

# THE ROLE AND IMPACT OF MULTINATIONALS IN CANADA'S INNOVATION ENVIRONMENT



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ITAC is the voice of the Canadian information and communications technology industry. Together with its affiliated organizations across the country, the association represents 1300 companies in the information and communications technology (ICT) industry in all sectors including telecommunications and Internet services, ICT consulting services, hardware, microelectronics, software and electronic content. ITAC's network of companies accounts for more than 70 per cent of the 566,000 jobs, \$130 billion in revenue, \$5.2 billion in R&D investment, \$20.7 billion in exports and \$11.5 billion in capital expenditure that the sector contributes annually to the Canadian economy.

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## Executive Summary

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Six of the top ten corporate investors in Canadian research and development in 2005, according to RESEARCH Infosource, are information and communications technology (ICT) companies<sup>1</sup>. Of those six, three are multinational corporations.

Many multinational companies find Canada an attractive location in which to conduct research and development (R&D) activities. Their investment has helped to build a strong commercial R&D capability here. Laboratories operated by companies such as IBM, Intuit, SAP and Xerox make a profound contribution to Canada's capacity for technology-based commerce. By providing opportunities for employment for scientists, engineers and technicians, they help to build an experienced workforce, skilled in the management of both science-based commerce and commerce-driven science. Many managers and researchers have built superb careers within the context of these laboratories. However, executives skilled in the art of managing and growing science-based businesses are a scarce resource for Canada's innovation environment.

The investment multinational companies make in Canadian laboratories produces world-class facilities, world-class science and world-class products and services. The reach and market power of large multinational companies helps to ensure that Canadian intellectual property is dispersed to the global marketplace.

Through a case study approach that examines four major laboratories operated by the Canadian divisions of multinational firms, this paper will explore the impact of R&D activities directed by companies headquartered in countries outside Canada. It will explore what attracts them to invest in R&D establishments in Canada as well as some of the challenges they face maintaining and growing their operations here.

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<sup>1</sup> Canada's Top 100 Corporate R&D Spenders 2005. *RESEARCH Infosource Inc.*  
<http://www.researchinfosource.com/2005-top100.pdf>

## Multinational R&D Facilities in Canada

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Many of the world's most innovative information technology companies have recognized Canada as a key player in their global R&D activities. Multinational corporations have invested heavily in Canadian cities by establishing advanced research facilities across the country. IBM, for example, has been carrying out R&D functions in Canada for nearly 40 years. Since its inception in 1967, the IBM Toronto lab has grown to be the largest software development facility in the country and is the third largest IBM lab in the world. The IBM Toronto lab works on some of the company's most successful products including DB2 Information Management, WebSphere, Tivoli and Rational software. Within the last five years, IBM Canada has established smaller software labs in Ottawa, Montreal and Victoria.

Similarly, Xerox has been performing R&D activities in Canada for quite some time. In 1973, Xerox formed the Canadian Value Added (CVA) program which was designed to increase the Canadian content of Xerox's products by developing manufacturing, procurement and research infrastructures in Canada. The following year, the company founded the Xerox Research Centre of Canada (XRCC) near Toronto as part of this mission. The XRCC was the first Xerox research facility located outside of the United States and is the only lab that conducts materials research for the entire Xerox Corporation. According to Dr. Hadi Mahabadi, vice-president and centre manager, the XRCC "is a premier research facility for conducting document production and management related materials research, for Xerox worldwide needs." While IBM and Xerox are among the early R&D settlers in Canada, other notable information technology multinationals have assembled in Canada more recently.

Intuit Inc, a US-based leader in business and financial management applications, opted for a Canadian research facility in 1994 when the company established a national headquarters in Edmonton, Alberta. Both establishments originated from the company's desire to tap into the Canadian market. For nearly 12 years, Intuit Canada has been altering and enhancing its existing products and developing new ones to serve specifically the Canadian and global markets. Intuit prides itself on a unique and innovative culture that spans the whole corporation. Instead of assigning all innovative responsibilities to the company's R&D group, members of the entire enterprise are encouraged to pinpoint customer problems and design applications to

solve them. In this respect, Intuit works to develop products that are directly encountered by the information technology consumer.

While the Canadian Intuit Centre for Innovation (ICI) works extensively on developing new products for new markets, other groups within the organization work to enhance existing Intuit products with new features. Approximately two-thirds of Intuit's business in Canada, however, comes from Canadian-made products. Intuit's Quick Tax, for example, is a Canadian-developed software application that assists users in filing annual income tax returns. Intuit's R&D operation is a prime example of a multinational working on commerce-driven science in Canada.

While Intuit began performing R&D functions in Canada for strategic purposes, SAP's association with Canada evolved rather organically. Having understood the benefits of conducting R&D on a global scale, SAP established a research centre in Palo Alto, California in 1997. This was the first facility to be located outside of Germany. The following year, SAP embraced distributed development and founded three more research centres in Japan, France and Canada. With humble beginnings in 1998, the success of SAP's Canadian R&D efforts largely mirror the career of Laure Le Bars, the chief proponent of the lab's creation and current managing director. The Canadian research centre was originally staffed with five employees and through the execution of strong assignments for the company, SAP Labs Canada grew to include more people and more projects. Le Bars attributes some of the success to the good quality programmers that are available in Canada. She explains that, "SAP is not purely looking for technical people because we are developing applications. Therefore, we need people who understand business processes and who can translate this knowledge into programming, throughout the entire software development life cycle." Currently located in Montreal's Cité Multimédia, the lab is a vital component to the company's global R&D network, creating cutting edge applications for a diverse customer group.

## The Attractiveness of Canada

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Although the multinationals in this study all operate in the technology sector, each company has different justifications for selecting Canada as an R&D site. Reasons vary according to the strategic motives of the respective companies; however, there are many commonalities as to why Canada is an attractive place to carry out tech-related R&D. Aside from the fact that Canada offers a stable business and political environment, the country also benefits from lower R&D costs. Historically, the Canadian dollar and economical labour costs, in comparison to the US, have helped to reduce global R&D expenditures for many multinational firms. For SAP, the overall costs of doing research in Canada are quite appealing. According to Le Bars, performing R&D in Canada is approximately 50 per cent less expensive than doing so in Germany. Similarly, the cost of living in Canada is considerably less than other countries and this can assist in a firm's recruitment endeavours. This is particularly true for Intuit Canada as the company operates in Alberta, Canada's only PST-free province. By being exempt from provincial sales taxes and subject to lower personal income tax rates, Albertan R&D professionals retain more disposable income dollars.

While Canada's tax incentive programs can be beneficial to multinational R&D enterprises, financial support is not necessarily a strong motivator to establish facilities in the country. For example, as a member of Cité Multimédia, SAP Labs Canada receives credit for developmental personnel. Le Bars claims that although the credits are helpful and appreciated, they do not necessarily differentiate Canada from the rest of the world since many countries offer financial incentives. In other words, financial support is a resource most R&D intensive companies can find anywhere in the world, including developing nations such as India and China. It will not be the sole differentiator in a company's decision to locate in a specific country.

The Scientific Research and Experimental Development (SR&ED) federal tax program was one of the first of its kind in the world,<sup>2</sup> however, participants in this study pinpointed some key areas for improvement. Chris Wilkinson, Manager of the Intuit Centre of Innovation (ICI), feels that

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<sup>2</sup> "Do Your Research & Development in Canada... It Pays Off!" *The Government of Canada*. September 2004. [http://www.leadingedgebc.ca/usr\\_files/RD\\_Brochure\\_Final\\_Sep\\_2004.pdf](http://www.leadingedgebc.ca/usr_files/RD_Brochure_Final_Sep_2004.pdf)

because filing for the SR&ED is such an onerous process, accounting firms benefit more than foreign investors do.

IBM agrees that there are problems with the SR&ED credit for multinational firms. Carol Felepchuk, Government Programs Executive at IBM Canada, explains that, "In circumstances where a foreign investor owns a Canadian company performing SR&ED activities, they are generally able to claim back the Canadian corporate income tax, payable by the Canadian company, in the form of a foreign tax credit against tax otherwise payable on the distributed earnings of the Canadian company. Because the SR&ED Investment Tax Credit reduces the Canadian corporate income taxes payable, this in turn reduces the foreign tax credits that are available to the foreign investor, thereby increasing their local income tax liability. Consequently, the Investment Tax Credit provides no net benefit to the foreign investor in determining total income taxes payable for all jurisdictions." IBM suggests that, "access to these credits needs to be improved by either allowing for a refundable credit (with a cap to ensure affordability), or by allowing R&D performers to offset their credit against another government levy, like the employer portion of EI premiums."

Canada's R&D tax credit program has served Canadian research-oriented firms well, but it is becoming less meaningful for multinationals. Improving tax incentives such as the SR&ED may assist in attracting and retaining multinational R&D operations in Canada.

Each multinational did, however, highlight the Canadian workforce as being fundamental to their global R&D activities. Dr. Mahabadi of the XRCC notes that the presence of major universities such as the University of Toronto, McMaster University and the University of Waterloo enable Xerox to hire highly qualified chemists, chemical engineers, engineering and materials research professionals. The Canadian talent pool is also desirable because it offers a mix of graduates from various levels. For example, 30 per cent of the employees at the IBM Toronto lab hold post graduate degrees. At the XRCC, 36 per cent of the workforce holds PhDs and 44 per cent hold science degrees at the bachelors or masters level.

The Canadian talent pool also includes many experienced professionals. In the past, Intuit typically recruited more intermediate employees with three to five years of engineering experience. The company has been successful in drawing from the Edmonton area. Under the leadership of Cameron Peters, CTO of Canada and the UK, Intuit is looking to establish a more

diversified mix of recent graduates and experienced professionals. Due to the fact that the company is embarking on more global initiatives, the firm is forecasting a significant increase in technical staff. By mid-2006, Intuit is expecting to hire an additional 30 technical employees and recruiting from western Canada may pose a potential challenge. According to Peters, "In Edmonton, the software engineering density is a little more sparse." Depending on the magnitude of Intuit's growth, the company may have difficulty soliciting recruits from Edmonton.

In addition to the technical skills available in Canada, Felepchuk believes that diversity is a definite strength of the Canadian IT workforce. Canada offers a fairly gender balanced, multicultural and multilingual environment. For example, 34 per cent of the XRCC staff is female. By welcoming immigrants, Canada continues to enhance the diversity of the nation's IT workforce. This type of diversity within one nation alone can be very valuable to a corporation's global R&D objectives. Because of the diversity mix, Canadian R&D efforts are oftentimes a collaboration of people from all over the world who bring different cultural perspectives, employment experiences and educational backgrounds to the R&D table. Consequently, Canadian R&D professionals are capable of developing technology products from a global perspective, which is essential to firms competing in the international marketplace.

Intuit certainly benefits from the diverse and innovative culture of Canadian R&D professionals. Originally established for the purpose of penetrating the Canadian market, Intuit Canada has evolved dramatically in a short period of time. More recently, Intuit's Edmonton location has been developing new features for American-made products to meet the needs of the global market. According to Wilkinson, Intuit's US-based parent often adopts a more American-centric approach to R&D, creating products for US customers and the US dollar. Intuit Canada works on amending these products to suit other markets; however, this ability is largely dependent on the way the product was originally constructed. Canadian-made IT products tend to be designed from a different point of view. Wilkinson points out that because Canada's scale is small, Canadian innovators have to consider a global perspective in order to justify the capital required to conduct R&D activities. In respect to Intuit's line of business, Wilkinson explains that "Canadian financial systems are comparable to those of Germany, Australia and the UK, particularly in terms of taxes. As a result, we've been able to use Canada as a launching board for products designed for other countries." Due to the similarities between Canada and other nations, along with the emphasis on globally applicable innovations, Intuit Canada has been quite successful in developing products that are distributed worldwide.

Given that Canada's workforce is one of the country's greatest ICT resources, and produces superior performance and results for many multinationals, it is important that Canada improve continuously the quality of technical personnel. Otherwise, it is not unlikely that multinationals will locate R&D centres elsewhere. Both representatives from SAP and Intuit suggest that recruiting global talent may assist Canada in this regard. In doing so, Le Bars of SAP asserts the importance of recognizing international credentials when accepting applicants from other countries. Cameron Peters of Intuit agrees. Peters suggests that, "Canada needs to be a free trade partner in labour." He explains that formal education should not be the sole credential when accepting multinational R&D staff into the country. Instead, he encourages the consideration of work experience and skill level when employing global personnel.

## Benefits to Canada

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The presence of multinationals in Canada represents a reciprocal relationship whereby both the country and the corporations benefit. Multinational companies experience lower R&D costs and have access to Canada's R&D labour force. In turn, Canada benefits by having world-class research facilities for the top R&D talent in the country. Through multinationals, Canada is able to retain and develop some of the country's brightest science and technology researchers. The IBM Toronto Lab, for example, has 2,100 employees working in software development. SAP currently offers another 180 technical R&D positions, followed by Xerox and Intuit with 115 and 100 positions respectively. Combined, these multinationals provide over 2,500 technical R&D seats to Canadians.

Multinationals do more than employ and develop Canada's talent. The success and global reputation of these labs also entices researchers from all over the world to assist in technical R&D projects in Canada. XRCC employees, for example, originate from 37 different countries. Through these state of the art research facilities, Canadians have the opportunity to work with world leaders in the science and technology community, contributing to and learning from superb multicultural teams for the exploration of science.

These research centres also enable Canadian software engineers, technicians and scientists to contribute to the greater ICT community by working on multinational projects. While most facilities have their own mandates, collaborations do occur between research labs within some corporations. These associations can be as simple as sharing resources and ideas through databases, or as complex as designating very specific projects to a few carefully selected labs. The latter is the case with SAP's global innovative network. SAP's R&D facilities work in collaboration on a variety of projects, and assignments are distributed in accordance with a facility's skills, resources and project record. This enables SAP to assign projects to the most appropriate lab and incorporate a variety of perspectives into the international innovation process. At SAP, multiple labs around the world may work on components of a larger project. For example, Germany, India and Canada are working together on Customer Relationship Management (CRM) applications. While the labs work rather autonomously on their respective assignments, the component parts from each lab are eventually integrated to create truly global products. This gives Canadians the opportunity to work on some of the world's most ground-breaking applications.

## Canadian Success Stories

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Many remarkable technology innovations have been conceptualized with the help of Canadian R&D specialists. For example, Intuit Canada has worked with its American counterpart in Mountain View, California on the QuickBooks accounting program. While QuickBooks is an American innovation, the QuickBooks team at Intuit Canada developed all the online banking features that are used in QuickBooks worldwide. The QuickBooks Online Edition is a secure, internet-based accounting application that enables users to access and manage their finances remotely.

Along with labs in Germany and Palo Alto, SAP Labs Canada has participated in the enterprise's overall research on Radio Frequency Identification Technology (RFID). SAP's global R&D network worked extensively to evaluate the integration of RFID into various

business processes. After a series of experimental research efforts, prototyping and other developmental activities, SAP matured and standardized the technology. The company released the SAP Mobile Asset Management application which allows users to perform regular work activities, pertaining to plant maintenance or customer service, for example, in a mobile capacity. The Frankfurt Airport in Germany was one of the earliest adopters of this technology.

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The Frankfurt Airport wanted to develop an efficient method for performing and tracking maintenance completed on the facility's fire shutters, which are designed to close automatically in the event of a fire. The objective was to abandon the former paper-based system in favour of an IT-enabled application. The project required RFID transponders to be installed in airport ceilings which contain information related to the maintenance of the fire shutters. Using mobile devices, maintenance personnel can receive work orders and provide maintenance progress updates, thus eliminating the need for paper reports which can be time consuming and cumbersome to store.

Through their specialization in mobile business applications, the research group at SAP Labs Canada participated in the development of standards for the mobile readers. This is a prime example of the contributions that Canadians employed in multinational R&D labs make to the larger ICT community. Le Bars explains that when it comes to RFID applications, "the imagination is the limit." Today, SAP's RFID technologies are used in security systems, retail applications and global supply chain operations including warehousing and distribution.

The XRCC lab has made many vital contributions to the document productions and management industry including the incorporation of nanotechnology into materials research for the Xerox Corporation. The XRCC released a nanotechnology-based chemical toner called EA Technology. According to Dr. Mahabadi, this technology "yields sharper image quality, higher reliability, reduced toner usage, faster warm-up time and an environmentally friendly manufacturing process." This type of breakthrough research is not uncommon for the XRCC. To date, the lab has generated close to 1000 patents and produces approximately 160 ideas per year. The XRCC has had some involvement with the majority of products offered by Xerox for more than 30 years.

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<sup>3</sup> "SAP Mobile Asset Management at Fraport AG." *SAP Corporation Case Study*.  
[http://www.sap.com/solutions/mobilebusiness/pdf/CS\\_fraportcase.pdf](http://www.sap.com/solutions/mobilebusiness/pdf/CS_fraportcase.pdf)

Through these work associations with multinational R&D facilities, many Canadian employees have established impressive careers within the ICT sector. At the XRCC, for example, four scientists have reached the remarkable achievement of having one hundred patents. In a June 2005 press release, Xerox recognized Dr. George Liebermann, a senior research fellow at the XRCC who holds 41 US patents. Dr. Liebermann is one of only 260 Canadian engineers to have been inducted into the Canadian Academy of Engineering for his exceptional chemistry and chemical engineering research. Dr. Mahabadi is quoted as saying that, “George holds an extraordinary international reputation as an expert in his field, and his inventive work has significantly contributed to XRCC’s overall success in delivering key innovations to Xerox worldwide.”<sup>4</sup>

The Canadian IBM labs are also home to many internationally recognized R&D professionals. The IBM Corporation uses a system of internal titles to honour outstanding performers in science and technology research. The highest technical honour at the company is the title of IBM Fellow. Annually appointed by the CEO, IBM Fellows are R&D employees who have demonstrated exceptional performance in engineering, programming and technology. There are currently 55 active IBM Fellows in the world, two of whom are Canadian; George Galambos of Montreal and Kevin Stoodley of Toronto.<sup>5</sup> The next highest technical distinction in IBM is that of Distinguished Engineer. IBM Canada’s software labs are home to nine Distinguished Engineers. The Master Inventor designation is awarded to patent leaders at IBM. There are currently 28 Master Inventors at IBM Canada.

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<sup>4</sup> “Xerox Canadian Researcher Enters Scientific ‘Hall of Fame’.” *Xerox Corporation Press Release*. June 5, 2005. <http://media.xerox.ca/news/default.asp?articleID=992>

<sup>5</sup> “IBM Fellows.” *IBM Corporation*. [http://www.research.ibm.com/resources/awards\\_fellows.shtml](http://www.research.ibm.com/resources/awards_fellows.shtml)

## The Establishment of Academic Partnerships

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The presence of multinational R&D facilities in Canada is invaluable to academia. Through joint research and publication endeavours, internship opportunities and recent graduate development programs, multinational R&D facilities are improving the university curriculum and further developing Canadian talent. Through these associations, multinationals and academic institutions are bridging the gap between academic and commercial research. IBM and Xerox, in particular, have extensive partnerships with Canada's academic community that help to foster technological innovation.

IBM has launched three separate programs in Canada designed to attract, recruit and develop students and researchers. The IBM Centre for Advanced Studies (CAS) was developed in Toronto in 1990 to establish valuable relationships with university professors and post graduate students. Through project-based work, IBM product development teams and members of academia collaborate on corporate R&D initiatives. Through CAS, IBM has access to academia's brightest minds and is exposed to academic research methodologies. Furthermore, the program supports the introduction of IBM's products and R&D activities into the university curriculum. Academic researchers have the ability to supplement their education, pursue their own research interests and solve real world technology problems. Since its inception in 1990, CAS Toronto has initiated over 100 research projects.<sup>6</sup> In fact, the program has been so successful that it has been launched in other IBM labs worldwide.

Recognizing the need to fuse technology with commerce-based knowledge, IBM also has a program geared towards technical and MBA students. The IBM Extreme Blue Program hires student interns for a 14 week period. With the support of IBM mentors, the interns are encouraged to turn an innovative idea into a practical and effective solution for the enterprise. The IBM Toronto Lab participated in the Extreme Blue Program for the first time in 2004 and the program has proven to be quite successful. During its first year, one of the Toronto Extreme Blue teams managed to transform its idea into the Performance Optimization Toolkit, which is now part of the IBM product portfolio. The Extreme Blue program exposes students to the technology R&D process in the country's largest software development facility.

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<sup>6</sup> "IBM Centres for Advanced Studies." *IBM Toronto Software Lab*. July 2003.

<https://www-927.ibm.com/ibm/cas/background/overview.pdf>

Lastly, IBM uses the Employment Pathways for Interns and Co-ops (EPIC) program as a recent graduate recruitment tool. IBM labs across Canada typically hire 200 interns annually who have the opportunity to work in IBM research. Students gain access to the IBM innovation environment and IBM has the ability to see firsthand what the candidates are capable of. At the end of the term, both parties can make very informed employment choices.

The XRCC has established formal relationships with academic institutions since its inception in 1974. Through collaborative research projects, donations and offers of financial support, Xerox has made considerable contributions to the Canadian university system. Consisting of members of the XRCC, the University Partnership Committee (UPC) works to develop ties with chemistry and chemical engineering research faculty at various universities and colleges across Canada. Through this network, members from both the XRCC and academia work on joint research ventures that are of interest to both parties. Oftentimes, the XRCC provides financial support for these collaborative research ventures. The company also provides grants through the Xerox Corporation's University Affairs Committee, which enables scientists to sponsor fundamental research endeavours at universities. Through these affiliations, the XRCC shares its resources with academia and even donates surplus equipment to researchers and institutions. In addition to these formal working relationships, the XRCC also engages in regular discourse with universities. For example, members of the XRCC often visit and lecture at various institutions. Alternatively, members of academia are welcome to visit, lecture or complete sabbaticals at the XRCC. Due to the positive ties between the XRCC and universities, it is not uncommon for researchers to return to academia to teach, even after retirement from Xerox. In doing so, these researchers are contributing to the breadth of technical and scientific knowledge at the university level.

In addition to working with leading academic researchers, the XRCC offers a cooperative program for undergraduate science and engineering students. Each year, the XRCC provides approximately 30 co-op students with real world R&D experience. Through working on innovations or the commercialization of new technologies, students are encouraged to consider post graduate studies or careers in scientific research. The internship program has proven to be quite successful and it often acts as a recruitment program for more permanent R&D positions. Dr. Mahabadi explains that, "co-op students have proven to be reliable, independent researchers, who play a significant role in the achievement of many of the centre's technical

objectives.” While the program is advantageous to Xerox as a recruitment tool, the benefit to students is beyond measure. It is clear that the XRCC has a vested interest in education and the company is a fundamental contributor to science and technology learning in Canada.

According to Le Bars, SAP Labs Canada does not have enough academic programs in place. Le Bars feels that “giving opportunities to students is part of being a good corporate citizen.” This is one of the reasons why developing stronger ties with academia is among Le Bars’ priorities. Despite her aspirations to achieve more, a relationship between the SAP’s research group and academia does exist. SAP Labs Canada regularly recruits software engineering and computer science interns from the bachelors, masters and doctorate level and runs a cooperative program. These interns most commonly work on Java-based applications for mobile business. Depending on the time of year, interns can make up approximately 10 to 15 percent of the R&D workforce in the Montreal lab. This is indicative of the fact that the centre makes a concentrated effort to train and develop science and technology students.

As a relatively new arrival in Canada’s innovation ecosystem, Intuit’s relationships with academia are still evolving. Nonetheless, the corporation has demonstrated significant intentions to develop more structured associations with academia. Intuit intends to hire five graduates and two engineering interns in 2006. The company is also working closely with the University of Alberta, holding regular information and campus recruiting sessions. Through this relationship, Intuit has established an open forum to discuss the University curriculum. Intuit provides regular input on how the university can produce students equipped with employable skills.

Feedback from multinationals is useful in the attempt to make the Canadian education system more globally competitive. Some valuable recommendations from representatives from the four research centres were offered during interviews. IBM, for example, has expressed concern with declining computer science enrolments and urges Canada to make a concentrated effort to attract more females to the field of study at the university level. In addition, Dr. Mahabadi of Xerox suggests that “Canada needs a more educated workforce with postgraduate degrees.” Through their extensive internship programs, however, both companies are attempting to improve the situation. By recruiting interns, developing their skills and exposing them to technological R&D, multinationals are doing their part to motivate Canadians to pursue careers in ICT research.

Le Bars of SAP suggests that academia work on curricula that transforms math oriented people into effective managers. She explains that the workforce does possess individuals with strong analytical and programming skills. While these abilities are vital to the execution of strong R&D projects, an aptitude for management is also essential at more senior levels. SAP Labs Canada conducts its own programs to develop proficiency in management among its technical staff. However, Le Bars believes this is one of the areas where universities could assist in workforce skills development.

## Summary

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R&D spending can be directly linked to a country's standard of living. Consequently, the federal government announced the intention to make Canada one of the five most innovative economies in the world by 2010<sup>7</sup>. In the pursuit of this initiative, the government has pledged to double its R&D spending by 2010. The remainder of the commitment rests with the private sector.

The ICT sector was responsible for more than half of the total corporate R&D spending in 2005<sup>8</sup>. IBM, for example, contributed over \$340 million Canadian to R&D last year. Since the ICT sector is the largest R&D spender, and three of the top six corporate ICT spenders are multinational firms, it is imperative that Canada support these companies that have made a commitment to the country's innovation environment. Multinational R&D operations are essential to Canada's 2010 innovation target.

The representatives from IBM, Intuit, SAP and Xerox who participated in this study are prime examples of skilled science and technology experts at the executive level. While interviews

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<sup>7</sup> Barber, H. Douglas, "Can the Private Sector Get Canada into the Top Five Innovative Economies of the World by 2010?" *Information Technology Association of Canada*.

<sup>8</sup> Canada's Top 100 Corporate R&D Spenders 2005 - Analysis. *RESEARCH Infosource Inc.*  
<http://www.researchinfosource.com/2005-analysis.pdf>

indicated that the availability of skilled resources in Canada was among the strongest motivators for multinationals to conduct R&D here, some valid recommendations as to how to improve the innovative ecosystem were offered. Firstly, tax policies can be reformed in support of multinational R&D activities. In addition, developing the science and technology workforce across all provinces and encouraging men and women to enrol in higher education would assist in making Canada's workforce more competitive on a global scale. Dr. Mahabadi of Xerox suggests that Canada needs to develop "a culture that promotes innovation as the major source of wealth creation. This requires work at all levels of education and a strong leadership." Through the establishment of academic partnerships, multinational corporations are taking an initiative to assist in workforce skills development.

The importance of the multinational presence in Canada must not go understated. Through advanced research facilities, Canadians are establishing impressive careers in science and technology research. The R&D activities carried out in these facilities translate into new or enhanced products or product components for the technology consumer. In this respect, Canadian scientists, researchers and engineers are contributing to the global ICT knowledge base. Most importantly, multinational R&D firms provide a mechanism for Canadian science and technology innovations to make a vital contribution to world knowledge and to the science-based products and services that do so much to improve the quality of 21<sup>st</sup> century life.