Protegra's innovative Escentia Information Technology delivers a clear business process orientation, definition and meaningful enterprise application service to enterprise clients in Canada, United States, Europe and Japan.

ImagiNET Resources Corp. established in 1997 and named by Manitoba Business Magazine the third fastest growing company and the fastest growing technology based company in Manitoba. The company is a leading developer of integrated information management solutions, serving clients across Canada, United States, South America and Europe. The company employs 20 people.

Frantic Films has firmly established a reputation as one of North America's most creative resources for stunning visual effects, post-production and animation. Established in 1994 the company takes pride in redefining the cutting edge of CGI and digital VFX with each new production. Frantic has worked with numerous industry leaders, including Warner Bros, Paramount Pictures Corp, 20th Century Fox, ABC, Viacom and Regent Entertainment. Frantic's award-winning work has appeared in films such as The Italian Job, X2: X-Men United, The Core, Swordfish, and Stephen King's Storm of the Century. The company employs approximately 70 people.

R&D Environment

Canada has been able to attract foreign investment in research and development. Its share of investment by foreign companies has been the highest in the OECD countries since 1997. Canada has lower R&D costs than the US and one of the most attractive R&D tax credit systems. The two key elements explaining this success are generous tax incentives and the availability of highly qualified people at the lowest labour rates in the G7. A recent KPMG study reported that Canada's advantage over the US in ICT R&D was 33%. The federal R&D tax provisions have been generously strengthened in Manitoba through the provision of a 15% non-refundable tax credit for R&D conducted in the Province.

A solid R&D foundation is a critical component underlying a healthy and growing ICT sector. Manitoba's ICT sector is well served by a strong R&D base that includes a number of key organizations.

TRLabs is the largest not-for-profit applied ICT research and development lab in Canada and is internationally recognized as a leading model for industry-university-government collaboration. TRLabs Manitoba has 72 staff, students and seconded company researchers conducting ICT R&D in a number of areas including:

- Information and communications applications.
- Internet protocol (IP) technologies.
- IP network performance.
- Content aware networks.
- Internet and multimedia applications.
- Tele-medicine prototyping of new IP devices.
- Distributed caching and image processing.

The University of Manitoba is the Province's premiere research university. Through collaboration and partnership agreements, the University makes its expertise, facilities and high technology equipment available to business and industry as well as government agencies and other universities. The University Industry Liaison Office was established in 1994 to facilitate the commercialization of University research and link the research expertise and capabilities of the University with Canadian business and industry.

The University is at the forefront of R&D in a number of ICT related areas.

- Speech coding and compression, machine vision and speech processing.
- Artificial neural networks, computer communications high speed circuits and computer aided design.
- Innovative computer systems.
- Computer applications including parallel computers, computer networks, databases, natural language processing, multimedia systems, computer graphics, expert systems and cryptography.

The Bioinformatics Group resident within the Systems biology program associated with the University of Manitoba has strength in creating, storing and retrieving information about protein sequences from experimental sources. This effort has required the development of new methods and algorithms for evaluating the quality of laboratory generated information as well as the design and construction of specialized databases and data handling tools.

The systems and methods that have been developed here have been implemented in a number of academic, government and private sector environments, such as the University of Michigan, the University of Tennessee, the US Department of Agriculture and Eli Lilly and Company.

The Internet Innovation Centre is a focus for the array of interdisciplinary Internet-related research projects currently underway, or proposed, at the University of Manitoba. The Centre encourages collaborative interdisciplinary activities between researchers. The IIC offers an opportunity to work with internal and external communities as an innovations hub for the University and Manitoba's economy.

The Scanning Probe Microscopy and Nanofabrication Laboratory located at the University of Manitoba is a leading facility in Canada with R&D capacity in probe microscopy, micromachining and nanofabrication, semiconductor manufacturing, and high frequency microelectronics and microwave circuit testing.

Canarie, through its local Manitoba offshoot MRNet offers members access to a Canada wide high speed optical network delivering unrivaled network capability to research institutions and universities.

The Virtual Reality Centre is a unique facility, providing industry, academia and government, easy access to the most advanced visualization tools. The Virtual Reality Centre allows manufacturing and other industry sectors such as civil, architectural, urban planning, design, and medical, to visualize complex datasets within a virtual model or immersive environment.

The Biomedical Informatics Group located in the Institute for Biodiagnostics develops and adapts state-of-the-art methods for the analysis and monitoring of complex biomedical data, commercializes the resulting software products and provides information services to IBD. The Biomedical Informatics Group also investigates software engineering methodologies to develop programs that are able to handle large data sets, both for data visualization and data analysis.

Current priorities include the analysis of MR data from cancer projects, analysis and display of MR and infrared spectral data in general, and the extension of these methods to data from proteomics (mass spectra) and genomics (microarray gene expression).

Technology Commercialization

Transforming new knowledge into products, processes, and services is key to reaping the full economic benefits of publicly funded research and development (R&D) activities. There is a growing need to accelerate technology commercialization activities by Manitoba SME's and enhance commercialization processes at post-secondary and other research institutions.

Incubat is an incubator located at the Smart Park at the University of Manitoba. Incubat provides critically needed, experienced early-stage management, business and fund-raising services to high-tech start ups. Its focus is on opportunities derived from research at the University of Manitoba and its research affiliates and on opportunities from the broader Manitoba community. The specific services offered by Incubat include:

- Office space.
- Technical development assistance.
- Funding.
- Business planning.
- Intellectual Property advice.
- Legal and accounting assistance.
- Mentoring.
- Introductions to potential customers/partners.
- Consulting advice.

The Virtual Incubation Manitoba Program is designed to assist companies in the ICT sector or other companies that are undertaking significant IT related projects, in the start-up or expansion phases of business. Assistance varies according to the needs of the participant and may include management services such as; business planning, strategic planning, and management consulting and mentoring. Participants are chosen on the basis of being a Manitoba company; having a viable IT based business concept and their personal ability. Virtual Incubation Manitoba is designed to be flexible and responsive to the unique needs of the participant and offers a somewhat tailored approach to each client.

Education

Rapid technological progress is changing jobs, altering traditional work options and increasing the educational and skill levels workers need to gain and maintain employment. Workers in the new economy must be multi-skilled, possess high literacy, numeric and computer technology skills, and be committed to learning throughout their working lives. The educational facilities supporting the ICT industry sector are the University of Manitoba, the University of Winnipeg, the University of Brandon, Red River College, Assiniboine College, South Winnipeg Technical Centre, The University of the North and a number of private vocational facilities.

The University of Manitoba provides undergraduate and graduate education in ICT related fields of study. The Departments of Electrical and Computer Engineering and Computer Sciences deliver highly skilled graduates to Manitoba firms. Both faculties offer co-op programs and the University has continuing education courses in ICT areas of study. In 2003/2004, 1104 students were enrolled in programs offered in these departments, 291 at the graduate level.

The University of Winnipeg provides a Business Computing Degree program that develops business information professionals such as application programmers, systems analysts, data analysts and system consultants. This applied undergraduate program concentrates on the analysis, design and development of computer based systems for a business environment. The University of Winnipeg also provides continuing education programs that include multi-media and web design to advanced network topologies and Internet security. In 2003/2004, 564 students were enrolled in these programs.

Red River College offers a two year diploma program in Electrical/Electronic Engineering Technology, with specializations in Communication, Computer, Electrical, Electronics and Instrumentation Engineering Technology, Computer Analyst/Programmer and Information Systems Technology. Red River also has a number of programs in the continuing education program related to the ICT sector such as a software development certificate program and information systems programmer certificate. In 2003/2004, 738 students were enrolled in these programs.

Assiniboine College offers programs in Business Information Management, Computer Systems Technology, Computer Systems Technician, Media Production, Office Administration and Web Design. In 2003/2004, 106 students were enrolled in these programs.

The South Winnipeg Technical Centre offers ICT programs including an E-Commerce Developer, Microcomputer Systems Technician and Network Support Technician. In 2003/2004, 154 students were enrolled in these programs.

Brandon University's department of Mathematics and Computer Science offers B.Sc. degree programs and B.Sc. (honors) degree programs with majors and minors in both Mathematics and Computer Science. Brandon also offers an alternative computer

concentration path with a concentration in business computer applications that can be taken within the Bachelor of Business Administration Degree. In 2003/2004, 35 students were enrolled in these programs.

The University College of the North offers diploma and certificate level Programs & Courses covering a wide area of interests. Many of their programs have full accreditation and are unique to Manitoba. UCN is also in the midst of a Distant Education initiative, which will bring their programs and courses into an estimated 24 northern communities. UCN offers regular and continuing education programs in Computer Programmer Analyst, Computer Systems Technology, Computerized Business Skills and Computerized Business Applications. In 2003/2004, 185 students were enrolled in ICT related programs.

There are also numerous private vocational facilities within the Province that provide a variety of ICT training programs.

Broadband Infrastructure

Manitoba has an advanced telecommunications infrastructure, with high-speed broadband access becoming the norm throughout the province. Over 75,000 strand kilometers of fibre-optic cabling with 100% digital switching technology is in place. Manitoba is well served by a number of competitive private carriers, including MTS, Shaw Big Pipe, Westman Communications Group, 360 Networks/Group Telecom and Telesat. Connectivity into the United States and internationally is fast, abundant and affordable.

ICT Industry and Professional Associations

Information Communication and Technology Association of Manitoba is an industry association that works to foster Manitoba's ICT Sector. It is a membership based organization that delivers value to its members through the delivery of programming, providing members with networking opportunities and by speaking to government and other parties with a single voice for its membership.

The Manitoba Interactive Digital Media Association is not-for-profit association that is dedicated to fostering the expansion and growth of the interactive digital media industry in Manitoba. The organization serves as a networking group and actively supports the partnerships and initiatives sought by organizations involved in the industry. MIDMA supports and represents the interests of interactive media producers in Manitoba.

Smart Partners of Manitoba was established to assist and advise citizens, organizations and governments with the goal of creating technically enabled communities. The activities of the organization include planning, coordinating and initiating "Smart" projects that stimulate economic development. Smart Winnipeg also pursues project partnerships and facilitates partnerships with, and for, other organizations.

The Canadian Information Processing Society's Winnipeg Chapter is a professional association which provides leadership in information systems and technologies by developing and promoting quality standards and practices, research, certification and professional development while safeguarding the public interest.

The Winnipeg Chamber of Commerce is the leading organization representing business in Winnipeg. The Economic Development Committee supports an economic development strategy for Winnipeg. The Workforce and Technology Development committee encourages the development of a skilled workforce to enhance Winnipeg's competitive position in attracting and retaining existing and emerging industry.

The Manitoba Chamber of Commerce is a provincial association of chambers and business members with a national network with a staff and members focused on strengthening the competitive enterprise system and the provincial economy through information delivery, services and lobbying.

The Manitoba Contact Centre Association (MCCA) provides Manitoba stakeholders the opportunity to create a long-term strategy to help ensure the growth of a sustainable Manitoba labour pool and to address the employment needs of the contact centre industry through public and private partnerships.

Government Programs

The Short Term Accelerator Program is to better position small and medium ICT and New Media enterprises to attract early stage financing. The ability to attract the appropriate level of early stage financing is critical to the development of these enterprises. The program is delivered through eight once a week evening seminars culminating in participants presenting to a group of venture capitalists.

The Trade Assistance Program assists Manitoba firms to launch products and services in new markets outside of the province by cost-sharing participation in recognized trade shows and cost-sharing the development of new promotional materials and websites. Participating companies must operate manufacturing facilities in the province or offer exportable services, have no more than 125 employees and be exploring new markets. While the focus has been on exporting outside of Canada, first time exports may apply for assistance to explore new non-Manitoban markets within Canada.

The Technology Commercialization Program (TCP) is a cost-shared financial assistance program that provides financial support to businesses for developing new products and processes. There are two types of applications; new Business Assistance supports the development of new products and processes, and technology transfer supports the transfer of technology to Manitoba companies from businesses and institutions. The program provides assistance up to 50% of project costs to a maximum of \$50,000.

The Feasibility Studies Program is a cost-shared study program where assistance is provided to offset the costs of hiring an independent, arms-length consultant for the purpose of researching and compiling a feasibility study or business plan. The study may

include financial analysis, market analysis, engineering analysis or a combination thereof relative to the development of a new and/or expanding manufacturing/processing facility located in the Province of Manitoba. The program provides assistance up to 50% of project costs to a maximum of \$25,000.

The Interactive Digital Media Fund was designed to enhance local producers' capacity to undertake projects for which they hold a majority of the intellectual property rights in their products and increase the overall production of Manitoba-owned new media projects. The fund provides financial assistance for the creation of original entertainment, educational or edutainment products published in a digital format or distributed through online services and destined for the general public. The program is administered by the Manitoba Film and Sound Recording Development Corporation.

KEY ICT SECTOR DEVELOPMENT ISSUES

As illustrated above, Manitoba has many ICT related strengths. However, to enable the ICT industry to take up future growth opportunities, many challenges must still be addressed. The 2002 ICTAM commissioned report "*Conditions for Growth, Retention, and Attraction in Manitoba's ICT Sector*" has been a key resource for identifying issues confronting the sector. This analysis has been strengthened by regular discussions with stakeholders in the sector. Key objectives can be divided into four distinct categories.

Business development

- Encourage coordination and collaboration amongst ICT industry, government, educational institutions and other stakeholders.
- Ensure that government's approach to ICT procurement is consistent, coordinated and inclusive of an economic development focus.
- Equip small companies with the business and/or technical skills to develop, plan, assess and export ICT products or services.
- Ensure the Aboriginal community is positioned to play a meaningful role in the sector through Aboriginal owned ICT company activity.
- Strengthen the capacity for Manitoba companies to access venture capital at all levels, but particularly at the seed level.
- Support the emerging Digital Media/New Media sub-sector in Manitoba in order to facilitate future growth.

Research and Technology Commercialization

- Increase applied R&D capacity
- Increase the rate of technology commercialization.
- Increase R&D activity in key emerging areas of economic importance.

Marketing and Investment Attraction.

- Effectively market the ICT sector inside and outside Manitoba and attract ICT investment to Manitoba.
- Assist Manitoba communities in their efforts to attract customer contact centres.

Workforce

- Ensure the availability of a highly qualified pool of knowledge workers and top tier managers.
- Work with the Aboriginal community to ensure it plays a meaningful role in the sector through employment.

ICT SECTOR DEVELOPMENT GOALS

The following strategy is designed to guide the Knowledge Enterprises branch in its efforts to address key issues and build on the strengths of the ICT sector. Our mandate is to work in partnership with key stakeholders to develop an innovation environment in which knowledge enterprise sectors can thrive. Four goals have been identified to guide the branch's activities. The goals are a direct reflection of the key issues presented above.

1. Create an environment fostering ICT business development.
2. Increase ICT research activity and the rate of technology commercialization.
3. Market the Manitoba ICT sector and attract ICT investment to Manitoba.
4. Foster a knowledgeable and growing ICT workforce.

Achieving each goal requires the identification of objectives, the formulation of tactics or initiatives to accomplish these objectives and the establishment of metrics to assess progress in achieving goals.

GOAL 1: CREATE AN ENVIRONMENT FOSTERING ICT BUSINESS DEVELOPMENT

1a) Objective: Encourage coordination and collaboration amongst ICT industry, government, educational institutions and other stakeholders.

The presence of an ICT industry association in Manitoba has long been recognized as a critical foundation for the successful development of the sector. A variety of models have been utilized in the past to provide this foundation, but for a variety of reasons, were not able to achieve the goals of the ICT community. Chambers of Commerce, ICT professional organizations, business incubators and all levels of Government have identified the formation of an industry association as a top priority. The organization would provide three critical functions, common to all industry associations;

- an aggregated voice for the sector
- a vehicle for delivering programming
- networking opportunities

In August of 2004, the Government of Manitoba announced \$130,000 of core funding over five years for the ICT Association of Manitoba (ICTAM) to ensure this foundation

for the industry. The Province holds an ex-officio position on the board of directors of ICTAM.

The establishment of this critical coordinating body will allow for the formation of strategic partnerships, ability to effectively lobby government on issues of importance to the industry and an increased ability to market Manitoba's ICT capabilities, locally, nationally and abroad.

Tactics:

- Work at the board level to assist ICTAM in delivering on its mandate and accomplishing the milestones established in its business plan.
- Establish a Ministerial ICT Advisory Group to foster communication and community-wide approaches to issues confronting the sector.

Metrics:

- Report back to Treasury Board in relation to the association's performance achieving milestones in January 2005, and provide the Deputy Minister and Minister with annual performance updates beginning in August 2005.
- Ministerial ICT Advisory Group established by March 2005.

Ib) Objective: Ensure that government's approach to ICT procurement is consistent, coordinated and inclusive of an economic development focus

An ICT Procurement Task Group was created by the Premier's Economic Advisory Council (PEAC) to review current Government ICT procurement practices and policies and to make recommendations for improvements. The Task Group examined the need to consider economic development issues in the ICT procurement process and the need to ensure that procurement policies and practices provide the best possible value to Government. It presented a series of recommendations to PEAC in early December 2003, which were adopted by PEAC.

In January 2004, the Community and Economic Development Committee of Cabinet (CEDC) directed the Department of Energy, Science and Technology (EST) to undertake further analysis of PEAC's recommendations and coordinate the development of an implementation strategy.

An interdepartmental steering committee and working group was formed and an implementation strategy devised that addresses the PEAC Task Group's recommendations and makes additional recommendations aimed at improving efficiencies for Government. The document deals with organizational and structural issues pertaining to how ICT procurement is conducted within Government and also details procurement processes and principles developed by the working groups.

Tactics:

- Present the strategy to the PEAC taskforce, PEAC and CEDC, making the required amendments at each approval step.

- Assist MICT in its efforts to implement the strategy after final approval.

Metrics:

- Strategy approved by PEAC taskforce by October 2004, PEAC by November 2004 and CEDC by January 2005.
- Enter into discussions with MICT about a vendor relations role.

Ic) Objective: Equip small companies with the business and/or technical skills to develop, plan, assess and export ICT products or services.

The Technology Commercialization Program and Feasibility Studies Program are designed to assist companies address skills gaps when developing a product or service for market. The utilization of these programs is significant, with six ICT companies in the last year (August 2004) availing themselves of the 50% matching grant contributions these programs offer. However, given the size of the sector and number of SMEs more companies should be taking advantage of these programs.

The ICT business community has consistently asked for more assistance with trade matters. Manitoba Trade and Knowledge Enterprises Branch have formed a small team to work together to facilitate trade development in the ICT sector.

Tactics:

- More aggressively market the TCP and FSP programs utilizing our website, and public events to communicate with interested parties.
- In partnership with Manitoba Trade, continue to meet with industry to introduce vehicles for trade show assistance, marketing material development and other trade related assistance.
- Provide links to Manitoba Trade and trade assistance programs through our website.
- Participate in the recruitment and facilitation of selected outgoing ICT missions.
- Work with Manitoba Trade to structure an incoming mission program, leveraging relationships with Industry Canada/DFAIT.
- Attend/Exhibit at relevant ICT Trade Shows.
- Facilitate trade related information sessions for industry.

Metrics:

- TCP/FSP website marketing in place by December 2004.
- Two TCP/FSP speaking engagements undertaken by March 2005.
- In person meetings with 30 ICT companies to introduce programs and explore options for trade development by April 2005.
- Comprehensive sector information to Canadian Embassies, Consulates and/or High Commissions in the top 5 export markets identified by the sector which are US, UK, Mexico, Germany and Australia by April 2005.

- Attendance and participation in the recruitment of companies for all identified ICTAM missions to Minneapolis, the first of which is scheduled for November 2004.
- One incoming mission from the UK, Mexico or Australia by August 2005
- Facilitate TechMadness luncheon featuring Export Development Canada and other provincial trade programs by November 2004.
- Leverage ICTAM's presence at Tech 2004 in Brandon in November.

Id) Objective: Ensure the Aboriginal community is positioned to play a meaningful role in the sector through Aboriginal owned ICT company activity.

In Manitoba, there are a small number of ICT companies owned and operated by Aboriginal people. Research has demonstrated that Aboriginal persons are much more likely to succeed when working in the culturally familiar environment of an Aboriginal company. Aboriginal owned and operated ICT companies are essential locations for Aboriginal people with ICT skills.

In July 2004, the Knowledge Enterprises Branch working with the Procurement Services Branch established that 5% of ICT tenders would be evaluated and scored on the partnerships and involvement of Aboriginal ICT companies.

Tactics:

- Continue to facilitate partnerships between Aboriginal owned ICT businesses and other ICT businesses through informal relationship meetings.
- Work with Procurement Services Branch to schedule an event or publication to showcase the capabilities of Aboriginal owned ICT companies.

Metrics:

- Aboriginal owned ICT businesses winning or participating as a partner in two winning ICT bids by August 2005.
- An event held and or a publication produced profiling Aboriginal owned ICT companies capabilities by March 2005.

Ie) Objective: Strengthen the capacity for Manitoba companies to access venture capital at all levels, but particularly at the seed level.

The vast majority of Manitoba-based ICT companies are small enterprises. Access to equity capital is essential if many of these companies are to grow to medium sized enterprises that are internationally competitive. As in many locations, access to capital for ICT ventures needs to be strengthened, particularly at the seed and pre-seed stages. Manitoba entrepreneurs also require increased skills to effectively market themselves to potential investors.

Tactics:

- More aggressively market the short term accelerator program. The objective of the program is to better position small and medium ICT and New Media

- enterprises to attract early stage financing. Utilize our website, and public events to communicate with interested parties.
- Working with partners sponsor two educational seminars on investing in local ICT companies to provide both knowledge and understanding of the financial process from the companies and the investors prospective.

Metrics

- Website marketing in place by January 2005.
- Two venture capital educational seminars held by August 2005.

If) Objective: Support the emerging Digital Media/New Media sub-sector in Manitoba in order to facilitate future growth.

The new media or digital media sector is an emerging sub-sector within ICT and represents a significant opportunity for growth. While there are several larger companies and a number of small companies in Manitoba that do business in the area, there is potential to facilitate further cross fertilization among business, research and educational stakeholders to promote innovative collaborations.

Tactics:

- Facilitate greater communication and collaboration among stakeholders in the new media sector, including brokering dialogue between potential users and providers of technology.
- Develop a New Media sector strategy including an inventory of the sector's strengths and identifying areas of opportunity for Manitoba.

Metrics:

- By the end of March 2005, facilitate or lead four strategic meetings among industry stakeholders to begin the process of exploring new opportunities for collaboration.
- A New Media sector strategy completed by August 2005.

GOAL 2: INCREASE ICT RESEARCH ACTIVITY AND THE RATE OF TECHNOLOGY COMMERCIALIZATION

2a) Objective: Increase applied R&D capacity

The ICT R&D chain can be considered in terms of basic R&D, pre-competitive R&D, applied R&D and commercialization. Manitoba needs a balance between curiosity-based basic research and applied research that has commercial application. Investments in R&D can help attract new specialized talent and firms, and lead to local technology commercialization and new technology based start-ups.

The Province directly invests into applied ICT R&D through its sponsorship of TRILabs Winnipeg lab. The Province has been working with TRILabs to ensure the organization is well positioned to conduct R&D that is relevant to Manitoba companies.

TRLabs was awarded a \$10.6 million in Canada Foundation for Innovation and provincial funding, for the establishment of TRNet, a prototype of future optical and protocol-based networks. TRNet is an extremely high speed optical communications wide-area network between Edmonton, Calgary and Winnipeg. It operates as a crash and burn test-bed for research and development purposes. The network nodes in Edmonton and Calgary are operational, and the Winnipeg node is expected to be online by March 2005.

Tactics:

- Work with the University of Manitoba and other stakeholders to create a comprehensive directory of existing ICT research capacity.
- Consult with MTS, CanWest Global and other large ICT firms to identify R&D opportunities.
- Continue to work with TRLabs to structure the Manitoba lab to deliver value to the Manitoba ICT sector. Undertake an international peer review of TRLabs operations in coordination with other Provincial Government sponsors. Continue to work with TRLabs to ensure that TRNet becomes operational in the near future.

Metrics:

- ICT R&D Directory prepared by August 2005.
- Meetings held and analysis of R&D opportunities undertaken by March 2005.
- International Peer Review of TRLabs operations complete by March 2005. TRNet operational by November 2004.

2b) Objective: Increase the rate of technology commercialization.

Incubat is a business incubator formed by a joint venture between the University of Manitoba and two Incubat managers; Genesys Venture Inc. (GVI) and e-Stage Capital Inc (e-Stage). Incubat's objective is to provide critically needed management, business, and financing experience to early stage companies in the Life Science (GVI) and Information Communication Technology (e-Stage) sectors. The University of Manitoba provides Incubat with new technology ventures through a University program called VentureBox and the SpringBoard Fund provides initial financing for the first year. Other new local innovative enterprises are also eligible to locate in the facility. To date, e-Stage has accepted five companies from the community into the incubator and is assessing a number of prospective University-based opportunities.

Tactics:

- Engage a consultant to assess the operations of Incubat at the University of Manitoba SMARTpark and recommend actions to increase its ability to incubate and graduate successful new ventures.

Metrics:

- Incubat assessment report complete by April 2004.

2c) Objective: Increase R&D activity in key emerging areas of economic importance.

Manitoba has a significant opportunity to build upon existing research strengths and assets in several key emerging areas including nanotechnology, digital media, medical imaging, bioinformatics, health informatics and telehealth.

Nanotechnology is an emerging field which has research and commercial application in a host of other areas. The University of Manitoba Scanning Probe Microscopy and Nanofabrication Laboratory is a leading facility in Canada with R&D capacity in probe microscopy, micromachining and nanofabrication, semiconductor manufacturing, and high frequency microelectronics and microwave circuit testing. An opportunity exists to create commercial linkages leveraging the R&D capacity of this group.

Digital media is a large and growing area of commercial and research activity. Digital media encompasses a broad area of activity from medical imaging to video games. To understand the importance of the sector it is interesting to note that the video game industry now generates more revenue than the film industry on a global basis. Digital media is about the generation of content utilizing specialized technological tools and communicating this content through networks often utilizing innovative networking applications. The government of Manitoba has identified Digital Media as a priority area for development in the *Manitoba at the Forefront of Innovation Report*. The development of a Digital Media Centre of Excellence (Centre) was a key commitment of the government set out in the Report's deliverables or targets.

The Centre will form the cornerstone in the government's strategy to develop Manitoba as a key player in Digital Media research, education and business development. The Centre will promote and develop research, technological innovation and new products within the Digital Media industry. Ultimately the Centre will create science and technology jobs providing social and economic benefits to the province.

The Province has been in discussions with TRILabs, RRC and the University of Manitoba, and private sector stakeholders about the development of a Digital Media centre business plan. A business plan is expected by the spring of 2005.

Manitoba has a world class research infrastructure in the life sciences sector. The intersection of Life Sciences and ICT is an area of enormous growth both in terms of research and commercial opportunity. Specific opportunities exist in the areas of bioinformatics and telehealth in Manitoba.

In many aspects, biology is becoming an information science; many important questions in biology are now being addressed, at least in part, through interactions with computer science and applied mathematics. Scientists can now produce immense datasets that allow them to look at biological information in ways never before possible. Once a large resource of biological data or information becomes available, however, it becomes a

challenge to use that resource effectively. The new field of bioinformatics aims to develop the computational tools and protocols needed for establishing, maintaining, using, and analyzing large sets of data or biological information.

Telehealth is the use of information technologies to link care providers and patients over short or long distances.

MBTelehealth is one of 27 federally funded telehealth projects funded in the spring of 2001. The goal of MBTelehealth is to provide quality information and knowledge at the point of care, for all Manitobans, wherever they reside. MBTelehealth utilizes information technology to achieve this goal.

For telehealth to grow new and innovative technology solutions need to be developed. Manitoba is well placed to meet this need with a group of interested stakeholders in the research, health delivery and commercial sector.

A consultant has been engaged to identify these opportunities and map out a strategy for developing R&D in the area.

The R&D capacity in bioinformatics and telehealth needs to be strengthened to ensure Manitoba realizes these opportunities.

Tactics:

- Discussions held with the University of Manitoba Scanning Probe Microscopy and Nanofabrication Laboratory staff to assemble material for marketing purposes.
- Continue ongoing discussions with TRILabs and other stakeholders regarding the formulation of a Digital Media Lab proposal.
- Engage a consultant to develop a bioinformatics sector business plan in consultation with other funders.
- Receive consultants report investigating R&D opportunities associated with telehealth in Manitoba. Assess findings and create action plan.

Metrics:

- The University of Manitoba Scanning Probe Microscopy and Nanofabrication Laboratory capabilities profiled on KE website.
- Digital Media proposal received by spring 2005. Analysis of proposal and recommendation to Government regarding funding complete by summer 2005.
- Development of a bioinformatics sector business plan by June 2005.
- Telehealth report received by November 2004. Action plan in place by March 2005.

GOAL 3: MARKET THE MANITOBA ICT SECTOR AND ATTRACT ICT INVESTMENT TO MANITOBA

3a) Objective: Effectively market the ICT sector inside and outside Manitoba and attract ICT investment to Manitoba

In a global economy, it is a challenge for Manitoba to attract high value added industries where wages and scales of production are central. However, the province is well placed to attract companies engaged in the production of specialty products and high-end services that require a highly skilled workforce using high-tech equipment. Manitoba's advantage lies in moving up the value chain to concentrate on niche areas where it can compete globally.

In order to attract investment and support future growth, Manitoba must market the strengths of its ICT sector and supporting infrastructure and demonstrate critical mass in niche areas.

Tactics:

- Develop a Branch website to profile the sector and showcase the capabilities of Manitoba ICT companies, and promote Manitoba as a great place for ICT companies to invest.
- Develop a suite of printed materials and complementary PowerPoint presentations for promotion of the sector outside of Manitoba.
- Explore opportunities for a Virtual Trade Show function on the web in concert with Manitoba Trade
- Create & leverage relationships with external governments and organizations to promote MB companies and their capabilities. Such relationships will include Canadian Embassies, Consulates and/or High of MB companies, ICT Associations/ Technology Business Councils and Chambers of Commerce.
- Update in-house proposal to enable timely and effective response to investment RFPs/RFIs.
- Selected prospecting of ICT investment projects, including possible joint prospecting program with MB Hydro.

Metrics:

- Website in place by January 2005.
- Make marketing materials available to the local ICT community to support their internal marketing & trade efforts. Notice of availability distributed by April 2005.
- Engage MB Trade and Web Development personnel (MICT) in discussions around the development of a Virtual Trade Show feature on KE website.
- Provide comprehensive sector information to Canadian Embassies, Consulates and/or High Commissions in the top 5 export markets identified by the sector, which are the US, UK, Mexico, Germany and Australia by April 2005.

- Update in-house proposal to enable timely and effective response to RFPs/RFIs by August 2005.
- Specific business opportunities to be identified with MB Hydro (ie. Data storage etc.) and a complementary framework for action to be developed by April 2005.

3b) Objective: Assist Manitoba communities in their efforts to attract customer contact centres.

Manitoba is home to a thriving customer contact industry, which has grown to 10,000 employees. The Province assists communities working to attract customer contact centres, and continues to respond to incoming inquiries in keeping with the economic priorities of both communities and the Province.

Tactics:

- Continue to assist communities seeking to attract customer contact centre investment

Metrics:

- Annual feedback sought from communities regarding satisfaction with Provincial assistance commencing August 2005. Status report prepared for Deputy Minister and Minister.

GOAL 4: FOSTER A KNOWLEDGEABLE AND GROWING ICT WORKFORCE

4a) Objective: Ensure the availability of a highly qualified pool of knowledge workers and top tier managers.

Prior to the contraction in the ICT sector beginning in 2001, new ICT related postsecondary graduates were hired into meaningful well remunerated jobs as soon as they graduated. Many people working in the sector experienced regular and large increases in pay or rapid promotions. The ICT human resource market has changed radically since these heady times. Senior level ICT project managers with deep knowledge of key sectors like financial services are still much in demand, but demand for other occupations is less clear. Anecdotal evidence appears to indicate that there is renewed demand for persons with ICT skills, but at a more modest level than prior to the retraction in the sector. An assessment of the ICT human resource situation in Manitoba needs to be undertaken so that an accurate picture can be formed allowing decisions to be made as to what actions are most appropriate to support human resource development in the sector.

Tactics:

- In partnership with other stakeholders, engage ICTAM to assess the state of the ICT workforce in Manitoba and identify key issues requiring attention.

Metrics:

- ICT workforce study completed by April 2005.

4b) Objective: Work with the Aboriginal community to ensure it plays a meaningful role in the sector through employment.

The number of Aboriginal people working in the ICT sector is very small by any measure. This is troubling for a number of reasons, but especially so given that one in four new job seekers is of Aboriginal origins in Manitoba. Government needs to act to create an environment where Aboriginal youth are aware of the opportunities in the sector, the educational requirements to work in the sector's various occupations and the Government and private sector assistance available to those who choose this career path.

Tactics:

- Devise a strategy designed to make Aboriginal youth aware of, and interested in, ICT career opportunities, understand associated educational requirements and available assistance.

Metrics:

- Aboriginal engagement strategy in place by January 2005.

CONCLUSION

The strategy presented above focuses on key objectives with tactics that have measurable outcomes ensuring performance accountability. However, the metrics employed are specific to the tactics required. Together, the accomplishment of the objectives outlined will assist in the creation of an environment in which the ICT sector can flourish in Manitoba. With this in mind there are key sector wide measures that need to improve if this strategy is to be deemed a success. These include:

- The number of companies operating in Manitoba
- The number of persons employed in the sector
- The number of firms exporting to new markets
- The number of companies emerging out of post secondary institution research and commercialization activity.

An annual assessment of these measures will be undertaken and reported to key stakeholders. It is important to recognize that any success in relation to these measures is the result of the actions of those companies, research institutions and individuals active in the ICT sector. The Knowledge Enterprises Branch's role is to create an environment conducive to the success of these individuals and organizations.

APPENDIX A

ICT Industry Sector – NAICS Code Classifications

Industry Group	NAICS Code	Description
Manufacturing (Value Added)	334	Computer and electronic manufacturing
	335	Electric equipment appliance manufacturing
Services (Enabling)	4173	Computer and communications equipment and supplies wholesale distributors
	5133	Telecommunications
	514	Information services and data processing services
	5414	Specialized design services
	5415	Computer system design and related services
	8112	Electronic and precision equipment repair and maintenance

APPENDIX B

<i>NOC</i>	<i>Occupation and Title</i>	<i>Abbreviated Name</i>
A122	Computer and Information System Managers	Managers
C033	Electrical and Electronics Engineers	Electrical Engineers
C047	Computer Engineers (except Software Engineers)	Computer Engineers
C071	Information Systems Analysts and Consultants	System Analysts
C072	Database Analysts and Data Administration	Database Analysts
C073	Software Engineers	Software Engineers
	Computer Programmers and Interactive Media	
C074	Developers	Programmers
C075	Web Designers and Developers	Web Design Operators/ Technicians
C181	Computer and Network Operators and Web Technicians	Technicians
C182	User Support Technicians	User Support
C183	Systems Testing Technicians	Testing
F141	Graphic Designers and Illustrators	Designers