PREMIER'S TECHNOLOGY COUNCIL

- Skilled Technology Workforce
- Leader in e-Health, e-Education & e-Government
- Computer Literate Population
- Connected Communities
- World Class Technology Industry
- **Global Technology Hub**

We believe that with strong cooperation between the provincial government and private enterprise, British Columbia will be one of the world's top ten technology centres.

Every effort has been made to consider all information obtained and to be as accurate and consistent as possible in our use and analysis of all research materials. However, errors or omissions may have occurred. Please notify the Premier's Technology Council of any significant inaccuracies by e-mail at:

Premiers.TechnologyCouncil@gems8.gov.bc.ca

In Memory of Len Juteau

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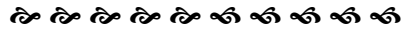
As this report went to print, we learned of the death of our friend and colleague, Len Juteau, who passed away on Friday, April 15.

Len was the Director of Operations for the Premier's Technology Council. His commitment and contribution to the Council were extraordinary as he worked quietly behind the scenes to ensure that everything ran smoothly.
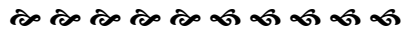
As he was a modest man many were unaware of Len's distinguished background. Graduating first in his class in engineering from Royal Roads Military College, he served as a much-decorated member of Canada's Armed Forces in senior positions. After 21 years, he retired as a Lieutenant Colonel and embarked on a new career with the BC government.

A true advocate for science and technology, Len was a key driving force behind the growth of BC's innovation culture, spearheading the science and technology infrastructure programs though the Science and Technology Division. His extensive involvement with the community, industry and post secondary institutions helped to advance many programs in the province such as the Network Centre of Excellence, University Industry Liaison Offices, Regional Science and Technology Councils, and the BC Advanced Systems Institute.

Accustomed to positions of significant responsibility, he handled the demanding workload with grace and humour. His staff and colleagues considered him both an enthusiastic mentor and a true friend. Above all, Len was a fine man of great character whom we are proud to have known. We will all miss him profoundly.

Our deepest sympathies are with his wife Ann and children David, Jason, Carrie and Sean.

This 7th Report of the Premier's Technology Council is dedicated to his memory.

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Foreword

The Premier's Technology Council (PTC) was created in August 2001 to provide advice to the Premier on technology-related issues. The mission of the Council is to help make British Columbia one of the world's top ten technology centres.

The Honourable Gordon Campbell is Chair of the Council, a position shared with the Co-Chair, Paul Lee, Executive Vice-President and Worldwide Studios Chief Operating Officer, Electronic Arts Inc. The Council is fortunate to draw its membership from 20 other leaders of BC's technology industry and from senior levels of the academic sector who generously volunteer their time and expertise.

This 7th Report begins on a positive note: tremendous progress has been made in transforming British Columbia's economy and in reaping the benefits of high technology in the public and private sectors. Through the PTC's consultations, stakeholders have affirmed that the province is moving in the right direction. Equally important, they urged the Council to continue to press forward with recommendations that will maximize the province's high-tech potential.

The 7th Report addresses our traditional areas of interest including the digital divide, government operations and industry development. As in all previous reports, we lead off with the digital divide which is still the PTC's highest priority. The potential benefits for economic development and improved government services, such as health and education, are immeasurable. A broadband network is as important as the rail system was a century ago, the air transportation and road transportation network was a half century ago, and the telecommunications and satellite network was 30-40 years ago.

The PTC has been deeply impressed with the level of collaboration among community leaders, passionate advocates of broadband in local areas including First Nations, government and non-government organizations, as well as industry, in providing broadband throughout BC. The PTC is pleased to note that through outstanding leadership, creative thinking and public, private and community cooperation, government has signed a strategic partnership agreement that will connect all 366 BC communities to affordable broadband connectivity by the end of 2006. This initiative is clearly an innovative example to emulate.

The 7th Report also touches on several other areas in both the public and private sectors. Health care is the number one public policy priority of British Columbians and e-health is central to high quality and efficient patient services. The PTC makes several important recommendations regarding an Electronic Health Record strategy, a unique client identifier, and common standards across health authorities.

Consistent with our focus on the private sector, we examine new opportunities for growth and competitiveness. This report looks at the power technology sector in depth, based on a report the PTC commissioned, entitled *A Vision for Growing a World-Class Power Technology Cluster in a Smart, Sustainable British Columbia*, and urges the province to pursue the strategies that study outlines to secure BC's position as a world leader. The Province has responded positively to the report and created an Alternative Energy and Power Technology Task Force to address the recommendations put forth in the *Vision* report. This Task Force will help to take the sustainable energy sector, one of the most promising areas of high-tech, to the next level of its development. Finally, this 7th Report contains a brief section on commercialization which foreshadows more specific recommendations the PTC plans for its 8th Report.

More than ever, the PTC is convinced that technology is key to the economic future of the province. Clearly, there are opportunities to continue to grow the sector as well as opportunities for synergies among new technology and traditional industries. Above all, we must realize that the world has changed and we are now in the position to make the right public policy choices to secure our high-tech leadership.

Jim Mutter
President, Premier's Technology Council

Executive Summary

Progress towards making British Columbia one of the world's top technology jurisdictions will be made through incremental steps, but it is often the bold leadership and decisive actions of government that send signals to the world about our commitment to the goal and put us on the right path. In this 7th Report, the Premier's Technology Council takes stock of some of these decisive actions and looks forward to new ones. To this end, we present 15 new recommendations.

The province's commitment to expanding broadband to all communities, large and small, was one such defining moment that delivered a clear, unequivocal message. The government recently announced a partnership agreement that will close the digital divide by the end of 2006. In the area of government operations, the reform and modernization of the government's $8 billion procurement system was a much needed initiative. Today, both government and business consider the Joint Solution Procurement (JSP) process to be a major advance. Yet other successes have been reforms to provide more seed capitals to the technology community, such as the venture capital program in the *Small Business Venture Capital (SBVC) Act*. After changes were made in 2003, the feedback from the community has been positive and industry has gained much needed early stage capital. The Scientific Research and Experimental Development (SR&ED) tax credit has been a brilliant way to foster innovation in both the technology sector and the economy more broadly.

British Columbia's economy is in a transition phase, and government is playing an important leadership role in partnership with the private sector, academic institutions, and non-governmental bodies. Going forward, this report encourages the province to fine tune its efforts both in terms of the management of its own operations, such as IT Procurement, and the development of policies to attract and retain world class companies.

For instance, while the JSP improves the efficiency of the procurement system, it is useful for the largest projects. Stakeholders have suggested that criteria be developed to assess whether an abbreviated version of JSP is more appropriate for smaller projects. There is also a continuing need for improved strategic planning in IT procurement, with centralized leadership and clearer communications to the vendor community.

Also within the area of government operations, this report devotes considerable attention to health care – British Columbians' number one public policy priority -- and how the application of technology can improve quality of care as well as cost-effectiveness of the system. The

expansion of broadband provides critical foundations for e-health. British Columbia now has the opportunity to "get it right" up front, with tremendous long-term benefits. This report provides a detailed update on e-health and reviews the technology for electronic health care, the regional health authority strategy, infrastructure and standards for e-health, the physicians' electronic medical records, and clinical applications of technology. The PTC is firmly convinced that the province must move forward with measures such as a unique client identifier, electronic health records and telehealth applications.

Competitiveness is the cornerstone of BC's drive to become a top technology jurisdiction. In a world in which skilled professionals are in high demand globally and capital moves instantly, BC has to offer investors and knowledge workers good reasons to make this province their destination of choice. Thus, this report devotes considerable attention to industry development and the role that government can play. In particular, the PTC revisits its recommendations on capital and investment from its previous reports.

In its consultations, the PTC learned that there are funding gaps at the pre-commercial phase, which is research intensive, and at the pre-IPO-stage just prior to getting the product to market and the beginning of large-scale development. To close these gaps, the PTC recommends again that Victoria remove the individual annual limit in the provincial *Income Tax Act* for angel investors. Furthermore, because the federal government is closely involved in taxation matters, the province needs to work with Ottawa in such areas as eliminating double taxation for foreigners, supporting the creation of a national model based on the provincial Equity Capital Program (ECP), and extending the loss carry-forward provision from the existing 7 year period to 20 years (the newly enacted US limit).

While capital shortages pose problems for British Columbia firms, they often also lack essential human resources. To attract top talent, the PTC recommends that the province create an accurate inventory of current and projected technology sector skills and enact tax measures to attract entrepreneurs and skilled workers, as well as work with industry to develop immigration policy recommendations that will help attract the senior talent that is essential to growing BC's technology companies.

Finally, this report discusses innovation and commercialization, areas in which the PTC is currently conducting consultations, as well as two subsectors of high technology, power technology and new media. The PTC endorses a recent study it commissioned on the power technology sector, and urges the province and its partners to focus their efforts on five especially promising areas: remote power solutions; sustainable urban practices; smart urban transport; smart grid; and large scale clean, green power production for the western power market. The Council recommends that the province pursue the strategies outlined in the study to advance the power technology industry and secure BC's position as a world leader in the power technology sector. The PTC is pleased to note that government has responded

positively to the report and has created an Alternative Energy and Power Technology Task Force to address recommendations put forth in the *Vision* report.

Within the new media sector, computer technology is transforming entertainment with a convergence occurring between gaming and motion pictures. The PTC believes that BC could be a world leader and encourages the province to extend the Digital Animation or Visual Effects tax credit to this area and establish a graduate-level program in digital entertainment technology to attract promising knowledge workers.

The PTC is gratified that the provincial government has acted upon or implemented over 90 percent of its recommendations. Throughout its provincial consultations, the PTC has received many favourable comments about the progress that has been made, tempered with the realization that steps still need to be taken.

The Council believes that technology is key to the province's economic prosperity in the future. From 1992 to 2002, the high technology sector's GDP has increased by 132% (from $1.5B to $3.4B)[1]. The PTC, therefore, continues to urge the province to maintain the momentum to achieve the goal of making British Columbia one of the world's top technology centres.

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[1] BC Stats, BC Ministry of Competition, Science and Enterprise, "Profile of the British Columbia High Technology Sector: 2003 Edition".

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Digital Divide – Broadband

From its inception, the PTC has regarded broadband as its top priority. Broadband has been raised as an issue at the PTC's consultations and events throughout the province. All six previous reports have underscored its importance. As the PTC observed in its 6th report, *"If the regions were loud in their demand/need for broadband two years ago, they are screaming for it today. They want broadband and they want it now."* Even when other subjects such as e-health and e-learning were discussed, broadband was inevitably linked to them.

The Council is pleased to note that the government has taken an important step forward to close the digital divide. A recent announcement revealed a partnership agreement between the province and TELUS that will bring affordable broadband connectivity to all 366 BC communities by the end of 2006. This impressive achievement is due in no small part to partnerships among the public sector, private sector, and non-governmental organizations. As the PTC's 2nd report observed, broadband is a community effort, involving telecommunications providers, Internet Service Providers, First Nations, libraries, health facilities, schools, businesses, and government agencies. The PTC commends all stakeholders for their contributions in finding creative solutions to bridge the digital divide while financial resources were limited. The results of their joint efforts bode well for future cooperation to make BC a top technology jurisdiction.

Key to the digital divide initiative was the creation of NetWork BC which has been leveraging public sector telecommunications purchases through its dedicated group of government network experts. If vendors want to sell telecommunications to the provincial government they need to be involved in providing a solution to underserved communities. NetWork BC is going further than anyone originally contemplated and it is collaborating with other governments and communities to assist in last-mile solutions. Broader public sector CIOs are unanimous that Network BC has been an extraordinary initiative.

Details on the partnership agreements including a detailed schedule can be found at NetWork BC site at http://www.Network.gov.bc.ca/.

First Nations

First Nations people are passionate and articulate about what they believe the benefits of broadband service will be. They see it bringing economic development opportunities, better

health and education services, and better access to social services. They even see the possibilities it presents for cultural matters such as language preservation.

From its travels throughout the province and its extensive consultations, the PTC has concluded that First Nations have a special need. While broadband is important, broader issues must be addressed if the benefits of broadband are to be fully realized. These broader issues include computer availability, computer literacy, availability of technical support, community leadership and so on. To address these, the PTC has previously made the following recommendation:

Recommendation 6.8
The PTC recommends that government, through NetWork BC, in cooperation with other ministries, lead a process whereby a comprehensive and focused team (possibly federal/provincial) work with First Nations to address digital divide issues and government services such as e-learning and e-health.

Though well-intentioned, the recommendation, in retrospect, was not strong enough. At the provincial level, NetWork BC has a clear mandate to provide broadband services throughout the province. It also has the authority to cut across ministry lines and to provide government leadership where necessary to achieve its objective.

Although the province has made a clear and focused effort to bridge the digital divide, realizing the full benefit of broadband in the First Nations communities will also require active federal government participation. The Council believes that providing a broadband connection to a First Nations community is only part of the answer. Providing an <u>effective</u> solution is the real challenge, and it will require a collaborative effort by the federal and provincial governments in cooperation with First Nations.

The key is a provincial/federal task force where each party has the expertise, resources and authority to represent its government and to focus on getting the job done. The PTC acknowledges the effort made in 2003 by the Province, in cooperation with the First Nations Summit, where the parties, together, approached the federal government to propose a joint working group to address issues in an integrated, comprehensive fashion. Ultimately, the PTC is convinced that only a joint, targeted effort will ultimately succeed and it urges the Province to try again. To that end, the PTC recommends:

Recommendation 7.1
That the provincial government work with the federal government to create a Joint Task Force with the expertise, authority and resources to provide broadband and related services to First Nations communities in British Columbia wherever reasonably possible. The Task Force must also have First Nations representation.

Government Operations

e-Health

INTRODUCTION

All stakeholders in the healthcare sector acknowledge the significant value that technology can provide in enhancing the quality of healthcare and in helping to control healthcare costs. Given the high priority that the government has placed on the improvement of health services for the citizens of British Columbia, e-health remains a critical area of study.

In consultation with the health authorities, the Ministry of Health Services continues to develop its vision for the evolution of an electronically enabled health system. Progress is being made towards the establishment of a healthcare system that will deliver the right information at the right time to the right people to support personal health, healthcare decision-making, and healthcare system sustainability. If British Columbia's e-health strategy is well executed, it will markedly improve the quality of care and the efficient delivery of health services, as well as enhance the ability to achieve many best practices. The leadership and budgetary challenges are, nonetheless, significant. The Council believes that e-health can deliver visible benefits within two years but will continue to evolve over as much as 10 years.

Other challenges include collaboration among all stakeholders in the healthcare system, management skills, innovation in work processes and leadership. The formation of a well crafted provincial strategy founded on a common architecture, shared services wherever benefits and costs can be leveraged, and regional deployment of business and clinical systems will require the constructive participation of the Ministry of Health Services, regional health authorities, and all healthcare professionals and their respective organizations.

This report provides a review of the status of e-health and makes several key recommendations.

ELECTRONIC HEALTH TECHNOLOGY

The communications technology and software applications necessary to provide a robust e-health solution currently exist. It is, therefore, timely to consider investment in the infrastructure and

applications that are required, while recognizing the following:

- The electronic health record is not a single centralized electronic record or database. Rather, it is a combination of applications, databases and work processes and policies that provide a secure, integrated view of persons (the clients of the system) records.

- Each person in the BC healthcare system will be uniquely identified as a client in the electronic healthcare record systems.

- Information required to make a clinical healthcare decision for a client will be accessible in a single integrated user interface and will be delivered in a timely manner to healthcare professionals at the point of care.

- Individual rights for personal privacy, confidentiality and information security will be protected by appropriate standards.

- The e-health system will empower clients to participate in the management of their own care and to interact electronically with the healthcare system.

- Delivery of health services will function as a system that provides a local community with primary care (physicians and community hospitals), leveraged by regionally-based secondary and tertiary care, and supported by province-wide specialized services. This coordinated system will enhance the speed of care delivery, the quality and timeliness of clinical information and the referral to appropriate clinical expertise while maximizing productivity.

- Systems and applications will be deployed to match the scale of the regional health service organization, extending workflow, leveraging resources across the regional enterprise, and operating on industry standards that will ensure inter-operability across the province and throughout Canada.

- Information will be acquired digitally only once, eliminating redundant record keeping.

- Clinical decision support and medication safety systems will be implemented to reduce medical errors, as outlined by the Institute of Medicine.

REGIONAL HEALTH AUTHORITIES

The Council supports the regional health authority strategy initiated by the government a number of years ago. The strategy balances community care with integrated delivery systems that have sufficient scale to provide the full continuum of care. The PTC believes that the formation of five geographic regions, plus the Provincial Health Services Authority, is "right-sized" to maximize best industry practices.

The regional strategy is a key platform upon which the success of the e-health system will be built. The decision to establish health authority mandates that address the complete continuum of care

creates the opportunity for an integrated solution that will "maximize health" rather than treat "acute care illness". The process of transforming each health authority represents a complex challenge and requires rationalization of systems to balance near-term costs and long-term benefits.

Each of the health authorities must address its own unique community requirements and rationalize operations to maximize efficiency of the enterprise. This will require strong leadership and management skills. While each health authority is making progress to a varied degree, the Council encourages them to continue to collaborate on the adoption and implementation of province-wide best practices and standards. It is expected that the evolution of the regional healthcare enterprises will continue over the balance of this decade.

INFRASTRUCTURE AND STANDARDS

The foundation of an effective e-health system is investment in infrastructure, definition of standards, and a detailed architectural strategy. It is important that provincial architecture and standards are also consistent with the federal Canada Health Infoway initiative to ensure an eventual pan-Canadian integration. Failure to invest in the "blueprint" will cause delays and additional costs in the long term.

- The objective of making broadband network services available to all acute care healthcare facilities has made significant progress. All health authorities reported service to most of their facilities with schedules for completion; some health authorities have successfully installed high-speed communications links to all facilities. This achievement is a direct result of the government's efforts to close the "Digital Divide".

- The Ministry of Health Services and health authorities have adopted a strategy to create a single unique client identifier (a master person index - MPI). The client identifier will be the standard for identifying individuals in the healthcare system, and will also be the master reference against which each application in the system that will synchronize their client-centric records. The implementation of this program is in the early stages.

- All health authorities are working towards a single platform for system security and access. This collaboration will help resolve incompatibilities in legacy systems, and is the first stage in creating a system that will enable electronic access across regional systems, where specific rights of access to records need to be determined.

- A Provider Registry, which is an accurate record of healthcare providers utilizing the e-health system, has been developed.

THE e-HEALTH USER EXPERIENCE

The essence of the e-health system is the interface that occurs between each segment of the healthcare system - primary care or specialist physician, nurse, medical technician, system analyst and patient. It is the computer screen, or user interface, that will represent the access point, or portal, of the system. A positive user experience is essential. To ensure this, best industry practice will dictate the need to:

- Provide integrated access to health information through a single application with common workflow and a customized user interface (nurse, physician, diagnostic specialist, etc.).

- Integrate with other information systems using defined common standards across the entire province.

- Optimize performance for intra-regional transactions, and collaborate inter-regionally to make the aggregation of records across the province transparent.

- Access patient records via the provincial 'unique client identifier'. This is linked to the Provincial Health Number which in turn links to the many existing clinical system records which have utilized a variety of identification numbers to date.

- Utilize industry standard Internet communication and display protocols and applications.

- Provide access to specific information that will empower patients to better manage their own healthcare. Possibilities for such access include the ability to confirm the status of a scheduled clinical event and modify it; to confirm that a diagnostic test has been delivered to the patient's physician for review; to confirm that the patient is on a scheduled list for surgery and that the expected wait-time is consistent with the priority of the treatment; to identify comparable waiting times in other regions, should the patient wish to receive care in an area where the waiting time is less; and to access Internet links to preferred sources of healthcare information.

- Provide the platform for the development of systems capabilities to support multi-disciplinary planning and care delivery.

PHYSICIANS' ELECTRONIC MEDICAL RECORDS

A comprehensive e-health information system will provide data exchange with electronic medical records (EMR) maintained by private practice physicians, permitting a two-way flow of information. The quality of medical care will be enhanced by the efficient delivery of test results ordered by physicians, alerts on practice guidelines, disease management notifications, and access to clinical information about the patient's medical history from one Internet based access point linked to the physician's EMR system. The quality of medical care may also be enhanced by the integration of relevant data from the physician's EMR - such as known allergies, known adverse

drug interactions, and adverse event reports.

The Ministry of Health Services and the regional health authorities are exploring options to maximize the use of EMR with different approaches and priorities. The development of an appropriate model and method of private physician's EMR is complex and require answers to the following questions:

- What is the patient's right to privacy in the personal patient-physician relationship, and how will this impact data exchange and access to information?

- What information do physicians require from the acute care system, diagnostic labs, and other segments of the healthcare system?

- What information from patient-physician office encounters is relevant and will contribute to the improvement in the quality of care and/or the ability to manage the healthcare system effectively?

- What are best practices and emerging standards for EMR? How can the British Columbia solution be most compatible with available technologies?

- How will data exchange standards and systems compatibility be managed?

- What is the best business model to encourage the development of an economically beneficial 'ecosystem' between the healthcare system and the physician?

The Council believes that one set of provincial standards must be determined for the exchange of information with private physician practitioners and implemented through the health authorities.

CLINICAL APPLICATIONS

Each of the regional health authorities operates a variety of clinical systems with acute care hospitals and other care-delivery facilities. These systems include such applications as lab and pathology management, document management, order entry, and electronic diagnostic imaging (i.e. Picture Archiving and Communications System (PACS)). The investment in the purchase of software applications, hardware, and work-process around each of these systems is significant and pre-dates the formation of the current health regions.

Best practices and architecture for the deployment of clinical systems in the regional healthcare model meet the following requirements:

- An enterprise system for each application, covering all relevant care-delivery facilities for that application, ideally creating a single enterprise view of patient transactions and common workflow. This architecture will improve productivity and accuracy by standardizing the work process and provide an opportunity to optimize the use of resources and personnel across the regional healthcare system.

- Systems that conform to industry standards operate on common hardware and software system platforms and align with any defined provincial architecture. Compatibility of clinical systems with Electronic Health Record data and messaging standards should become mandatory for new system purchases.

- Systems that are developed using rigorous commercial methodologies to achieve high reliability, enterprise scalability, continuous enhancement, and low risk of obsolescence over a long life span.

- A preference to standardize on fewer clinical applications and vendors across the province.

- Advanced systems that create the ability to share clinical work on one patient transaction across the regional healthcare enterprise. This will improve efficiency by: standardizing work process and systems support; facilitating the centralization of functions; better enabling care on a 24x7 basis; and providing better access to specialist knowledge across the entire health region.

All the regional health authorities were presented with the task of rationalizing the legacy clinical systems inherited on the formation of their mandate. Each region has made some degree of progress toward the "best practice" model and the Interior Health Authority has substantially achieved the best practice model in key clinical applications. The pace and extent of conformity to the enterprise application model will remain a significant management challenge requiring thoughtful investment decisions and coordinated execution.

TELEHEALTH

Telehealth is the delivery of health related services where the locations of the provider and the recipient are linked by an electronic network that offers audio, video, images or data that enables the service. In prior PTC reports, the opportunity to use network communications as a platform for the safe, reliable, cost-effective and secure means of delivering healthcare and health related services has been identified.

As broadband networking becomes ubiquitous within and among the health authorities, telehealth will and should be thought of as part of the mainstream of standard practice rather than a distinct service.

The keys to sustainable telehealth services are:

- The clinical utility of the specific service to be implemented: *Is it good medicine? Does it speed the delivery of care?*

- The community need for the specific service to be implemented on a community specific basis: *Is there an absence of ability to deliver that service locally?*

- The cost effectiveness of the specific service within the healthcare system: *Is there sufficient demand and sufficient benefit to justify additional resources?*

- The cost effectiveness of the specific service in the aggregate: *Are there additional economic benefits to patients or to the whole economy*?

Since the PTC's last report, a number of telehealth initiatives have been advanced, most notably:

- Billing codes have been approved for the provision of remote diagnostic services rendered by private practice physicians in ten out of 24 medical disciplines. The approval of these telehealth billing codes represents a significant incremental step toward broad implementation.

- Some regional health authorities have implemented enterprise-wide digital image management systems that permit radiology images to be captured at any hospital and diagnostically reviewed at any other facility.

- Health services planning for aboriginal people has become an integral part of the provincial plan.

GOVERNANCE - MANAGEMENT

The PTC has previously emphasized the need for a governance structure that is dedicated to the development and implementation of the e-health system and especially the Electronic Health Record. The Council believes that leadership and management remain the most important factors in determining the success of this process.

The complexity and scale of the systems to be implemented is daunting and will require thoughtful prioritization and strong project management skills. While many aspects of the e-health system may be executed within a region, collaboration between regions is also critical. Harmonization of infrastructure and standards to bring a high level of inter-operability is necessary to create a system that will function across the entire province. Some components of the e-health network should be implemented with a single standard, application or system.

The establishment of the Council of Chief Information Officers (CIO) has led to collaboration between health authorities, especially on standardization and infrastructure issues. The CIO Council is beginning to leverage resources by selecting specific regions for new pilot initiatives that will benefit all regions.

More recently the government has formed the e-Health Steering Committee (eHSC) which reports to the CEO Leadership Council. The eHSC includes representation from health authorities' CEOs, CFOs, and CIOs, physicians and the Ministry of Health Services. The ministry has also rationalized the reporting relationship so that the TeleHealth Steering Committee, the CIO

Council, the Provincial Laboratory Coordinating Office (IM/IT component), and the BC Health Information Standards Council report to the eHSC.

The eHealth Steering Committee has completed the "BC eHealth Conceptual System Architecture" that will help guide agencies responsible for healthcare in BC, especially the Ministry of Health Services and the health authorities to develop e-health capabilities. Additional expertise may be required to develop system architecture in the context of best practices, provide an objective external evaluation of the effectiveness of regional systems and practice, and provide implementation and change management resources.

Based on the analysis above, the PTC recommends that the provincial government:

RECOMMENDATIONS

7.2 **Define a provincial strategy and architecture for the Electronic Health Record and commit to its implementation. The PTC recommends that the provincial government:**
- **Give the highest priority to establishing architecture for the Electronic Health Record, giving consideration to the best industry practice using Internet technology. A defined EHR solution that aggregates existing information in the healthcare system will determine the appropriate standards and interface to ensure that the evolution of systems are properly directed.**
- **Ensure that the EHR strategy incorporates features to empower patients to better manage their own health and to interact with the health care system electronically.**

7.3 **Create a business model and data exchange standard to integrate the EHR with private practice physicians' internal Electronic Medical Records (EMR). To do this, the Council recommends:**
- **That a task force be established to determine a single business model and data exchange standard that will allow electronic information exchange with private practice physicians and their internal EMR while respecting patient privacy rights. Priority should be given to the electronic delivery of information to private practice physicians (for example, to improve chronic disease management), and the collection of private practice physician information should be deferred until a definitive plan is determined.**
- **That this strategy and business model incorporate a method to encourage private practice physicians to acquire broadband network connections for their offices, principally via demand for the "content" made available from the health authorities EHR.**

7.4   **Establish preferred standards for the regional implementation of clinical systems and give priority to optimizing clinical workflow on an enterprise basis across regions, as distinct from workflow bounded at each facility. To do this the Council recommends:**

- **That the eHSC and its working committees establish a policy for the preferred architecture for the deployment of clinical systems, as a basis for making future investments and joint procurement purposes.**

- **That the health authorities give priority to adopting the preferred architecture and undertake projects to optimize workflow within the next three years.**

7.5   **Continue infrastructure investment. The PTC recommends that the provincial government:**

- **Complete broadband network services to acute care facilities, expand the network to all government-managed care facilities, and consider a network platform that connects service provider groups within the health authorities.**

- **Invest to execute on the strategy for a client registry with the ability to uniquely identify each client. This will provide a critical resource for the establishment of the Electronic Health Record. Furthermore, collaboration managed through the eHSC should establish operational methods to add new persons to the client registry and to manage identity records efficiently. The client registry should be considered as a resource for the potential integration of client identity for other social services.**

- **Continue to invest in the execution of its implementation plan for the provider registry, in consultation with the College of Physicians.**

- **Invest in the continuing development of a detailed architecture and operational plan built on the common "active directory" security access standard. This would be used to develop a comprehensive system access standard that will be inter-operable (single sign-on) across regional systems. It would also meet national security and privacy standards. Preference should be given to the harmonization of regulations with the standards primarily adopted by major software systems.**

7.6   **Continue to develop telehealth initiatives. The PTC recommends that:**

- **The relevant agencies move expeditiously to expand fee codes to cover all billing categories, except where there is a specific medical reason where they should not apply.**

- **Under the guidance of the eHSC, there be continuing evaluation of opportunities to implement specific telehealth services that achieve positive clinical and economic outcomes.**

7.7 Governance and management. The PTC recommends that the leadership of health authorities and Ministry of Health Services collectively:

- **Place priority on collaboration to achieve significant progress in the development of the e-health system.**

- **Ensure that development of the e-health architecture is within the context of best industry practice, and also establish a process of independent evaluation of the effectiveness of all e-health technology deployed.**

- **Invest in resources to effectively lead the process of change management of a system required to successfully implement technology that will automate the delivery of healthcare in the province.**

IT Procurement

Like the extension of broadband, government procurement reform is also essential to make the province a top technology jurisdiction. The reform of the Government of British Columbia's procurement process has been a major thrust of the PTC's agenda. In June 2002, for instance, the PTC convened an IT Procurement Symposium in Vancouver to bring government and industry together to examine their common challenges.

As the PTC's 3rd Report indicated in September 2002, industry stakeholders found that the procurement process was misaligned with modern realities. It was more suited to acquiring commodities or standard products, such as furniture, asphalt or even desktop computers, rather than complex IT solutions. Indeed, the report warned that in many instances government procurement processes discouraged the IT industry from applying its expertise in developing creative and cost-effective solutions to improve government operations and enhance services.

More specifically, participants at the PTC's IT Procurement Symposium pointed out five strategic challenges:

1. IT procurement processes and organizational structures are too fragmented, costly, and lengthy.
2. Government lacks a clear IT vision and strategy.
3. There is a conflict between low-cost vs. benefits-driven procurement.
4. Government and industry do not share equitably in both the risks and the rewards of IT initiatives.
5. Joint Solution Procurement (JSP) is a tool that is underutilized, poorly understood, and incompatible with current procurement models.

To overcome these barriers, the PTC's 3rd Report proposed several recommendations. It argued that the Government of British Columbia should:

- Examine the scope of its current procurement reform initiative to ensure it adequately addresses the unique nature of IT procurement. It must permit the adoption of a benefits-driven procurement model based, above all, on the business objectives rather than the technology requirements of government.

- Identify a senior government official to drive both a strategy and implementation process around IT procurement reform. This official will also be responsible for fostering development and adoption of new IT procurement tools and models; facilitating government-wide and industry education; and championing support throughout government.

- Create a joint government and industry task group to address the wide range of issues associated with IT procurement reform, with particular attention to the prioritized list of issues and proposed solutions emanating from the Procurement Symposium as well as the larger list of tactical and strategic issues identified by the PTC during its consultative process.

When the PTC conducted its regional consultations in the winter of 2004, several stakeholders again raised the issue of IT procurement. The PTC's 6th report (June 2004) summarized some of the progress to date on procurement reform, including the implementation of JSP, the centralization of IT procurement, and creation of a government/industry task group. Nonetheless, the feedback from the consultations suggested that it was time to hold another IT Procurement Symposium to track progress to date and chart a course forward. This event occurred in October 2004 in Victoria.

Attendees raised five issues. In order of importance, they were:

1. **STRATEGIC PLANNING**

   The common theme during the discussions was the need for leadership. The issue of fragmentation, noted in the 2002 symposium, still remains. To remedy the situation, a government-wide strategic plan was proposed. It would be based on the principle that IT is business-driven, and would prioritize the business drivers and the public policy goals established by the Premier and Cabinet.

   To help advance the strategic planning process, the role of the CIO was highlighted. Some participants argued that the CIO should be at the Deputy Minister level, with the authority and budget to lead IT policy and planning across government, including chairing a government-wide CIO Council.

2. **THE JSP PROCESS**

JSP is widely regarded as an important advance in the province's procurement system and no one wants to revert to old methods. However, it is also true that one size does not fit all. Participants argued that some fine-tuning of JSP is required. For example, the JSP concept is useful only for the largest projects, otherwise the costs incurred by companies cannot be justified. In addition, vendors often face frustration at the length of time of the process and at changes in the scope of a project when it is already underway. Finally, confidentiality requirements limit collaboration among contractors.

Flexibility is essential in this process. Joint solutions are needed and the government should not rigidly adhere to a single model. Stakeholders suggested that criteria be developed to assess whether a project should be a full JSP or an abbreviated one (**JSP Lite**), that would take into consideration such factors as: complexity of the business problem; vendor's ability; size; maturity of the market; length of the contract; and business relationship.

3. **SMALL COMPANIES**

The ability of small companies to compete for government procurement opportunities has been mentioned frequently throughout the PTC's various consultations and was touched on in the PTC's last report. In essence, smaller firms believe that they are at a disadvantage in the procurement process primarily because of their size and the complexity of the various steps that the government requires. Those raising the subject, however, were not suggesting that companies be rewarded for being small or that subsidies be provided to them.

One possible way to offer better opportunities to smaller firms would be for the government to hold "Procurement 101" presentations for them to publicize definitions, examples, process descriptions, and contacts.

Other ideas included emphasizing procurement as an economic development tool (providing points to proposals led by larger firms that include smaller ones) and encouraging consortia through the JSP.

4. **GENERAL PROCUREMENT ISSUES**

The PTC heard that the Master Standing Order (MSO) process needs to be renewed. There is a tendency for government to make new purchasing decisions based on previous ones, rather than thinking fresh. Better value may be obtained through re-tendering many of the MSOs. Participants also argued that the vendor complaint process needs to be better communicated.

5. **UNSOLICITED PROPOSALS**

There was some interest in creating such a program, but time limitations at the symposium prevented more detailed discussions. The province may wish to further explore this idea.

SUMMARY

The PTC recognizes that there are many challenges involved in reforming a system as complex as government IT procurement. For instance, the need for leadership, first mentioned in the PTC's 3rd Report, still remains. Developments in response to some of the issues raised at the October 2004 Symposium are already underway. However, no jurisdiction has "solved" procurement, and BC is clearly an innovator and national, if not world, leader in the field.

In short, the government has got the big picture right, but it still needs focus. Refinements in areas such as JSP will help to improve British Columbia's stature as a leader in government procurement. The PTC recommends:

Recommendation 7.8
That the provincial government continue its procurement reform initiative in cooperation with industry to ensure the most effective process possible. It should consider the issues and the suggested solutions identified at the procurement symposium and further examine those that did not receive due attention.

Industry Development

British Columbians have come to expect high quality public services from their provincial government, but it is the growth and dynamism of the private sector that will ultimately provide the basis for them. BC is also taking an important role in building, growing, and financing high technology companies. BC must now set its eyes on the next phase of industry development: becoming world class.

The knowledge economy will provide British Columbia with both high-margin enterprises and skilled, high-paying jobs. It also has the potential to revolutionize the province's traditional strengths, such as forestry, to make BC's products more competitive in global markets.

As BC goes through a transition phase in its economic development with the new wave of high technology taking a premier role, government must be a champion to help drive the process, although this must always be in partnership with the private sector, academic institutions, and non-governmental bodies.

This section shows some of the steps that the provincial government can take to lead the way in such areas as capital and investment, human resources, power technology, innovation and commercialization, and new media.

Capital and Investment

INTRODUCTION

The Premier's Technology Council has examined various aspects of the province's capital and investment climate, especially in its 5th Report (January 2004). The Council's objective is to improve the quality and quantity of risk capital in British Columbia to foster the development of growth enterprises, especially those in the technology industry.

To achieve its objective, the Council has recommended a number of key measures, several of which are revisited in this report. These have been consistent with the conclusions from various studies from the financial community, industry associations (BCTIA and BC Biotech) and the provincial and federal governments. In response, the provincial government has implemented

a number of Council's recommendations, including:

- Changing the *Small Business Venture Capital (SBVC) Act*
- Extending the SR&ED program
- Studying capital availability in the province
- Promoting BC's profile as a high technology jurisdiction

These actions have benefited the province's economy. In particular, the venture capital program under the *SBVC Act* has been extremely successful. After changes were made in 2003, the feedback from the community has been positive and industry has gained much needed early stage capital.

While these results are encouraging, the Council believes that implementing the remaining PTC recommendations on capital and investment is imperative. Many firms with high growth potential are very research intensive and require different types of financing from small businesses in traditional sectors. To successfully introduce a product or service to the marketplace, many growth enterprises undergo a lengthy, complex process of research and commercialization. As new technologies and market acceptance on innovation is uncertain, investment in these companies is considered high risk.

CAPITAL ECOSYSTEM AND TECHNOLOGY DEVELOPMENT STAGES

The capital ecosystem diagram below[2] shows the development stages that most high growth enterprises experience as well as the sources of financing involved. Government and industry funding is prominent at the fundamental and applied research stage. As technology development advances to full-scale prototype development, less funding is available. Financing from the venture capital community is usually offered at a later stage when the potential product is more market ready (prototype has been developed and ready for demonstration). Investors will then realize a return on investment when the companies enter the market and industry/banks/IPO markets start to invest.

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[2] Sustainable Development Technology Canada, http://www.sdtc.ca/en/about/innovation_chain.htm
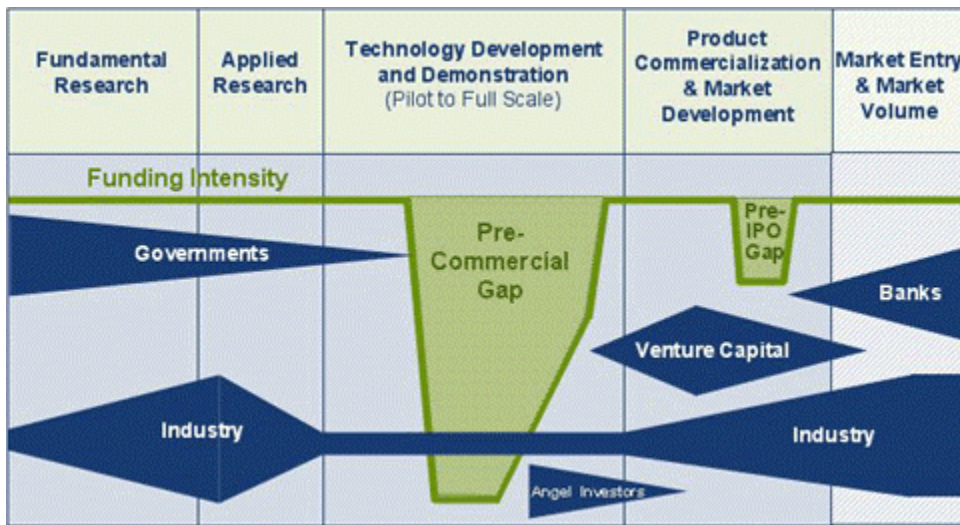
Source: Sustainable Development Technology Canada, http://www.sdtc.ca/en/about/innovation_chain.htm

FUNDING GAPS

The diagram shows two funding gaps along the development continuum: pre-commercial and pre-IPO. The first gap is best illustrated by the following data: while publicly-funded research amounted to $9 billion in 2003, only $200 million (less than 5% of R&D financing) of seed and start-up capital was invested by the venture capital community.[3] Sustainable Development Technology Canada (SDTC) estimated a $5 billion pre-commercial funding gap per annum. As technology development stages are interdependent, a capital shortage at an early stage of development will hinder progress to later development stages and ultimately reduce the number of successful high growth businesses. This is probably the largest barrier for companies trying to commercialize innovations.[4]

EARLY STAGE FUNDING - ANGEL INVESTMENT

Various industry groups and levels of government agree that closing the pre-commercial funding gap is essential to Canada's future economic prosperity. In its recent report, the Canadian Task Force on Early Stage Financing (CTFESF) concludes that encouraging angel investment in start-up and early stage companies will be the most effective way to achieve industry growth.

Angel investors are high net worth individuals who make significant investments with their own money in start-up and early stage companies.[5] Angel investments are considered very important

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[3] Canadian Task Force on Early Stage Funding, "Budget Recommendations", December 2004.
[4] National Angel Organization, "The Primer for Angel Investment in Canada", Summer 2004.
[5] Industry Canada, "Canadian Venture Capital Activity: An Analysis of Trends and Gaps 1996-2002".

for early capital finance, even more so than the venture capital financing.[6]   Many leading technology companies and those listed on the Canadian public exchanges were first financed by individuals rather than by the formal venture capital community. It is estimated that those Canadian grown companies that were first financed by the venture capital community were significantly less than one percent.[7]

Often a retired or active entrepreneur, angels provide not only early stage capital, but also business advice, contacts, and market intelligence that are usually lacking in most start-up/early stage companies.[8]

BC has a successful program that encourages individual investment in early stage companies. For the past 20 years, the Equity Capital Program has provided a 30% refundable tax credit to individual investors who finance eligible businesses. The program has spurred the development of many start-up companies in the province. In 2003, there were approximately 100 individually funded start-up companies compared to five that were venture-backed. In terms of economic returns, every dollar of tax credit generates a $1.3 return over a 5-year period and the payback period is within 2.8 years.[9]

The CTFESF has proposed that federal government create a national program that mirrors the British Columbia Equity Capital Program (ECP) under the *SBVC Act*.

Recommendation 7.9
The PTC recommends that government continue its existing programs under the *SBVC Act* and work with federal government to secure federal funding for the program.

In addition, to make the program more efficient, the PTC reiterates its previous recommendations:

Recommendation 5.8
- **That the provincial government remove the individual annual limit in the provincial *Income Tax Act* for angel investors in eligible small businesses under the *Small Business Venture Capital Act*.**

Recommendation 6.12
- **That government expand the tax credits under the *SBVC Act*. Further, government should change appropriate regulations so that the tax credits exist as a total allocation over multiple years and unused credits can be transferred between programs.**

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[6] Canadian Task Force on Early Stage Funding, "Budget Recommendations", December 2004.
[7] Canadian Task Force on Early Stage Funding, "Budget Recommendations", December 2004.
[8] Canadian Task Force on Early Stage Funding, "Budget Recommendations", December 2004.
[9] Canadian Task Force on Early Stage Funding, "Budget Recommendations", December 2004.

SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT (SR&ED) PROGRAM

While governments provide major funding to conduct basic research, once technology development advances to the applied research stage, capital is limited and most firms have to rely on their own capital to finance research. To assist early stage companies to conduct this high-risk research, the federal government has created the Scientific Research and Experimental Development (SR&ED) Program which provides a 35% refundable tax credit of the first $2 million of qualifying SR&ED expenditures by Canadian Controlled Private Corporations (CCPCs). The BC government has a similar program that offers a 10% SR&ED tax credit that operates according to federal rules.

The Council agrees with the CTFESF finding that, *"The CCPC distinction is a poor and often arbitrary measure of either financial need or public good and recommends that it be eliminated, such that the refundable SR&ED credits are also available to companies that have gone public or have otherwise lost their CCPC status."*[10]

While this has been one of the province's priorities, the Council encourages it to continue to press to have the following previous recommendation implemented as quickly as possible:

Recommendation 5.2
That the provincial government initiate an advocacy program with the federal government to:

- **Review and modify the rules within the SR&ED program that restrict tax credits to companies having investment from public companies and/or non-residents. This would ensure that firms that have obtained capital from legitimate sources are not being excluded from other opportunities.**

- **Review and modify restrictions in the program, mandated at a federal level, with respect to differences in the treatment of public (20% tax benefit carry forward) and private (35% tax credit carry forward) companies.**

LATER STAGE FUNDING

The second funding gap is referred to as "pre-IPO gap" that occurs just prior to getting the product to market and the beginning of large-scale development[11]. This break in the innovation chain further complicates the process of entering the market. The fund of funds program was proposed to fill this gap and the Council encourages government to implement this recommendation from its 5th Report:

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[10] Canadian Task Force on Early Stage Funding, "Budget Recommendations", December 2004.
[11] National Angel Organization, "The Primer for Angel Investment in Canada", Summer 2004.

Recommendation 5.9

That the provincial government develop programs to focus on attracting and or building 2 to 3 new venture capital funds per year staffed with experienced venture capital players in British Columbia. The new funds would be required to:

- Be associated with a top tier world class venture capital player that is establishing a new fund in BC;

- Be a new fund primarily directed at investment in BC which counts among the principals in the new fund individuals with extensive venture capital experience.

Any new funds must:

- Establish their funds locally: a BC office and general partners in BC,

- Target its investments in BC companies, and

- Raise private capital before accessing the BC programs.

POLICIES AND REGULATIONS

Fundamental to the whole capital ecosystem is a supportive tax policy and regulatory system that will keep BC's tax environment globally competitive and create an investment climate that will encourage local and foreign capital to invest in the province. The PTC therefore reiterates its previous recommendations:

Recommendation 5.4

That the provincial government work with the federal government to explore the issue of double taxation by nations whose citizens are working in Canada and ensure that all parties honour both the intention and letter of the appropriate treaties. Furthermore, the federal government, when acting upon new tax treaties, must pay particular attention to double taxation clauses.

Recommendation 5.5

That the provincial government work with the federal government to extend the loss carry-forward provision from the existing 7 year period to 20 years (the newly enacted US limit).

Recommendation 5.6

That to encourage more foreign investment, a thorough review of all regulations and taxation involved with foreign pension and investment fund investment in venture capital and entrepreneurial growth business be undertaken by the province in cooperation with the federal government.

INCREASING BC'S PROFILE AND ACCESS TO GLOBAL VENTURE CAPITAL AND PRIVATE EQUITY FUNDS

Together with Leading Edge British Columbia, the province has held targeted marketing campaigns to raise BC's profile as a high technology jurisdiction. The Council believes that these efforts will lead not only to companies and people relocating to BC but also global venture capital firms and private equity funds making investment in BC's technology industry. While some progress has been achieved, the Council believes that more timely efforts are necessary to further raise BC's profile among the global leaders of private equity providers. The PTC therefore reiterates:

Recommendation 5.12
That the provincial government work with industry and the financial and academic communities to invite the management teams of the top 20 global venture capital and private equity funds to visit the province on fact-finding tours. This should be executed within the year in an effort to build momentum in the venture community.

Human Resources

SKILL SHORTAGES

Over the past several years, company and CEO surveys, meetings and symposiums discussing HR issues have all identified skill shortages as an impediment to firm growth. The shortages are in, variously, technology management or senior management or at the CEO level. Anecdotal evidence, however, does not provide a sound basis for public policy decision-making.

To establish these firm foundations for government and private sector action, a comprehensive study is required to provide clear data for cross-sector recruiting and succession planning initiatives. The province should identify the specific skill shortages and obstacles to attract as well as strategies to retain talent. The PTC therefore recommends:

Recommendation 7.10
That the provincial government work with industry to develop an accurate inventory of the province's current and projected technology sector skills and then execute on strategies designed to close critical skills gaps that impair growth of designated technology clusters.

IMMIGRATION

Given the insufficient supply of top talent in many high-tech sectors, firms must often focus their recruitment strategies on other jurisdictions. Talent can be an especially critical factor for small and early stage firms, which are the vast majority in BC, and which require experience and entrepreneurship that must often be imported.

Although the government has taken important steps to improve the situation (such as the BC Provincial Nominee Program, BC Skills Connect Program, International Qualification Program), more efforts are needed. For example, some skilled newcomers still find accreditation is a barrier to participate in the job market. Companies also find bureaucracy is an impediment to a speedy process of recruiting talent. When it comes to attracting senior management, the province needs more flexible and facilitative immigration policies and procedures.

Senior management is a critical component of any company, especially those at the early stages. They will bridge the growth gap in companies particularly in taking them to the later stages of growth, including expanding past 100 employees. In BC, it is widely acknowledged that senior management is in short supply especially in areas pivotal to growing successful technology businesses (e.g. business development, marketing and product management). The Integrated Technology Initiative (ITI) has identified actions to drive recruitment of world class senior management. Senior management talent that is lacking includes both company grown senior executives and entrepreneurs who have started and helped their own companies become viable.

With a growing economy, the need for senior executives and entrepreneurs will continue to rise. BC needs immigration policies and procedures that will attract and expedite entry of this targeted group to the province. For example, bringing in executives to already-identified jobs is not a problem, however, should their original opportunity fails, they may have few options. The dilemma might be addressed if visas for entrepreneurs were not tied to specific employers. An open visa would permit them to move to another job if the first one falls through. Therefore, in order to address these issues the PTC recommends:

Recommendation 7.11
That the provincial government work with industry to develop immigration policy recommendations to the federal government targeted at attracting the senior management required to grow BC's technology sector.

WINNING THE COMPETITION

The goal of the PTC is to make British Columbia one of the world's top technology centres. BC needs to be clearly better than everyone else in at least one key area. Recruitment should be our competitive advantage.

The subject is not new and many discussions have occurred between industry and government. One of the barriers has been tax leakage where revenue is seen as lost. However, this can be handled by acting strategically and by making only new entrants eligible for the two-year holiday on stock options. The issue should be positioned to show that it is about managing "found money" as opposed to losing already available money. Studies in the US have shown that 70% of the money was spent within the 100-mile radius, so the returns would be reinvested locally.

Other measures to help implement this objective are:
- A dollar cap can be put on initiatives.
- Entrepreneur-in-residence programs could be in the form of no tax for start-ups – this would attract talent from the whole spectrum.
- Regulations could be tweaked to ensure that the BC's regions are not left out. For instance, the clause could be written so that it is valid for two years in Lower Mainland and three years elsewhere in the province.

Attracting entrepreneurial talent is key to building world class clusters. Knowledge-based industries face a fierce global competition for talent, and BC needs to tip the scales in its favour. The PTC therefore recommends:

Recommendation 7.12
That the provincial government work with industry and the federal government to define modifications to the *Income Tax Act* that would improve industry's ability to attract top senior talent to BC's technology sector.

Commercialization/Innovation

Traditionally, commercialization has referred to the flow of research-generated technology from universities. Other perspectives include technology development, technology transfer and technology adoption.

The PTC views commercialization in the widest possible context. It involves transforming a "eureka" into a marketable product or service, which in turn requires a healthy business environment to grow local companies and attract new ones.

To consider commercialization through the lens of BC's specific innovation environment, the PTC is currently in the early stages of a two-step process. The first step involves conducting a series of general consultations with local stakeholders to identify gaps or shortcomings. These stakeholders include representatives of the provincial and federal government, university leaders (Vice-Presidents of Research and University-Industry Liaison Offices); business people (university spin-offs, locally grown companies, imported companies); and financiers (angels and venture capitalists).

The second stage will involve a detailed investigation of these gaps as well as best practices from other jurisdictions. The objective is to identify government action needed to create an environment to:

- Foster creation of new and growth of existing companies in BC with locally developed or imported technology;
- Facilitate development of new or growth of existing companies in BC with technology from research institutions; and,
- Make BC globally known for its innovative capacity and encourage multinational companies to set up business in the province.

As the PTC undertakes its process, it is also closely monitoring the efforts of its partners. One of the most important is the Integrated Technology Initiative (ITI), a broad-based collaborative effort to develop and guide a next generation strategy for British Columbia's emerging technology economy. Initiated by industry, it involves over 300 participants from business, government and academia and is probably the most comprehensive technology sector effort undertaken in British Columbia in a generation.

The process is geared to build the framework for a comprehensive business plan for British Columbia's technology sector. It is being led by the BC Technology Industries Association (BCTIA), financed by Leading Edge British Columbia (LEBC) and Western Economic Diversification Canada. The first phase was managed by the Canadian Institute for Market Intelligence (CIMI) and supported in its analytical phase by ICF Consulting of San Francisco. Nearly every technology association in the province is a partner in the process.

Members of the Premier's Technology Council are actively participating and leading some of the activities. The PTC, as a whole, fully supports the initiative and strongly encourages the provincial government to recognize its importance and to remain engaged. Government attention is doubly important as the new BC Innovation Council prepares to take its place in the community.

It is too early to draw any conclusions. However, there are consistent themes emerging that, upon further examination, might result in a need for government action. Some are:

- <u>Government internal capacity for science and technology</u>. There is a sense that the province's efforts are fragmented and lack central governance of science and technology, inhibiting strategies and policies for S&T economic development and collaboration with various stakeholders. The lack of a government capacity has been raised often enough that it bears investigation but any discussion must take into account the roles of other existing organizations such as the PTC itself, the BC Innovation Council and Leading Edge British Columbia.

- <u>Initiatives to support both early and later stage funding</u>. The PTC has already made a number of recommendations in this area but a more detailed investigation may uncover further measures such as working with the National Research Council Industrial Research Assistance Program (NRC IRAP) and the federal SR&ED program to support early stage investment.

- <u>Technology Adoption.</u> There may be a role for government to adopt locally developed technology to assist companies to market their products.

The PTC looks forward to elaborating on its conclusions in subsequent reports.

Power Technology

The PTC's 4th report, issued in March 2003, explored the economic potential of the fuel cell industry and the need for industry-government collaboration in the face of intense competition from other jurisdictions. For instance, Ontario recently announced that it would establish a Centre for Excellence in Energy to encourage research and development in emerging energy sources and technology.

To further deepen its understanding of the challenges and opportunities facing the power technology industry as a whole, the PTC commissioned a study entitled *A Vision for Growing a World-Class Power Technology Cluster in a Smart, Sustainable British Columbia*. The report can be found at http://www.gov.bc.ca/prem/popt/technology_council/.

Globally, the power technology industry represents a market size of US$170 billion plus. In BC, the industry includes more than 60 companies which employ more than 3,000 people worldwide and generate more than $700 million in revenue per year. [12]

"Power technology (also known as "energy technology" or "smart energy") uses advanced materials, digital technology and other innovations to improve the creation, delivery, and use of power, making the whole

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[12] Mossadiq Umedaly, "A Vision for Growing a World-Class Power Technology Cluster in a Smart, Sustainable British Columbia", March 3, 2005.

energy system cleaner, greener, and more efficient. It merges alternative energy, power systems and energy efficiency into smarter choices across the energy value chain."[13]

Both market-driven global trends and public policy choices are enhancing the attractiveness of smart energy. In the area of fuels and power production, long-term demand will exceed supply. Rapid growth in emerging markets, such as China and India, will continue to put pressure on supply. At the same time, the recent entry into force of the Kyoto Protocol, of which Canada is a member, will push many nations to seek cleaner sources of energy.

Against this backdrop, British Columbia has tremendous potential to take a leadership role in a variety of niches in power technology. The 2010 Olympics and other high profile forums will provide prime opportunities for the province to showcase its innovations in this industry to the world, including the Hydrogen Highway, advanced metering and demand response, renewables and distributed generation, microgrids and green building design.

The province already has considerable competitive strengths. It is home to some of the top innovators in fuel cells and hydrogen (e.g. Ballard Power Systems, Questair), natural gas engines (Westport), electric hybrids (e.g. Azure, Railpower), power electronics and measurement (e.g. Xantrex, Power Measurement) and green buildings (e.g. Busby, Perkins and Will; Keen Engineering) and many more. Furthermore, there is a supportive environment for these innovative companies to flourish, including private equity firms that help to finance power technology, institutional investors, and government funding bodies. With its geographic proximity to the high growth economies of the Asia Pacific region, BC is well-positioned to quickly serve those booming markets. It also has geographical access to the Western Power Market, where the forward-thinking policies of numerous regions are driving up the demand for clean and green power production.

Based on its detailed research, *A Vision for Growing a World-Class Power Technology Cluster in a Smart, Sustainable British Columbia* recommends a *Targeted Innovation Strategy*. This means focusing on selected areas solving real issues in BC for which there are large worldwide markets: *"We must be seen worldwide as a place where companies can innovate and get their products to world markets faster with a higher probability of success. This involves capacity and competencies in research and development, systems integration, sales and marketing, and specialty manufacturing and assembly for early commercialization – all of which British Columbia is in a position to compete for effectively."*

From the existing research and discussions with experts from industry, academia, non-government organizations and government across the province and beyond, five areas emerged that are not only key for BC but also represent some of the biggest opportunities worldwide:

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[13] Mossadiq Umedaly, "A Vision for Growing a World-Class Power Technology Cluster in a Smart, Sustainable British Columbia", March 3, 2005, p. 5.

- <u>Remote Power Solutions</u>. Integrated power systems that combine renewables, storage solutions and efficiency measures to meet the power needs (electricity, heating and cooling) of remote communities and single off-grid applications.

- <u>Sustainable Urban Practices</u>. Planning approaches, building design, grid-tied distributed generation, demand-side management approaches, and energy management tools to optimize energy sources and use in dense urban settings.

- <u>Smart Urban Transport</u>. A portfolio of solutions that solve urban vehicle power system challenges - public transport, urban hauling, and personal transport - and enable the infrastructure for fuels and transport power sources of the future.

- <u>Smart Grid</u>. A set of hardware, software, and power electronics to update and automate the world's power grids to increase reliability and efficiency, and to enable new sources of renewable and distributed generation.

- <u>Large Scale Clean, Green Power Production</u>. A robust energy market of alternative power production (e.g. wind, biomass, ocean energy, etc.) from independent power producers and other sources that meets our region's needs to convert to cleaner, greener resources, and provides surplus to sell into the western power market.

The priority actions needed to succeed in these five areas include:

1. Establishing leadership, targets and resources for the five key worldwide opportunities and let the most suitable technologies rise to the appropriate challenges.

2. Speeding early commercialization in power technologies in the five key opportunity areas with support for testing, demonstrations, and pilots; incentives for local demand; and removal of utility barriers to help BC companies get products to market faster.

3. Accessing world markets in the five key opportunity areas through regional branding, industry coordination, and targeted outreach that establish the image of British Columbia as a world leader in power technologies and give local companies the relationships and opportunities they need to grow.

4. Developing on-going sources of innovation in power technologies that serve the five opportunity areas with support for company research and development, centres of innovation and education programs, thus giving local companies access to the best talent and development opportunities in order to maintain the region's value proposition as the world market grows.

Many of the steps required will be taken by industry, not government. The province does not intend to revert to a heavy-handed old-style approach of "picking winners." Rather, it intends to work hand-in-hand with its partners in the power technology sector to help open doors, remove unnecessary barriers, and enhance cooperation.

What, more specifically, is the role of government? The *Vision* report makes several recommendations in this area.

Goal Setting – The Premier and the industry should work together to set out specific economic development goals and strategies for each of the five areas. The Premier should communicate objectives for the sector in terms of economic growth, job creation, competitiveness, and environmental protection.

Vision Team – An industry-government team should be established to support the development of a power technology cluster and advance progress in each of the five market opportunities.

Government Procurement – Government ministries and Crown corporations should support the industry through procurement decision-making. BC Hydro, for instance, has created twenty-year goals and strategies for both supply choices and demand management that would represent more local market opportunities for power technologies. Cooperation with utilities is essential to develop a world class power technology cluster.

Funding – Selected areas require direct government investment to bridge the gap on near-commercial and commercial products.

International Branding - As noted above, the Olympics represent an ideal opportunity to showcase British Columbia's power technology. Similar profile-raising activities are needed. For instance, power technology should be included in trade missions and other formal outreach activities.

Recommendation 7.13
The PTC recommends that the government pursue the strategies outlined in the report (*A Vision for Growing a World-Class Power Technology Cluster in a Smart, Sustainable British Columbia*) to advance the power technology industry and secure BC's position as a world leader.

The PTC is pleased to note that government has responded positively to the *Vision* report and has established an Alternative Energy and Power Technology Task Force to implement recommendations made in the *Vision* report. Over the next 20 weeks, the Task Force will seek input from industry, utilities, researchers, communities, First Nations, non-government organizations, and others. This initiative is a part of government's effort to make BC a world leader in sustainable environmental management. As part of its co-operative approach, the Province will work with industry to develop solutions to today's energy challenges and showcase BC's leadership in world markets, using opportunities such as the 2006 World Urban Forum and the 2010 Winter Olympics.

New Media

Computer technology is transforming entertainment with a convergence occurring between gaming and motion pictures. Games are being turned into movies and movies into games. Both are becoming more and more dependent on digital sound and animation, providing dramatic realism to games and adding important special visual and sound effects to film media.

British Columbia is Canada's largest new media hub, with close to 800 companies working in the sector. The production of new media - interactive digital content - represents a major future growth sector for the province, and is already generating over $1 billion annually. BC could be a world leader in new media if strategically supported to attract and retain the talent required. The industry is currently under some distress given the recent subsidies announced in Quebec and incentives for new media in other provinces.

To become a world leader in interactive digital content, the Province needs to take action to provide highly qualified personnel who can hold and augment our leading position. BC needs a singular advantage to encourage the growth of local companies and to continue to attract the global work that keeps this industry vibrant.

The Digital Animation or Visual Effects (DAVE) tax credit is a labour-based incentive that has successfully energized the film and television sector. The activities considered under the DAVE tax credit are closely related, if not identical in some cases, to the activities of interactive digital content companies. To this end, the PTC recommends:

Recommendation 7.14
That the government work with industry to extend the DAVE tax credit to include the new media sector.

Recommendation 7.15
That the government establish a world class, graduate-level program in digital entertainment technology.

Concluding Remarks

The PTC would like to thank British Columbians from all sectors who generously contributed their time and ideas. British Columbia is a province of great diversity, but the Council has been impressed by the consensus that BC can and will achieve the goal of becoming a world class technology centre. In some areas, such as capital and investment, our ideas simply need to be put in place. In other areas, such as human resources, more research is required to define the extent of the gaps and propose appropriate public policy solutions. The PTC looks forward to continuing to close the remaining gaps.

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Appendix A. List of IT Procurement Symposium Participants

Bob Allen, President
ABC Communications

Darren Nippard, Partner
Accenture

Cindy Pearson, VP Business Development
BC TIA

Derek Gale, Director, Business Development
Jamie Sawchuk, Managing Director
BearingPoint

Kegan Adams, Director of Sales
Bell

Michael Brooks, Principal
Bell Brooks and Associates

Jeff Gau, Sales Manager, BC
Bell Mobility

Garth Wambolt, Account Executive
BIG PIPE Inc., a Shaw Company

Philip Stone, President
Boardwalk Communications Ltd.

Peter Kellerman, Director of Sales
Burntsand

Tom Wong, Vice President
Cap Gemini Ernst & Young (Vancouver)

Bill Tozer, Director, Business Development
CGI Information Systems & Management
Consulting Inc.

Paul Kellenberger, President & CEO
Chancery Software Ltd.

Mike MacDonald, Account Manager
Cisco Systems

Marilynne Miles Gray, Vice President
CMSI Mentoring Solutions

John Cave, Location Manager, Victoria
Leonard McCabe, Regional Manager, BC
Compugen Inc.

Christopher Weston, Managing Director
Data Base File Tech Group

David Gibbs, President
David Gibbs and Associates

Tim Lu, Director, Marketing and Sales
Dixon Networks Corporation

Ross Breckon, Vice President, Public Sector,
British Columbia
EDS Canada

(Dr.) Fred G. Peet, President/Physicist
Eidetic Digital Imaging Ltd.

Scott Stafford-Veale, Account Manager
ESRI Canada Limited

Shawn Mabey, Principal & Producer
Fluid Perception Media Inc.

Larry Phillips, Vice President
Fujitsu Consulting

George Grandy, Program Manager
Derek Watson, Account Executive
GE IT Solutions

Kathleen Lowe, Communications Director
GeoMetrix Data Systems Inc.

Greg Veitch, Account Manager, Enterprise
Sales Group
Kosta Chatzispiros, Services Principal
Hewlett-Packard (Canada) Inc.

Sandra Stoddart-Hansen, Vice President and
General Manager
Hill and Knowlton

Ralph Chapman, General Manager, Public
Sector BC
IBM Canada Limited

David Hughes, Chair
ICT Group

Carey Healey, Vice President, Sales
Infosat Telecommunications

Bill McQuarrie, Regional Coordinator
Interior Science Innovation Council (ISIC)

Michael Armer, Business Development
Meggan Podgorenko, Business Development
John Sherrah, President
Don Sherrah, Marketing Director
ITI International Technology Integration Inc.

Gordon Gunn, Associate Partner
KPMG LLP Victoria

Chris Holt, CEO
LogicLynx Technologies Inc.

Douglas Hartman, Director, Public Safety
MacDonald Dettwiler

John Ellis, President
Marlowe Consulting Group Inc.

Robert Binns, Director, Public Sector
Neil Ramgoolam, Account Executive
Microsoft Canada Co.

Marilyn Hutchinson, Executive Director
Mid-Island Science, Technology & Innovation
Council (MISTIC)

Frank D'Argis, Executive Director, Information
Technology Services Division
Gina Henley, Barrister and Solicitor
Anita Petkovic, Legal Counsel, Legal Services
Branch
Ministry of Attorney General

John Mackintosh, Director
Ministry of Children and Family Development

Dorothy Drislane, Director, Information &
Technology Management Branch
Ministry of Education

Dave Collisson, Deputy Chief Procurement
Officer, OCG - Procurement Governance Office
Glen Frederick, Manager, Advisory and
Consulting Services, Risk Management Branch
Ministry of Finance

Nelson Lah, Chief Information Office and
Director
Ministry of Forests

Stuart Frampton, Director, EHR Program
Ministry of Health Services

Karen Dellert, CIO
Ministry of Human Resources

Ministry of Management Services

Gord Allen, Manager, Business Systems, Purchasing Services Branch

Diane Brodie, Director, IT Infrastructure Procurement

Bob Dearborn, Manager Contract Administration, Access BC

Chris Duggan, Director, Purchasing Services, Common Business Services

Keith Finnie, Manager, Applications and Services Integration, Common IT Services

Bill Gipps, Contractor, Alternative Services Delivery Secretariat

Alan Guilbault, Director, Hosting Branch, Common IT Services

Barbara Hibbins, Director, IT Security Branch, Office of the Chief Information Officer

Rob Hollis, Manager, Commercial Services

Frank Hudson, Director, Intellectual Properties Program

Peter Lawrence, Business Development Director, Access BC

Cairine MacDonald, Deputy Minister

Roman Mateyko, Strategic Lead, NetWork BC

Sunny Mathieson, Assistant Deputy Ministry, Common Business Services

Rick McCandless, Chief Information Officer/Chief Operating Officer, Chief Information Office

Dave Nikolejsin, Assistant Deputy Minister, NetWork BC

Richard Poutney, Executive Director, Strategic Acquisitions and Intellectual Property

Brian Severinsen, Director, Network Services, Common IT Services

Kirsten Tisdale, Senior Advisor, Alternate Services Delivery Secretariat

Peter Broadbent, Executive Director/CIO, Information Systems Branch
Ministry of Provincial Revenue

Bob Buckingham, Director, Information Systems
Ministry of Transportation

Sophia Howse, Director, Information Systems Planning and Delivery
Ministry of Water, Land and Air Protection

Chris Cloutier, Service Delivery
Jack Murphy, CEO
Rob Rabey, Account Manager
MYRA Systems Corp.

Nigel Bailey, Executive Director, Government Relations
Navigata Communications

Kirstin Simmons, Communications and Marketing Manager
New Media BC

Hal Jackson, Director Canada West
Nortel Networks

Naomi Hamilton, Director, Project Delivery
OA Solutions

Tanya Northcott, CEO
Randy LaBonte, Director of Sales
Odyssey Learning Systems Inc.

Andrew Lane
Open Source Solutions

Gordon Ross, Vice President
OpenRoad Communications Ltd.

Vern Byggdin, Public Sector Accounts Manager
Eylin Gilbart, Senior Principal Consultant
Oracle Corporation Canada

Anna Poulton, President
Pacific Leaves Holdings

Tayo Runsewe, Managing Director
Pangaea Systems Inc.

Tim Heintzman, Regional Sales Manager,
Enterprise Solutions
PeopleSoft

Michele Merdink, Regional Sales Manager
Percussion Software

Greg Thomas, Director Client Service
PricewaterhouseCoopers LLP

Paul K. Hooper, President
Projectworx Technologies Inc.

Jim Grey, President and CEO
Radiant

Brad McPhee, VP Customer
Solutions/President
eLearning BC/Recombo Inc.

Tara Salter, Business Development
Salus Systems Limited

Stewart Jack, Director, Consulting Services
Bill Thomson, Vice President
Sierra Systems Group Inc.

Neil Wieler, Corporate Account Manager
Sprint Canada Inc.

Howard Robson, Business Development
Manager
Tata Consultancy Services

Tim Draper, VP Government
Telus

Brian G. Foley, Vice President
Thomson Communication Solutions Ltd.

Bill Cooke, Chief Executive Officer
VIATeC

Caroline Lewko, President
WINBC

Appendix B. Summary of Recommendations

This is a list of recommendations made by the PTC in this and all preceding reports. They are numbered in the order in which they appear in the original report.

7th Report

DIGITAL DIVIDE

7.1   That the provincial government work with the federal government to create a Joint Task Force with the expertise, authority and resources to provide broadband and related services to First Nations communities in British Columbia wherever reasonably possible. The Task Force must also have First Nations representation.

E-HEALTH

7.2   Define a provincial strategy and architecture for the Electronic Health Record and commit to its implementation. The PTC recommends that the provincial government:
- Give the highest priority to establishing architecture for the Electronic Health Record, giving consideration to the best industry practice using Internet technology. A defined EHR solution that aggregates existing information in the healthcare system will determine the appropriate standards and interface to ensure that the evolution of systems are properly directed.
- Ensure that the EHR strategy incorporates features to empower patients to better manage their own health and to interact with the health care system electronically.

7.3   Create a business model and data exchange standard to integrate the EHR with private practice physicians' internal Electronic Medical Records (EMR). To do this, the Council recommends:
- That a task force be established to determine a single business model and data exchange standard that will allow electronic information exchange with private practice physicians and their internal EMR while respecting patient privacy rights. Priority should be given to the electronic delivery of information to private practice physicians (for example, to improve chronic disease management), and the collection of private practice physician

information should be deferred until a definitive plan is determined.

- That this strategy and business model incorporate a method to encourage private practice physicians to acquire broadband network connections for their offices, principally via demand for the "content" made available from the health authorities EHR.

7.4 Establish preferred standards for the regional implementation of clinical systems and give priority to optimizing clinical workflow on an enterprise basis across regions, as distinct from workflow bounded at each facility. To do this the Council recommends:

- That the eHSC and its working committees establish a policy for the preferred architecture for the deployment of clinical systems, as a basis for making future investments and joint procurement purposes.

- That the health authorities give priority to adopting the preferred architecture and undertake projects to optimize workflow within the next three years.

7.5 Continue infrastructure investment. The PTC recommends that the provincial government:

- Complete broadband network services to acute care facilities, expand the network to all government-managed care facilities, and consider a network platform that connects service provider groups within the health authorities.

- Invest to execute on the strategy for a client registry with the ability to uniquely identify each client. This will provide a critical resource for the establishment of the Electronic Health Record. Furthermore, collaboration

managed through the eHSC should establish operational methods to add new persons to the client registry and to manage identity records efficiently. The client registry should be considered as a resource for the potential integration of client identity for other social services.

- Continue to invest in the execution of its implementation plan for the provider registry, in consultation with the College of Physicians.

- Invest in the continuing development of a detailed architecture and operational plan built on the common "active directory" security access standard. This would be used to develop a comprehensive system access standard that will be inter-operable (single sign-on) across regional systems. It would also meet national security and privacy standards. Preference should be given to the harmonization of regulations with the standards primarily adopted by major software systems.

7.6 Continue to develop telehealth initiatives. The PTC recommends that:

- The relevant agencies move expeditiously to expand fee codes to cover all billing categories, except where there is a specific medical reason where they should not apply.

- Under the guidance of the eHSC, there be continuing evaluation of opportunities to implement specific telehealth services that achieve positive clinical and economic outcomes.

7.7 Governance and management. The PTC recommends that the leadership of health authorities and Ministry of Health

Services collectively:

- Place priority on collaboration to achieve significant progress in the development of the e-health system.

- Ensure that development of the e-health architecture is within the context of best industry practice, and also establish a process of independent evaluation of the effectiveness of all e-health technology deployed.

- Invest in resources to effectively lead the process of change management of a system required to successfully implement technology that will automate the delivery of healthcare in the province.

IT PROCUREMENT

7.8 That the provincial government continue its procurement reform initiative in cooperation with industry to ensure the most effective process possible. It should consider the issues and the suggested solutions identified at the procurement symposium and further examine those that did not receive due attention.

CAPITAL AND INVESTMENT

7.9 The PTC recommends that government continue its existing programs under the *SBVC Act* and work with federal government to secure federal funding for the program.

HUMAN RESOURCES

7.10 That the provincial government work with industry to develop an accurate inventory of the province's current and projected technology sector skills and then execute on strategies designed to close critical skills gaps that impair growth of designated technology clusters.

7.11 That the provincial government work with industry to develop immigration policy recommendations to the federal government targeted at attracting the senior management required to grow BC's technology sector.

7.12 That the provincial government work with industry and the federal government to define modifications to the *Income Tax Act* that would improve industry's ability to attract top senior talent to BC's technology sector.

POWER TECHNOLOGY

7.13 The PTC recommends that the government pursue the strategies outlined in the report (*A Vision for Growing a World-Class Power Technology Cluster in a Smart, Sustainable British Columbia*) to advance the power technology industry and secure BC's position as a world leader.

NEW MEDIA

7.14 That the government work with industry to extend the DAVE tax credit to include the new media sector.

7.15 That the government establish a world class, graduate-level program in digital entertainment technology.

6th Report

DIGITAL DIVIDE

6.1   The PTC recommends that government:
- Keep up the momentum to extend broadband to the remaining communities as quickly as possible.
- Work with communities to identify last mile solutions.

INDUSTRY DEVELOPMENT

6.2   The PTC recommends that government:
- Recognize and support the important role that regional technology councils play in fostering innovation and small business development within their region.
- Support the formation of a regional technology council in the Northwest.
- Provide incentives to encourage growth and development of technology companies in the regions.
- Market the technology innovations and opportunities for the province as a whole through Leading Edge British Columbia.

e-LEARNING

6.3   The PTC supports the PLNet initiative and recommends that its installation and capacity review continue to receive top priority to ensure it has the ability to meet ever-expanding needs.

6.4   The PTC recommends that government, through the Ministry of Education, in cooperation with industry and the school districts, support the goals and financing needs of BCEd Online, and that the Ministry continue to monitor and promote the expansion of its activities to all school districts in the province.

6.5   The PTC recommends that the Ministry of Education:
- Continue research in e-learning for K-12 to include funding for school districts to use IP video and other telecommunications technology delivery systems.

- Conduct education programs for teachers to provide them with the skills necessary to utilize e-learning technology.
- Promote the use of technology in school districts.
- Continue to work with other provinces to research, evaluate and test, and cost-share in the implementation of e-learning strategies in the provinces K-12 system.

6.6   The PTC recommends that the Ministry of Education investigate providing a capability to encourage and assist students to enter high-tech careers. The Australian Skills Hub distance learning program, located on the web at www.itskillshub.com.au, is a good example of a resource that has been very successful.

6.7 The PTC recommends that government, through the Ministry of Advanced Education, continue to encourage and support the BCcampus initiative as the leading organization to promote e-learning concepts at the post-secondary education level.

6.8 The PTC recommends that government, through NetWork BC, in cooperation with other ministries, lead a process whereby a comprehensive and focused

e-Health

6.10 The PTC recommends that government support the adoption of a fee code structure that allows health care providers to bill for e-health procedures.

6.11 The PTC recommends that the government establish a governance structure dedicated to the development and implementation of the EHR. Its structure and accountabilities would involve the following:

- A pre-determined term (24-36 months, for example) be set, and clear, reasonable success criteria developed.
- A team leader who is a member of the ministry executive reporting to the deputy minister.
- Positioning so that it is acceptable to the entire community (the health

team (possibly federal/provincial) work with First Nations to address digital divide issues and government services such as e-learning and e-health.

6.9 The PTC recommends that the government work with BC universities, both the federal and provincial governments and large and small business to promote the establishment of an R&D facility to advance the e-learning industry in BC.

ministries, health authorities and practitioners).

- A direct link between the success of the team and the success of the EHR implementation.
- A funding model utilizing resources from other bodies such as Canada Health Infoway. The model must allow for central decision making on the common or province-wide EHR infrastructure but also provide continued funding for specific health authority equipment and software.
- An advisory group with members from the ministry, health authorities and practitioners to guide development activities.

Capital and Investment

6.12 The PTC recommends that government expand the tax credits under the *SBVC Act*. Further, government should change appropriate regulations so that the tax credits exist as a total allocation over multiple years and unused credits can be transferred between programs.

Human Resources

6.13 The PTC recommends that government, through Leading Edge British Columbia, undertake special marketing initiatives to assist in recruiting talent for high-tech companies throughout the province.

ALTERNATIVE ENERGY: FUEL CELL

6.14 The PTC recommends that government build on the record of success and work with the energy technology sector to complete the "Hydrogen Highway™" prior to the 2010 Olympics and to further develop the sector.

5th Report

CAPITAL AND INVESTMENT

5.1 That the provincial government extend the British Columbia SR&ED tax credit program beyond its current expiration date (September 1, 2004) and make it an ongoing program with periodic reviews.

5.2 That the provincial government initiate an advocacy program with the federal government to:

- Review and modify the rules within the SR&ED program that restrict tax credits to companies having investment from public companies and/or non-residents. This would ensure that firms that have obtained capital from legitimate sources are not being excluded from other important and appropriate financing sources.
- Review and modify restrictions in the program, mandated at a federal level, with respect to differences in the treatment of public (20% tax benefit carry forward) and private (35% tax credit carry forward) companies.

5.3 That the provincial government develop and implement an equity participation incentive to attract technology companies, senior management, key employees and head offices to British Columbia. The incentive must lower and/or eliminate the provincial tax payable on the exercise or disposition of stock options. The incentive would be applicable to:

- All employees who are residents of BC at the end of the calendar year and file for a BC tax return,
- All forms of equity compensation such as stock options and restricted stock, and
- The gain in value between the fair market value on the date of grant and the price on disposition.

The incentive would provide a tax credit equal to 50% of the provincial tax payable if the option is held for greater than 1 year but less than 2 years and a tax credit equal to the provincial tax payable if the option is held for more than 2 years.

5.4 That the provincial government work with the federal government to explore the issue of double taxation by nations whose citizens are working in Canada and ensure that all parties honour both the intention and letter of the appropriate treaties, and that the federal government, when acting upon new tax treaties, pay particular attention to double taxation clauses.

5.5 That the provincial government work with the federal government to extend the loss carry-forward provision from the existing 7 year period to 20 years (the newly enacted US limit).

5.6 That a thorough review of all regulations and taxation involved with foreign pension and investment fund investment in venture capital and entrepreneurial growth business be undertaken by the province in cooperation with the federal government.

5.7 That the provincial government undertake a study to investigate the under-investment of pension funds and other investment portfolios in venture capital, determine the key drivers (particularly educational and training) that would enhance such investment, and work with the venture capital industry and appropriate industry associations to encourage and/or secure further investments by such portfolios in venture capital funds within the province.

5.8 That the provincial government remove the individual annual limit in the provincial *Income Tax Act* for angel investors in eligible small businesses under the *Small Business Venture Capital Act.*

5.9 That the provincial government develop programs to focus on attracting and/or building 2 to 3 new, venture capital funds per year, staffed with experienced venture capital players, in British Columbia. The new funds would be required to:
- Be associated with a top tier world class venture capital player that is establishing a new fund in BC,
- Be a new fund primarily directed at investment in BC which counts among the principals in the new fund individuals with extensive venture capital experience.

Any new funds must:
- Establish their funds locally: a BC office and general partners in BC,

- Target its investments in BC companies, and
- Raise private capital before accessing the BC programs.

5.10 That immediate steps be taken to identify an appropriate and targeted campaign for creating greater awareness of British Columbia as a high technology jurisdiction and to make clear the entrepreneurial opportunity that lies within it. The campaign should be designed to be undertaken with existing provincial high technology and biotech players so that it benefits both the companies and the region.

5.11 That the provincial government work with the venture capital industry, successful high technology and biotech businesses, and appropriate trade associations to host small group meetings in the key investment centres of New York, London, Boston, Frankfurt and San Francisco.

5.12 That the provincial government work with industry and the financial and academic communities to invite the management teams of the top 20 global venture capital and private equity funds to visit the province on fact-finding tours. This should be executed within the year, in an effort to build momentum in the venture community.

5.13 That the provincial government work with the universities and institutes to ensure that British Columbia is receiving its fair share of federal funding for innovation, as well as any available industry funding. In addition, the PTC recommends the province work with industry and the academic sector to ensure that BC-based companies, or those having significant satellite plants in the province, are actively investing in innovation in the province.

HUMAN CAPITAL FOR AN INNOVATION ECONOMY

5.14 That the provincial government work with industry to develop a means to raise awareness of the opportunities available in an information-based economy and assist citizens to enter technology-related careers.

5.15 That the Ministry of Education continue to develop its K-12 e-learning strategy through the BCEd Online initiative to ensure that consistent, province-wide standards and content are developed and maintained.

5.16 That the provincial government fully implement the BCcampus initiative.

5.17 That the provincial government revise the definition of a "high technology professional" to provide:

- Enhanced clarity for employees and employers to minimize disputes and costly resolution processes.

- Greater clarity as to what occupational activities are included as opposed to defining specific occupational titles that limit interpretation.

- Inclusion of all occupational activities related to the full product and service life cycle, including sales and marketing.

- Clear inclusion of other high technology sectors such as new media, alternative energy (fuel cells), and biotechnology. The definition should also leave room to include new technologies as they emerge.

4th Report

THE PTC PRIORITY RECOMMENDATIONS

4.1 Continue to work to implement all previous PTC recommendations with priority consideration of the following by government in the coming year:

 a. Broadband

 Provide broadband services to all British Columbia communities. Work with the federal government to accomplish this in the next three years.

 b. Government Operations - Telehealth

 Make telehealth a top priority and continue work to adopt and implement common health information technology infrastructure and standards, and establish an e-Health Task Force.

 c. Industry Development

 1) Venture Capital -
 Work to pass the PTC's previously recommended amendments to the *Small Business Venture Capital Act* (*SBVC Act*).

 2) Promoting British Columbia -
 Develop a provincial marketing strategy and take every opportunity possible to promote the province. This includes:

 a) Marketing and promotion missions led by the Premier

b) A marketing and promotion plan developed from government analyses of the five key emerging industry sectors in British Columbia – information technology, life sciences, new media, alternative energy and wireless. The plan would provide for a sustained marketing effort of the province's technology industry and business climate. Among other things, it would include:

   i. Developing and executing a branding strategy and marketing plan for the British Columbia technology community.

   ii. Creating an inward-bound information centre for prospective corporate recruits to the province.

ALTERNATIVE ENERGY

4.2 Combine the strengths of the provincial and federal governments, industry and academia to develop and implement an aggressive British Columbia Fuel Cell Strategy that parallels and builds on a similar National Fuel Cells Strategy. Activities in the provincial strategy should include:

a) Enhanced support for research and development carried out by the private sector and in public institutions (in collaboration with industry).

b) Support for market focused demonstration projects in both public and private sector applications. This should include real life situations that validate product reliability and output, "ruggedize" the product, provide quality assurance data, and help manufacturers make the necessary alterations to earn commercial success.

c) The British Columbia government becoming an early adopter of fuel cell products. Government departments and crown corporations being real customers raises the profile and supports the development of markets.

d) Accelerate the development of harmonized codes and standards. Government and industry collaboration is necessary to remove regulatory obstacles to the introduction of fuel cell products and systems.

e) Incentives that support and reward growth and investment such as:

   1) Encourage the early adoption of fuel cell and related products and systems by providing fiscally neutral tax based incentives, such as the income tax payback approaches used in Michigan.

   2) Consider programs having an initial cost but longer term substantial savings to the treasury.

f) Development of infrastructure which includes building upon investments already made by BC Hydro and others.

g) Ensure the availability of a highly skilled, well-trained workforce. This involves conducting industry and government collaboration with secondary and post-secondary institutions to define and implement appropriate education and training at all levels in the post-secondary system.

REWARDING INNOVATORS IN THE PUBLIC SERVICE

4.3   Accelerate and reinforce desirable change in the public sector by adopting the Premier's Awards in all the proposed categories (leadership, service excellence, innovation and partnership), especially the innovation category.

3rd Report

IT PROCUREMENT

3.1   Examine the scope of its current procurement reform initiative to ensure it adequately addresses the unique nature of IT procurement and permits adoption of a benefits-driven procurement model based, above all, on the business objectives rather than the technology requirements of government.

3.2   Identify a senior government official to drive both a strategy and implementation process around IT procurement reform. This official will also be responsible for fostering development and adoption of new IT procurement tools and models; facilitating government-wide and industry education; and championing support throughout government.

3.3   Create a joint government and industry task group to address the wide range of issues associated with IT procurement reform, with particular attention to the prioritized list of issues and proposed solutions emanating from the Procurement Symposium as well as the larger list of tactical and strategic issues identified by the PTC during its consultative process.

3.4   Continue the momentum. Hold a follow-up IT procurement symposium within 120 days. The joint industry/government event should include a progress report from government outlining its response to the set of recommendations contained within this report, as well as future plans, deliverables, and timelines.

e-HEALTH

3.5.   Establish an e-Health Task Force composed of both government representatives and health care professionals to address the recommendations arising from the e-Health Roundtable. In addition, the mandate of the e-Health Task Force would include:

- coordinating and leveraging current e-health initiatives, including clinical and educational telehealth projects;
- the implementation of an Electronic Health Record (EHR), in conjunction with other levels of government and across ministries. This standard EHR would be adopted by all Health Authorities, institutions and businesses providing health care services in the province;

- address the licensure, liability and billing issues and the resulting changes required to existing policy or legislation to enable health care givers to participate in telehealth; and
- conduct a community consultation
- process to identify specific telehealth applications that will address critical needs in each community.

VENTURE CAPITAL

3.6. To meet the acute need for seed and early stage venture capital within the province, the PTC strongly recommends that the proposed amendments to the *SBVC Act* be passed by the legislature prior to the beginning of 2003. Failure to do so will discourage and inhibit the facilitation of more early stage capital within British Columbia, and will put us further behind other jurisdictions.

Second Quarter Report

UTILIZING SPAN/BC NETWORKS

2.1 Upgrade and extend SPAN/BC so it is capable of delivering advanced broadband network infrastructure to the communities of British Columbia.

2.5 Find ways to open up SPAN/BC to allow communities to take advantage of the government's broadband infrastructure in those communities where the private sector is unlikely to provide high speed Internet access to citizens and businesses.

PRIVATE SERVICE PROVIDERS' NETWORKS

2.4 Investigate all potential levers including – but not limited to – aggregating public demand, so that it can prompt service providers to extend and update their current telecommunications network infrastructure.

2.6 Reform procurement policy to allow for flexible, creative and competitive procurement models that will stimulate the private sector to upgrade and expand their broadband network infrastructure, as well as encourage the entry of local service providers, such as community-based networks, into the marketplace. To this end, two or three communities should be identified as pilot sites for further detailed planning, and implementation.

2.7 Conduct a Request for Information that solicits vendor and community stakeholder reaction to these recommendations, and taps into the innovative and creative potential for public-private partnerships that exists in the marketplace.

BROADBAND - DEMAND AGGREGATION

2.2 Aggregate total public sector demand (including core government, health authorities, schools, etc) where feasible to upgrade and expand SPAN/BC so that it will be capable of providing next-generation broadband infrastructure to the communities of British Columbia.

2.3 Investigate fully the economics as well as the potential benefits or obstacles inherent in aggregating public sector demand.

PUBLIC ACCESS AVAILABILITY

2.8 Make sure that there is public access to the Internet in every community in British Columbia.

2.11 Develop a complete map-based inventory of all public access sites by community to determine if the levels of public access and location of sites are appropriate for the size and demographics of the population.

PUBLIC ACCESS SUSTAINABILITY

2.9 Work closely with the federal government to coordinate the allocation of scarce public dollars for public access.

2.10 Find ways to sustain existing public access sites in the province and meet the growing public demand by increasing, where necessary (based on demographics and usage patterns), the number of sites, the number of public access terminals, the available bandwidth, and the hours of

IMPROVE AWARENESS ON PUBLIC ACCESS

2.12 Improve awareness and visibility of public access.

PROVINCE-WIDE HEALTH IT STANDARD

2.16 Continue meetings between the executive of the new Health Authorities and the Ministry of Health Services and Ministry of Health Planning to discuss province-wide health information and information technology standards that will apply to all six Health Authorities as they move to restructure and consolidate.

2.14 Work with the First Nations of British Columbia and the federal government to bring information technology, including public Internet access, to remote First Nations communities in British Columbia.

2.15 Determine if the province's 58 sCAT locations and if existing PLNet facilities could be used by the public to access the Internet.

operation.

2.13 Increase staffing levels at public access sites through programs like Youth@BC, through partnering with Industry Canada's CAP Youth program, or through use of the Labour Force Development Agreement with the federal government to train unemployed individuals to work at access sites

2.17 Ensure each of the Health Authorities appoints a person to be responsible for information management and technology with the task of implementing the appropriate standards in collaboration with the Ministry of Health Services and the other health authorities.

2.26 Extend its standards beyond just ministries to its agencies and other government service providers.

Ensure that the designated chief information and technology officers of each authority work with the Ministry of Health Services and Ministry of Health Planning and other appropriate ministries to establish integrated technology standards province-wide. At a minimum these information and technology officers should:

2.18 Establish a consolidated provincial strategy for Health Information Management and Information Technology (IM/IT).

2.19 Adopt and implement common health information technology infrastructure and standards.

2.20 Evaluate and seize opportunities for moving towards shared services where practical and cost-effective.

2.22 Identify policy changes needed to support the electronic delivery and management of health services.

2.23 Recognize information technology development as a strategic investment.

E-HEALTH AND TELEHEALTH STRATEGY

Ensure that the designated chief information and technology officers of each authority work with the Ministry of Health Services and Ministry of Health Planning and other appropriate ministries to establish integrated technology standards province-wide. At a minimum these information and technology officers should:

2.21 Develop a provincial strategy to facilitate Telehealth and electronic health record initiatives in consultation with medical and continuing education units of the colleges and universities.

2.24 Facilitate the advancement of key e-health and Electronic Health Record initiatives.

2.25 Establish a British Columbia e-Health Think Tank composed of e-health visionaries, not senior IT staff, who will examine the applications side of e-health, since it will be compelling applications that drive down costs and improve the delivery of health services to the remote and rural regions of the province.

IT PROCUREMENT

2.39 The provincial government should expedite its efforts to rewrite its Policy and Legislative Framework around Procurement Reform so as to result in more streamlined, flexible, and cost-effective processes for both government and the British Columbia supplier community, ensuring fair and open procurement throughout the province. The government should also develop procurement policies and educational programs for both ministries and the supplier community which will provide British Columbia-based technology companies with the tools and skills required to compete more effectively for government contracts.

VENTURE CAPITAL - CHANGES TO *SBVC ACT*

Accelerating 'Early Stage' Technology Investment

The provincial government should proceed promptly with the following streamlining amendments to the *SBVC Act* to address the need for early stage capital investment in technology companies:

2.27 Expand the tax credit budget legislated under the *SBVC Act* from $50 million to $100 million annually.

2.28 Introduce an investment model under the *SBVC Act* that does not require the registration of a separate VCC to facilitate investment and tax credits under the programs in order to allow direct investment, cut red tape and reduce program registration costs.

2.29 Increase the total amount of capital one business may receive under the program (beyond the current $3 million) to better reflect the capital needs of many early stage technology companies.

2.30 Increase the employee threshold limit for a small business from 75 to at least 150.

2.31 Allow approval for common investment regimen, such as multi-tranche investments over multiple years based on attainment of established milestones.

Leveling the Playing Field for Tax Credit Investment in British Columbia

The provincial government should enable small businesses and venture capital managers participating under the *SBVC Act* to raise and invest venture capital, with the assistance of tax credits, under the same conditions that are presently offered to the one Labour Sponsored Venture Capital Corporation (LSVCC) operating in British Columbia and other LSVCCs operating throughout Canada.
To achieve parity with labour sponsored funds, the task group recommends the following amendments be made to the *SBVC Act*:

2.32 Allow program investors the option to invest directly from their self-directed retirement savings plans.

2.33 Make the tax credit incentives available for program investment within 60 days after the calendar year.

2.34 Increase program flexibility in program capital investment beyond simple common or preferred shares.

2.35 Provide VCC investors up to 24 months to complete investments.

2.36 Open up the tax credits provided to the sole LSVCC to competition by allowing other venture capital firms to enter the market to create a more dynamic venture capital community.

RESEARCH AND DEVELOPMENT

2.37 The provincial government should take steps to create an e-learning chair at one of BC's universities.

ATTRACTING TALENT TO BRITISH COLUMBIA (RECRUITMENT)

2.38 The provincial government should work with the federal government to change immigration rules so that spouses of employees moving to British Columbia can work here automatically.

BRITISH COLUMBIA PROVINCIAL BRANDING

2.40 Develop a provincial branding and marketing strategy that feature technology and innovation as key drivers supporting British Columbia's image as a place with a sustainable and vibrant economy, including resource and knowledge-based industries, and an unparalleled quality of life.

2.41 Develop a strong macro-image positioning British Columbia as a desirable technology destination for investors, employees and site selectors.

2.42 Develop and execute its provincial branding strategy in consultation with the technology community.

MARKETING BRITISH COLUMBIA

2.43 Target its technology industry marketing effort at key audiences that include decision makers in technology investment, site selection and highly skilled workers.

2.44 Focus its technology industry marketing strategy initially on four sectors known as areas of strength within the province: biotechnology, wireless, alternative energy and new media.

2.45 Focus its marketing strategy to attract highly skilled workers or those individuals that may be predisposed to move to Canada such as expatriate Canadian and British Columbia technology workers and members of communities that are already represented in British Columbia.

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PUBLIC AWARENESS ON THE BENEFITS OF E-GOVERNMENT

1.8 Educate British Columbians about the benefits of being fully connected, including access to relevant Internet-based applications and information, and increasing e-government services.

RESEARCH AND DEVELOPMENT

1.1 Double the number of computer science and electrical engineering graduates from British Columbia post-secondary institutions.

1.2 Establish 20 British Columbia Research Chairs in the fields of medical, social, environmental, and technological research.

ATTRACTING TALENT TO BRITISH COLUMBIA (RECRUITMENT)

Attract senior professionals to accelerate industry growth by:

1.3 Making changes to immigration policy.

1.4 Establishing an Info-Office to aid in the recruitment of out of province technology workers and relocation of technology companies to British Columbia.

1.5 Implementation of a competitive provincial stock option program for British Columbia workers.

1.6 Resolution of cross-boarder security issues with the US.

MARKETING BRITISH COLUMBIA

1.7 Establish a domestic and international campaign to promote British Columbia's quality of life, superior infrastructure, education system, technology community and business-friendly environment.

Appendix C. Implementation Status of PTC Recommendations

This table shows the implementation status of PTC recommendations up to the 6th Report.

Area	Implemented	In Progress	No Longer Applicable/Relevant	Not Implemented
Digital Divide				
Broadband	2.3, 2.5, 2.6	2.1, 2.2, 2.4, 2.26, 6.1, 6.3	1.8, 2.7, 2.14	
Public Access	2.11, 2.15	2.8	2.12	2.9, 2.10, 2.13
Government Operations				
IT Procurement	3.1-3.4	2.20	2.39	
e-Health	2.16-2.18, 2.21, 2.23, 3.5, 6.10	2.19, 6.11	2.22, 2.24, 2.25	
e-Learning	2.37, 6.5, 6.7	6.4, 6.8	5.15, 5.16	
Rewarding innovators in the public sector	4.3			
Industry Development				
Industry Development - general	6.2			
Capital and Investment	2.27-2.36, 5.1, 5.7, 5.10, 5.11	5.2, 5.4-5.6, 5.8, 5.9, 5.12,	1.5, 3.6	5.3, 6.12
Alternative Energy (Fuel Cells)		4.2, 6.14		
Research & Development		1.2, 5.13, 6.9		
Human Resources	1.4, 1.6, 2.38, 5.17	1.1, 5.14, 6.6	1.3	
Marketing BC				
Marketing & Branding	1.7, 2.40-2.45, 6.13			
Other			4.1	

The following pages list the recommendations that are no longer applicable as well as those that the PTC has decided are no longer relevant.

BROADBAND

RECOMMENDATIONS	STATUS

NO LONGER APPLICABLE

| 2.7 | Conduct a Request for Information that solicits vendor and community stakeholder reaction to these recommendations, and taps into the innovative and creative potential for public-private partnerships that exists in the marketplace. | Events have overtaken the need for an RFI. |
| 2.14 | Work with the First Nations of British Columbia and the federal government to bring information technology, including public Internet access, to remote First Nations communities in British Columbia. | Superceded by 6.8. |

NO LONGER RELEVANT

| 1.8 | Educate British Columbians about the benefits of being fully connected, including access to relevant Internet-based applications and information, and increasing e-government services. | The benefits of being connected to the Internet are widely known by the public and well advertised by industry. There is no need for government to be in the Internet advertising business. |

PUBLIC ACCESS

RECOMMENDATIONS	STATUS

NO LONGER RELEVANT

| 2.12 | Improve awareness and visibility of public access. | Public access to the Internet is well advertised by industry. There is no need for government to be in the business. |

IT PROCUREMENT

RECOMMENDATIONS	STATUS

NO LONGER APPLICABLE

| 2.39 | The provincial government should expedite its efforts to rewrite its Policy and Legislative Framework around Procurement Reform so as to result in more streamlined, flexible, and cost-effective processes for both government and the British Columbia supplier community, | This recommendation is no longer applicable. The recommendation was made in the second quarter report and has been superceded by recommendations resulting from the IT Procurement Symposium and recommendations made in the 3rd Report. |

RECOMMENDATIONS	STATUS
ensuring fair and open procurement throughout the province. The government should also develop procurement policies and educational programs for both ministries and the supplier community which will provide British Columbia-based technology companies with the tools and skills required to compete more effectively for government contracts.	

e-HEALTH

RECOMMENDATIONS	STATUS

NO LONGER APPLICABLE

2.22	Identify policy changes needed to support the electronic delivery and management of health services.	Superceded by 3.5.
2.24	Facilitate the advancement of key e-health and Electronic Health Record initiatives.	Superceded by 3.5. An EHR framework has been developed. $15M was allocated to advance key e-health and EHR initiatives.
2.25	Establish a British Columbia e-Health Think Tank composed of e-health visionaries, not senior IT staff, who will examine the applications side of e-health, since it will be compelling applications that drive down costs and improve the delivery of health services to the remote and rural regions of the province.	Superceded by 3.5.

e-LEARNING

RECOMMENDATIONS	STATUS

NO LONGER APPLICABLE

5.15	That the Ministry of Education continue to develop its K-12 e-learning strategy through the BC Ed Online initiative to ensure that consistent, province-wide standards and content are developed and maintained.	This recommendation is covered by 6.4.
5.16	That the provincial government fully implement the BCcampus initiative.	This recommendation is covered by 6.7.

CAPITAL AND INVESTMENT

RECOMMENDATIONS	STATUS
NO LONGER APPLICABLE	
1.5 Implementation of a competitive provincial stock option program for BC workers.	Superceded by 5.3.
3.6 To meet the acute need for seed and early stage venture capital within the province, the PTC strongly recommends that the proposed amendments to the *SBVC Act* be passed by the legislature prior to the beginning of 2003. Failure to do so will discourage and inhibit the facilitation of more early stage capital within British Columbia, and will put us further behind other jurisdictions.	This recommendation is no longer applicable as this recommendation was made in the 3rd Report but was not implemented by the time the legislature rose (November 28, 2003). Legislation was passed in the spring of 2004.

HUMAN RESOURCES

RECOMMENDATIONS	STATUS
NO LONGER APPLICABLE	
1.3 Making changes to immigration policy.	Superceded by 2.38.

OTHER

RECOMMENDATIONS	STATUS
NO LONGER APPLICABLE	
4.1 Continue to work to implement all previous PTC recommendations with priority consideration of the following by government in the coming year: a) Broadband b) Government Operations-Telehealth c) Industry Development	This recommendation is covered by other recommendations.

Appendix D. PTC Members, Staff & Acknowledgements

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PROCUREMENT SYMPOSIUM

The Premier's Technology Council would like to express its gratitude to those who have participated in discussions and consultations on government's IT procurement policies. Those who attended the PTC IT Procurement Symposium are listed in Appendix A.

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