



2012 Ontario Provincial Pre-Budget Submission

OVERVIEW

At McMaster we appreciate the immense challenges that lie ahead for the government relating to Ontario's economic recovery. As the Government of Ontario develops Budget 2012, McMaster University supports continued vigilance and focused strategic spending. In order to ensure that the province is in a position to compete in the increasingly globalized, knowledge-based economy, Ontario must continue to support the programs and institutions that will contribute to its future prosperity.

The McGuinty government has shown great leadership in the postsecondary sector. On many occasions the government has reinforced its belief that building the best-educated workforce in the world is the most important thing Ontarians can do to generate jobs and prosperity. Initiatives such as Reaching Higher; Putting Students First; Building Together, and the government's 10-year infrastructure plan for Ontario have generated positive results for the province and for students.

Universities continue to be an important part of Ontario's economic future. They play a key role in regional economic development. They are centres for the development of highly qualified people and research and therefore are essential contributors to the province's innovation agenda. In 2010, universities in Ontario educated over 480,000 undergraduate and graduate students and, in 2009, the latest year for which information is available, performed 34% of the province's total research and development activities.¹ It is estimated that by 2015 almost two out of three new jobs will require a postsecondary education.

Even in today's current economic climate, graduates from universities in Ontario continue to experience high rates of employment. In 2009, almost 94% of McMaster graduates found employment within six months after graduation. In addition, since the implementation of Reaching Higher, the overall employment rate for McMaster graduates (2 years after graduation) has increased from 95% to 97%. This increase is quite substantial given the current economic circumstances, and is a direct result of the University's ability to achieve its goal of providing an innovative and stimulating learning environment where students can prepare themselves to excel in life.

McMaster University has a proud history of connecting students, teachers and researchers. The University has achieved an international reputation as a centre for teaching creativity and impact and has become one of Canada's most research-intensive universities. Currently, almost 29,000 undergraduate and graduate students are reaping the benefits of this balanced approach to education and researchers at the university have generated over \$395 million in annual research income.

McMaster University recommends that Budget 2012:

- At a minimum, maintain current levels of tuition increases and grant funding;
- Enable Ontario universities to offer and enhance high-quality educational experiences and opportunities for students by guaranteeing the flexibility of operating funding;
- Allow for future graduate funding to be provided in a manner that enables innovative programs to be developed and students adequately supported;

¹ Statistics Canada, *Research and Development in Canada (GERD), and the Provinces (Ottawa, 2011) 25.*

- Ensure the enrolment targets set by government can be met by making strategic capital investments in deferred maintenance, and, where required, new facilities;
- Strengthen economic development and job creation through funding support for university research and innovation.

SUPPORTING STUDENTS AND A QUALITY UNIVERSITY EXPERIENCE

FORWARD WITH INTEGRITY

Universities across the province provide great experiences and opportunities for students. The existing model has served our students well, however, that doesn't mean we cannot improve. Continuing to ensure a relevant, rigorous, community-based education is an important priority for McMaster and this requires ongoing change.

McMaster has begun a strategic and institution-wide reconsideration of teaching practice and learning assumptions, from curriculum structure to the way in which programs are delivered. This process, led by President Patrick Deane, will engage the entire campus community including students, staff and faculty. While experiential, self-directed, and interdisciplinary learning are all part of programs at McMaster, expanding these opportunities so that they are available to all students in all programs is an ambitious and important goal if we are to help students reach their full potential.

At McMaster we will define excellence through:

- **Experiential learning**
An increased level of experiential learning will allow students to experience a higher level of engagement, which in turn will lead to an improved learning experience. In addition, it has the potential to bring a tangible social and economic benefit to the university's regional community.
- **Self-directed learning**
Self-directed learning can be expected to grow in importance in the future, as students' access to information and to the tools of discovery increase. When self-directed learners engage with the broader community, the learning environments are altered by the existence of a greater number, and more diverse, teachers than McMaster can generally provide.
- **Interdisciplinary**
Interdisciplinarity is acquiring greater importance and altered meaning. If properly understood and integrated it will compel significant change to education, and it will license and support bold paradigm-breaking new directions in research.

Also of key importance to McMaster is our level of engagement with our community. We work closely with the City of Hamilton as well as communities in Niagara, Kitchener-Waterloo, Burlington and the rest of Halton. Partnerships involving local government, institutions like McMaster, business and other community groups are vital drivers of economic development.

Community engagement is an important part of the history of McMaster University. To re-incorporate civic engagement into the University's core mission, an effort will be made to integrate it fully and meaningfully into McMaster's learning environment and activities related to research and exploration.

We look forward to working with the Government of Ontario to ensure the highest quality experience for students given the evolving opportunities and demands of the system.

GOVERNMENT OPERATIONAL SUPPORTS

The province's commitment to quality within the postsecondary sector is encouraging. In order for the University to build on the quality of education and reflect our shared goals for university students we need funding that is flexible and at a minimum, maintains current levels of tuition increases and grant funding.

Over the last three decades, provincial operating grants to Ontario universities have increased substantially in absolute terms. But as student numbers and associated costs have increased, that funding as a proportion of total operating revenue has decreased. In an effort to make up for the lost revenue, universities have had to gradually increase the levels of tuition, and other fees. This has resulted in additional costs for students, and higher student assistance requirements (i.e. OSAP). Maintaining current levels of funding in a manner that is flexible will allow universities to meet their commitment of quality education to students and their parents.

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ENSURE CAPACITY THROUGH STRATEGIC CAPITAL INVESTMENTS

The Government of Ontario has been clear in its commitment to increase capacity in Ontario's postsecondary system. Ensuring students have access to education and training is an important element of the McGuinty government's plan to provide quality, affordable postsecondary education and training to Ontario students. McMaster is proud to partner with the government in its effort to improve access to students who wish to benefit from a university education.

McMaster would like to thank the provincial government for investing \$1.5 billion in 49 projects at Ontario's colleges and universities, through the Knowledge Infrastructure Program (KIP), including renovations to McMaster's nuclear reactor and the expansion of the University's Centre for Spinal Cord Injury Education, Research & Rehabilitation.

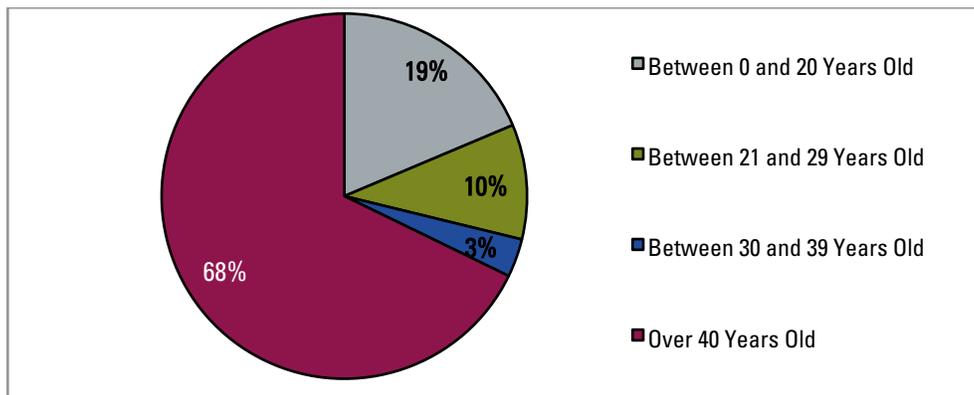
The University is also excited to be moving forward with the construction of the Wilson Building for Studies in Humanities and Social Sciences, with the support of the province. This new 104,000 square foot liberal arts building will accommodate 1,275 more student spaces, and create approximately 150 construction jobs. The project is to commence in 2012, with construction anticipated to begin in 2013.

Even with investments across the sector, pressure on postsecondary infrastructure continues due to increases in demand, particularly in the Greater Toronto Area from which McMaster attracts many of its students. From 2010 to

2011, applications to Ontario universities in general increased by 2%. Over the last ten years, total applications have increased by 34%. It is anticipated that, in 2012, for the first time ever, the number of applicants will surpass 90,000. At McMaster, demand for student spaces once again surpassed the provincial increase. This past year overall applications have risen by 5% and the number of students who name McMaster as their first choice increased by 6%. Additionally, since 2002, applications to McMaster University have increased by almost 44%, 10% higher than the provincial average.

To ensure that McMaster had a factual understanding of its space resources and needs, the University undertook a campus capacity study in 2010. The review established that the university was below the physical space required to meet the current number of students enrolled at McMaster. Furthermore, it is anticipated that by 2020 McMaster will require approximately 40% more space, over current totals, to meet projected need. This places significant pressure on University facilities, the majority of which were built more than 40 years ago (See Chart 1).

Chart 1: Age Breakdown of McMaster University's Facilities



The most significant pressure areas are focused in the following areas: classrooms, student study areas, research space, and graduate student space.

McMaster's goal is to provide the best possible student experience through renovated studio space, labs and classrooms designed to support McMaster's distinct learning style. The University agrees with the government that the efficient use of existing space is paramount and it is a critical element of the university's capital plan.

The University welcomes the province's commitment, as a part of its long-term infrastructure plan, Building Together, and its willingness to work with both the federal government and regional municipalities to address deferred maintenance as well as the demand for new buildings.

McMaster has a cost-efficient capital expansion plan in place for the renovation of existing facilities and the development of new space. The University's most pressing need currently is phase two of the Wilson Building for Studies in Humanities and Social Sciences. With support from government, this project will enable the University to renovate existing liberal arts space that will substantially and most effectively increase classroom and learning space on campus. These renovations will help McMaster build program and teaching excellence for students through experiential, self-directed and interdisciplinary learning.

For the university to adequately accommodate its increasing demand and fulfill its purpose of developing intellect at the highest level, it will require on-going and predictable funding to significantly reduce the current backlog of deferred maintenance, which, for McMaster University, presently stands at approximately \$145 million.

In addition to renovating and improving existing space, McMaster is also examining innovative opportunities for partnerships with the City of Hamilton and other local postsecondary partners to help meet the growing demand from students while at the same time be an important part of an effort to revitalize the City of Hamilton's downtown.

McMaster University recommends that Budget 2012:

- Ensure the enrolment targets set by government can be met by making strategic capital investments in deferred maintenance, and, where required, new facilities.

DEVELOPING THE ECONOMY THROUGH INVESTMENTS IN INNOVATION

Ontario's research-intensive universities are positioned to help the government steer the province toward economic recovery. McMaster University has been a driver of economic renewal in the Hamilton community and surrounding region through knowledge and technology transfers, and spin-off companies. McMaster's research within its top rated Faculty of Health Sciences is also helping to deliver innovations that will ensure better patient care and gain better value from our health care dollars.

As the Government of Ontario develops Budget 2012, McMaster University supports focused strategic spending in areas that can and will improve Ontario's competitiveness by investing in innovation. The funding programs provided by the Ministry of Economic Development and Innovation have contributed substantially to Ontario's people and the economy. Each dollar spent on university research by the Ministry is multiplied through the opportunities for partnerships with the private sector across Ontario or other funding programs.

Initiatives such as the Ontario Research Fund (ORF) are particularly important. The ORF – Research Infrastructure stream of funding which is mirrored by the Canada Foundation for Innovation's (CFI) matching program is a perfect example of leveraging funding to support research that is transforming Canada and the world.

McMaster also encourages the Government of Ontario to invest in opportunities designed to bring universities together with industry – where scientific findings are translated into useful innovations and industry invests in developing new products in Ontario. The German Fraunhofer model epitomizes the benefits of these kinds of partnerships and has been a model of success for that country.

The Fraunhofer organization operates between 60 -70 institutes in Germany. Their mission:

1. to promote and undertake demand-driven research in an international context of direct utility to private and public enterprise and of wide benefit to society;
2. to reinforce the competitive strength of the economy by developing technological innovations and novel systems solutions for their customers;
3. to provide a platform that enables staff to develop the necessary professional and personal skills to assume positions of responsibility in industry and in other scientific domains.

For the government, this amounts to an investment in the physical infrastructure and core funding of 30% towards operating, with the remaining 70% coming from institute partners – primarily industry. A modest investment for such a

significant pay-off is the direct result of a highly effective and trusted innovation platform that serves as the de facto research organization for many of Germany's technology leaders and manufacturers of some of the best known brands in the world.

The Expert Panel for the Review of Federal Support to Business Research & Development, authored by Tom Jenkins, encourages this type of model at the national level, and, we believe the same holds true at the provincial level.

This paper highlights some specific areas where there is tremendous opportunity for Ontario to be a world leader and we offer specific opportunities for targeted investment. These opportunities exist across all disciplines and are enhanced at McMaster by the University's track record of interdisciplinary approaches to research.

Below are a few key examples of opportunities for commercialization of research. They include:

- Two approaches to the development of personalized medicine. First, McMaster's Faculty of Health Sciences is studying the global population to find the genetic susceptibilities for a wide variety of diseases including those of cardiology, allergy and metabolic disorders. This work will lead to a developing a panel of susceptible genes against which individuals may be assessed. With the rapidly falling cost of technology, it is anticipated scanning will be an affordable reality within five to seven years. Second, stem cell research is enabling the scanning of responses to drugs, using high throughput screening for chemical biology and the use of deprogrammed human skin (fibroblast) cells developed by Dr. Mick Bhatia to identify the biological effect (and potential clinical efficacy and toxicity) of novel compounds. This drug screening has the potential of enormous savings in health care as it would considerably shorten the time for drug development. The platform would also include mining the microbial community for new antibiotics and other agents.
- There is also some very promising work being done in the Department of Family Medicine at McMaster University using the electronic medical record (EMR) OSCAR and the personal health record (PHR) MyOSCAR. The OSCAR EMR is a sophisticated software with advanced clinical and research functionality which has been the second most adoptive EMR in the recent wave of Ontario MD funding. Experience gained from the development of the OSCAR EMR has generated a new tool called the MyOSCAR PHR which enables individual patients to have access and control of their health records, enabling them to become more actively involved in the management of their health. Lessons learned from the development and dissemination of the OSCAR EMR are being used to plan for the development and commercialization of MyOSCAR on an international scale.
- One of the most pressing challenges for Ontario will be to address the demographic challenges we are facing. Although the numbers may seem daunting, the demographic trend presents an excellent opportunity for McMaster researchers in many disciplines to capitalize on their established successes and to create new avenues in the diverse aspects of aging research and knowledge translation. We would recommend the establishment of an Optimal Aging Initiative. This initiative must be an interdisciplinary enterprise, bringing together the latest research and developments for seniors, creating synergy among health researchers and caregivers across the country. This initiative would capitalize on research and healthy aging initiatives and will, ultimately, result in better health for Canadians and others worldwide.

In science and engineering the opportunities for research commercialization include:

- The McMaster Automotive Resource Centre (MARC) is becoming a premier automotive facility and a go-to place for industry. Plans for a second phase are now underway. This next phase, to be constructed adjacent to MARC, will provide 50,000 sq. ft. of space designed specifically for two areas of R&D:
 1. automotive electrification
 2. experimental software engineering

The Automotive Electrification Centre will consist of four main activities; cooperative research & development; engineering services, training and development of sustained technical knowledge; and recruitment for industry partner(s).

The Experimental Software Engineering Research Centre will include work in software design, validation and verification, and software-process management. It will service the software industry (including automotive, aerospace and medical/health), with a focus on three specific applications – embedded systems, information systems, and medical systems.

These centres, demand-driven and characterized by their professional R&D services, will be rooted in innovative partnerships with industry – including, and perhaps most importantly, SMEs. They will create high-level jobs, be a hub for experiential learning, provide incubation and laboratory space for small start-up companies, and commercialize the results of the research.

As governments, institutions and industries are challenged to be more competitive, to produce more with less, to innovate and to add value, we believe a Faunhofer-type model of partnership will guarantee success. McMaster University is committed to working with its industry partners to strengthen our province's global competitiveness and increase jobs in Ontario. Government investments should be targeted to areas where Ontario has a demonstrated, competitive advantage. The government must remain focused on obtaining maximum benefits from its investments in the province's economic development system. Supporting Ontario university-based research is an important part of that solution.

McMaster University recommends that Budget 2012:

- Strengthen economic development and job creation through funding support for university research and innovation.

CONCLUSION

As the Government develops Budget 2012 and works to strengthen Ontario's economy we are pleased to partner. As previously noted, Universities in Ontario develop the skilled workers that are needed to succeed in the knowledge economy. Universities are also performing an increasing amount of the province's research and development activities. From 2002 to 2009, the percentage of Ontario's Gross Domestic Expenditure of R&D (GERD) performed by universities increased from 28% to 34%. Whereas, over the same period, the percentage Ontario's GERD performed by private sector decreased from 68% to 52%. Furthermore, universities are the economic engines of their regional economies, and McMaster is no different.

McMaster is one of the largest employers in the greater Hamilton area. As of fall 2010, the University employed 1,330 full-time instructional faculty and, as of July 2011, about 6,100 staff. Additionally, the University is the major knowledge generator in the region, providing both the human capital and the research output necessary to fuel the region's economy. For instance, the McMaster Innovation Park (MIP), which opened its first building in 2009, is less than 2 kilometres from the University's main campus. When completed, the MIP will offer 1.7 million square feet of office, research and amenity space for researchers and entrepreneurs to connect and collaborate, leading to increased research commercialization between McMaster and its public and private partners. In the future, a new health campus in downtown Hamilton will provide patient care, clinical services and educational learning opportunities. This, along with McMaster University's Downtown Centre (home to the University's Centre for Continuing Education) are helping to revitalize the City of Hamilton's downtown.

Therefore, as leaders in the development of intellect, innovative research, community interaction and development, Ontario's capacity to develop and innovate is directly dependent on the ability of the province's universities to educate the highly skilled people, and to produce innovative research that is needed. The recommendations set forth in this submission represent an investment in Ontario's future.

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