

# CHAPTER 2

## The Strategic Repositioning of Research Universities to Fulfil their Global Promise

*Heather Munroe-Blum and Carlos Rueda\**

### INTRODUCTION

**T**he relevance of universities has become a theme of public debate, reflecting the anxiety and excitement surrounding changing forces in the larger context of globalization, as well as widespread concern with regard to basic economic and societal well-being.

Despite a whirlwind of change and transformation, universities have been stable, resilient and durable social institutions. A study done for the U.S. Carnegie Commission on Higher Education identifies 66 institutions in Europe that have prevailed since the 16th century. Remarkably, apart from two churches and two parliaments, the other 62 institutions are universities (Neilson & Gaffield, 1986, p. xiii). Given this staying power, we can ask: is this ability of universities to adapt to changing forces and circumstances sufficient to ensure their central place, contribution and viability, going forward? How is higher education responding to the transformation of information and communication technologies with the rise of the internet, and the global impacts of major economic and social events? And, are universities optimally organized and managed to address the fundamental global challenges that exist, and to do so at the pace of change required be effective?

It is evident that the world's research universities must be active and flexible in the face of global powerful forces: demographic change, environmental unpredictability, increasing population mobility, a rapidly changing landscape of ethnic and cultural diversity, hypercompetitive markets, unstable govern-

ments, the internet, disruptive technologies, and a decline of deference for leadership and institutions, across sectors — from governments to industry, NGOs and universities. In the context of these fundamental shifts, we identify five themes or forces that have strong relevance for the world’s research universities and, perhaps most critically so, for the great public research-intensive universities.

At large, these five main forces include:

- Urgency of global challenges and shifting mandate of universities; Instability of government funding for universities, and public trust/confidence in universities;
- Rapid expansion of massive online information and education; Increased tensions with respect to differentiation of mission in post-secondary systems; Expansion of large-scale, international research programs.

While fundamental aspects of the mission of the research-intensive university are enduring, today’s top public research-intensive universities face different concerns than their predecessors: difficult, fundamental questions with regard to purpose, role and relationships. This was well demonstrated in a 2012 study published by the National Research Council, “Research Universities and the Future of America”, which highlights the threat to the future of top U.S. research universities and to the prosperity and security of society. The report finds that U.S. state funding for higher education, already eroded over the past two decades, has fallen further in the recent recession, and recommends that, especially in these tough times, governments cannot afford to defer investment in research universities. If the nation is willing to renew its commitment to keeping these institutions the best in the world, they will lead the way to the next generation of scientific and technological breakthroughs that propel prosperity, just as they have in the past.

## **THE URGENCY OF GLOBAL CHALLENGES AND THE SHIFTING MANDATE OF RESEARCH UNIVERSITIES**

The “Global Challenges Survey”, a United Nations-led effort within the context of the Millennium Development Goals program, gives an overview of some of the most urgent global challenges to humanity. These challenges, primarily man-made, are selected and prioritized based on indicators of damage and risk to life and health, economic and social development, and the natural resources on which human life depends (Global2015, 2010). Among the 24 challenges analysed, the Survey identifies the following four as top priorities: world nutrition and poverty eradication; elimination of epidemics; sustaining a livable climate; and achieving safe birth conditions.

The figures are startling. Every year these four global issues combined are responsible for the premature death of at least 11 million people (equivalent to one-third of Canada's population) and affect nearly two billion people worldwide. No country escapes problems of nutrition, poverty, epidemics, climate and negative birth conditions. These immediate threats have prime implications for our societies, our education systems and their perceived and actual societal relevance.

Against this background, what then is the role of higher education and research in creating a sustainable future for us all and generations to come? The concept of "university" goes back to the classical understanding of the learning and teaching community. As knowledge and talent have become ever-stronger driving forces for the development of healthy, civil society, the perception and expectation of universities have both shifted and broadened considerably. Universities cannot be relevant today as self-contained systems without direct links and contributions to the rest of society. Universities are well placed to make a difference, by playing a significant role in shaping and responding to the change process and contributing to the alleviation of many local and global challenges — including poverty, disease and malnutrition — but also in positioning communities and nations for international competitiveness in distinctive fields and sectors of high global importance. This is particularly so when one considers the necessity of achieving globally competitive talent, products and services to sustain local community progress in a global economy and with global demographic factors at play. Our universities can play a prime role in shaping policies and programs, developing leaders, shaping existing sectors, creating new sectors and industries, and promoting the fundamental ideas and learning that influence every one of us and that enhance civil society as a whole.

As Duderstadt and Womack (2003, p. 6) note:

*The public university provides a model of how social institutions, created by public policy and supported [...at least in part...] through public tax dollars, evolve in response to changing social needs. They exist to serve the public interest. As the needs and aspirations of society have changed, so too have public universities.*

These challenges are all "public" problems for today's world. They cross beyond our notion of a "public-as-national" interest or concern, and emerge into the "public-as-global" imperative. They are front and centre to discussions of the future of the public, research-intensive university.

In this context, McGill University has a long history of contributing to progress and responding to global challenges. McGill's involvement in shaping the international human rights agenda dates back to the drafting of the UN Declaration of Human Rights by Professor John Peters Humphrey in 1948, right up to current programs, such as the McGill International Commu-

nity Action Network, a fellowship program in the School of Social Work that engages and educates young scholars from war-torn regions in the Middle East and encourages them to apply their learning towards the betterment of their home countries. Similarly, a creative new collaboration of the MasterCard Foundation with a small consortium of universities, in which McGill is a partner, aims to advance social and economic progress in sub-Saharan Africa, by educating talented young people drawn from the most economically disadvantaged sub-Saharan regions and preparing them to lead change in their home communities. In a conversational context, the sustainability and food safety and security programs of McGill's Faculty of Agricultural and Environmental Sciences and the School of Dietetics and Human Nutrition are geared towards meeting industrial and public sector demands for professional development in the fields of food safety, nutrition, water resources management and environmental sciences. And, lastly, to name just one example of student-driven social change: most recently, a team of five MBA students from McGill's Desautels Faculty of Management won the Boston Regional Finals of the 2013 Hult Prize competition for their novel plan to combat famine in urban slums. Their submission outlines the development of a manufacturing plant to grow edible crickets to use as a safe and affordable source of protein to fight hunger and malnutrition.

Such innovations and educational programs, as described here and found broadly in our university, are compelling, and there is more to do at home and abroad, to fulfil the mission of our research universities. The "public" nature of universities goes beyond financial or legal relationships to local jurisdictions and governments. Indeed, it rests in the broad public domain that public research-intensive universities serve, adapt and respond, providing solutions to prime societal challenges as a collective responsibility.

## **INSTABILITY OF GOVERNMENT FUNDING AND CHANGE IN PUBLIC TRUST**

The last financial meltdown demonstrated both how vulnerable our financial markets really are, and how vulnerable our system of higher education can be in regard to the vicissitudes of government financing. Instability in public finances translates into big impacts on public universities. The year following the financial crisis of 2007-08, and again in the past year, many national and regional governments in jurisdictions including Canada, the U.K. and the State of California imposed dramatic cuts to their university systems. These cuts were a wake-up call about universities' financial over-dependence on government funding, leading to and imposing major constraints in operations for public universities around the world. With unstable and declining government finances, public universities worldwide experience unrelenting pressure

to take measures to increase and diversify revenues, while at the same time working to retain their capacity to fulfil the core mission.

The Canadian Association of University Teachers (CAUT) reports that between 1979 and 2009 the proportion of university operating revenue provided by government sources has declined from 84% to 58%. Federal government cash transfers for post-secondary education in Canada, when measured as a proportion of GDP, have declined by 50% from 1992-1993 to 2011-2012; that is, from 0.41% to 0.21% (CAUT, 2013). Most recently, many Canadian provinces have also imposed sudden, drastic funding cuts to their universities: \$250 million in Quebec, \$146 million in Alberta, \$121 million in Ontario, and \$70 million in British Columbia. The Quebec government announced its decision to cut funding for the current fiscal year eight months into the 2012-2013 fiscal year, leaving Quebec's universities under order to cut \$120 million within four months.

University research is complex in terms of its sources of funding and its impact on the operations of the institutions. The just-released Canadian State of the Nation 2012 report shows that Canada's gross domestic expenditures on R&D (GERD) declined from a peak in 2008 and, when measured in relation to gross domestic product (GDP), since 2001 (STIC, 2013). In contrast, the GERD and GERD intensity of most other countries has been increasing. Canada's declining GERD intensity has pushed its rank down from 16th position in 2006 to 17th in 2008 and to 23rd in 2011 (among 41 economies). While there have been shifts in funding among sectors in Canada over time, the more recent declines in the country's total R&D funding efforts are attributable predominantly, but not only, to low levels of private sector funding of R&D.

In other places such as the U.K., continental Europe, North America and Japan, government investment is also increasingly unstable and limited, especially at the state/regional level. Beyond influences such as economic slow recovery, structural factors — escalations in healthcare costs, heavy and growing public and private debt, and the demographic deficit reflected in the aging of populations — contribute greatly to the weakening of public finances and are correlated with a decreased investment in education. Universities, as well as countries, are responding in different ways to the financial consequences of the economic downturn and such structural factors. In the U.S., for example, 71.2% of universities with doctoral-level programs cut their academic programs and activities, 59.3% increased tuition fees by 5% or more (already high by international standards), 57.8% cut administrative operations and services, and 50.8% laid off administrative staff (Green, Jaschik & Lederman, 2011).

Universities require a high degree of financial stability and predictability to ensure effective and sustainable operations, to maintain the capacity to hire and retain outstanding talent, to enhance quality and to innovate in infrastructure, pedagogy and research programs.

In return, this investment serves all sectors of society. Universities are talent magnets, employers, innovation and workforce catalysts, infrastructure and product creators, and community collaborators. University graduates are the principal leaders and workforce in creating and building the knowledge-based industries that fuel innovation (Munroe-Blum *et al.*, 1999; STIC, 2013). These essential roles shift higher education from an economic mainstay, primarily, to serving as a driver of the next generation of leaders, and of regional economies and indeed, the health of nations; 51% of Canada's adult population has a university or college education — one of the highest levels in the world; however, Canada lags others in its production of PhDs, especially in the STEM disciplines (STIC, 2013). University graduates today play an especially important role in building high value-add companies and the jobs that contribute to economic prosperity in the new global context.

Despite their central importance for society, public universities have been simultaneously facing an increasingly burdensome regulatory framework, along with declining public respect. At the federal and provincial/state levels in Canada and elsewhere, universities are staggering under a range of growing administrative and regulatory burdens as new government reporting and regulation requirements are added to existing ones. Research shows that increased university performance is favoured by less regulation and increased autonomy (Oliveira Martins *et al.*, 2009), when accompanied by strong institutional governance and institution-specific compacts with governments; that is, when the focus is on accountability via results rather than on a large burden of rules, regulations and reports. Universities work better under accountability mechanisms that foster agility such as those requiring a commitment to accessible information on high-performance, cost-effective operations, services and programs, and research and educational program impacts consistent with the institution's prime academic mission (Munroe-Blum, 2012 & 2013). Highly prescriptive regulatory environments encourage a "one-size-fits-all" culture and lead to drifts downward in attention to mission-targeted performance and results, in general.

Public institutions are experiencing a decline in the confidence of publics, universities included. A survey commissioned by the Association of University and Colleges of Canada (AUCC) shows that although universities continue to be viewed to be among the most ethical of public institutions, trust in them has declined over the last decade by nearly 30% (AUCC, 2013). The decline of trust in academia, and for science in particular, is a trend observed in many parts of the world. Perhaps one powerful explanation is the interaction of the uncertainties of global economies with the eradication of "expertise", as it has been known and respected, in lieu of accessible information; and, collaborative content-generation repository such as Wikipedia, in lieu of evidence, experience and wisdom.

The loss of trust from and in government agencies may be related to a seemingly unstoppable expansion in public health care costs without perceived increases in healthcare services and outcomes, and a related significant decline, therefore, of public investment available for education. Both factors stand to negatively affect the value placed on education by the public, and pose potential risks to the health and well-being of society.

## THE RAPID EXPANSION OF MASSIVE ONLINE INFORMATION AND EDUCATION

Related to these phenomena, and as we move further into the 21st century, information and knowledge are increasingly democratized. Google and Wikipedia organize information and disseminate it quickly and more widely than could have been imagined 20 years ago or less. Paradoxically, at this very time, as the privileged sites of critical inquiry, intellectual debate and knowledge generation, research-intensive universities may be uniquely positioned authorities with respect to knowledge validation and adjudication of competing claims to truth. “Evidence-based” now takes on new meaning.

The world’s top-ranked public research universities are increasingly positioning both to transform their own facilities, networks and practices to take full advantage of the modern-day, high-tech environment, and to stand as global leaders in innovative, technology-enhanced teaching and learning, for both enhanced campus-based learning and benefitting communities of students around the world.

Massive Online Open Courses (or MOOCs) present a special, yet mixed opportunity to develop new pedagogical models and educational outreach. *The New York Times* dubbed 2012 “The Year of the MOOC”, and MOOCs have since become one of the most discussed topics at educational conferences and workshops (Pappano, 2012). *Time* magazine noted that free MOOCs open the door to the “Ivy League for the Masses” (Ripley, 2012). This assertion has been reinforced by several well-financed providers, associated with top universities, including:

- The edX Consortium (edx.org), a not-for-profit organization launched by MIT and Harvard. More than 100,000 students signed up for the first prototype course offered by MIT. McGill University, among others, has recently joined the edX Consortium.
- Coursera (coursera.com), a for-profit start-up founded by Stanford professors. It has almost 3.5 million users and offers more than 300 courses.
- Udacity (udacity.com), another for-profit, founded by a Google VP. It currently offers 25 courses, five of which can serve as credit courses at San Jose State University.

While MOOC providers address a variety of interests, they are unlikely to deliver in the absence of active assessment and R&D to develop and position these online courses effectively, as any new teaching and learning model would demand. According to a survey of MOOCs' professors, on average 33,000 students enrol in a MOOC; however less than 8% of them successfully complete the course with a passing grade (*The Chronicle*, 2013). These figures point clearly to a broad surface interest and, as well, to the significant work ahead in developing optimal online and campus enhanced e-learning experiences. The edX Consortium, for one, is taking on the challenge of researching and developing online learning, using technology to enhance campus-based learning for the "born digital" student. This could allow technology to assist in providing a research experience as a hallmark of the undergraduate learning experience.

No one institution on its own will likely be able to gather the quantity of data necessary to understand what features of these new and emerging tools are best deployed, what aspects will engage students best to enhance their learning experience, the role of interactive learning, and how preferences interact. Research collaborations with peer institutions, such as those in the edX Consortium, are positioned to contribute new pedagogical methods in an evidence-based context and stand to advance the effectiveness of the research-intensive university in a world where technology is prevalent and more and more of the world's population are born digital.

## **A GREATER EXPRESSION OF MISSION, SPECIFICALLY IN POST-SECONDARY SYSTEMS**

Widespread cuts to government-supported student aid and tertiary education threaten the quality of higher education. A concomitant rise in the world's youth population and global fiscal challenges combined are expected to produce an unprecedented need for education. These and other factors will require greater diversification of revenues for teaching (and research). While new sources of funding should not replace public funding, diversification of income sources is increasingly essential if financial risks are to be shared and quality preserved.

The California three-tier system has long served as the gold standard for differentiation of resources in higher education systems, notwithstanding the financial constraints discussed earlier. With 10 campuses of the University of California, 23 campuses of the California State University, and 112 California Community Colleges, the state has three clearly differentiated institutional models, by law, and differential resources and funding models assigned to each group of universities through public funding, tuition fees and other revenue sources, including state and federal research programs. The three-tier system has been credited with helping to shape and nurture the strengths of Califor-



nia's economy. Today, five out of the 10 universities in the University of California system rank among the top 50 universities in the world (*Times Higher Education*, 2013).

Many countries have introduced policies to vigorously support world-class, research-intensive universities. Countries such as the U.K., the U.S. and Australia have traditionally focused their research funding on their most competitive universities; the U.K.'s Russell Group, an association of 24 public research universities, receives approximately two-thirds of all university research grant and contract income (from among a total of 115 public universities); according to a study by the National Science Foundation, in FY 2011, the top 30 academic institutions in the U.S. accounted for approximately 40% of total federal R&D support (of all 896 schools that received federal money for R&D) (NSF, 2012); and Australia's "Group of Eight" leading research institutions receives approximately 70% of national competitive research grants (from among a total of 39 accredited Australian universities).

Germany and France have also developed targeted programs: in 2006, the German Excellence Initiative created a national program in which top universities received additional support in order to promote cutting-edge research and raise their international visibility (in 2012, out of the 140 universities in Germany, 11 universities were chosen as "elite universities"); while in 2010, France's Initiatives d'excellence promoted university clusters with international visibility to compete with the best universities in the world, selecting projects led by eight research-intensive universities and providing financial support of €7.7 billion over a period of at least four years. In recent years, many Asian economies, including China, India, Japan, South Korea, Singapore, Hong Kong, Chinese Taipei and Malaysia, have developed ambitious plans to strategically build world-class universities in support of their economic and societal development. In 2011, China allocated CAD \$11.4 billion of its education budget towards achieving world-class status for 100 of its more than 3,000 universities; while India has selected nine universities — with six more to come — under its University with Potential for Excellence scheme, to provide "substantial support" to these universities with the amount to be decided on the merit of the proposal (STIC, 2013).

Funding research-intensive universities on an equal footing with liberal arts, state and community colleges is an unproductive trend increasingly referred to as the disposition of governments to "vocalize" universities and their research. This approach stands at odds with the core principles and mission of the research university, but also with the evidence. Performance-driven, mission-differentiated funding models enable institutions to take advantage of their unique pasts, strengths, assets and missions, and to craft appropriate results-oriented niches, including appropriate programs and modalities of teaching and learning, of research and scholarship.

Canadian provincial governments (which hold prime jurisdiction over education), unlike most of the governments mentioned earlier, have long favoured a more homogenous approach to university funding; allocating the majority of operating grants according to headcounts vs. funding formulas that advance performance according to mission; the former approach being process- rather than results-oriented. Consequently, Canada's most productive and highest-performing research universities are often the least well-funded to perform their mission, relative to their peers elsewhere, or to regional and undergraduate liberal-arts-focused universities. To address this, the Higher Education Quality Council of Ontario prepared the policy report "The Benefits of Greater Differentiation of Ontario's University Sector" (HEQCO, 2010), presenting four key benefits to greater differentiation in institutional mission and funding. The report notes that "greater differentiation" is one of the most powerful levers available to government, especially in resource-constrained times, to achieve goals of greater quality, competitiveness, accountability and sustainability; it provides clarity to students as to the postsecondary institutions that may best serve their career goals, talents and personal aspirations; it helps institutions and society to be cost-effective and outcomes-oriented by preventing mandate dilution and mission creep; it allows institutions to allocate their resources most effectively by providing clarity as to mandate, performance goals and public expectation; and finally, it allows for a results-focused accountability framework for universities, and also provides a framework for best determining the differential costs of education and research by mission and results, and levels of required funding.

Canada has strong science, technology, education and innovation foundations on which to build, but stands to do better in investing at internationally competitive levels in programs that reward research, excellence, top talent and institutional performance. All participants in the educational ecosystem have a role to play in driving enhanced performance and lifting Canada into the top ranks of the world's leading innovative economies. It is not only about investing more, but about investing more strategically and coherently, focusing resources and efforts, learning from the experience of leading nations and improving agility to create and seize emerging opportunities. Differentiation in mission and funding, building upon institutional assets, strengths and performance, will foster institutions and nations that "run with the best."

## **EXPANSION OF LARGE-SCALE, INTERNATIONAL RESEARCH PROJECTS**

NASA's Apollo program was a great scientific collaboration involving government, academia and industry. Landing humans on the moon by the end of 1969 required an intense burst of technological creativity, and the largest

commitment of resources (\$24 billion) ever made by any nation in peacetime. At its peak, the Apollo program employed 400,000 people and involved over 20,000 industrial firms and universities. The Apollo project provides some useful reflection about large-scale R&D initiatives. Can humanity harness collaborative knowledge beyond industrial or military applications, for the public good?

Knowledge — and even more importantly, the production of knowledge — is highly relevant for the economy of today. Collaboration channels between universities and industry stand to be enhanced. On the one hand, new ventures and established companies are increasingly seeing universities as sources of scientific discoveries that can be transformed into innovations for the market, as well as places to recruit innovation-minded workers trained in rich research environments. On the other hand, universities are increasingly seeing companies as effective agents to transform research results into concrete solutions for society and new support for financing basic research. This situation creates a natural, powerful partnership between research-intensive universities and innovative companies.

The modern research-intensive university is characterized by the increasing internationalization of its activities and a related rise in collaboration, including open innovation, among different players and across national borders. Universities can anchor clusters of innovative activity in their local communities and act as bridges between businesses, governments and other countries. They also play a critical role in developing and advancing knowledge and its application. Much of the knowledge underlying today's innovation resulted from research conducted in the higher education sector. Through their research activities, universities play a critical role in linking local economies to the global pool of knowledge, technology and talent. Through research collaboration with foreign counterparts and through attraction of world-class researchers and scholars to their institutions, universities advance regional knowledge and talent advantages. Today, building local strength in priority areas is no longer enough. Only clusters that are competitive, connected and recognized on the world stage will achieve sustained local economic benefit (Munroe-Blum, 2011).

The Canadian government, with this aim, created the Networks of Centres of Excellence (NCE) program in 1989. The program has since invested \$1.8 billion in research, commercialization and knowledge translation; leveraged \$1.1 billion in contributions from industry and other partners; helped train more than 39,000 highly qualified personnel; and created 107 spin-off companies (NCE, 2013). One of these networks, BioFuelNet Canada, based at McGill University and led by Prof. Don Smith, connects 25 post-secondary institutions, nearly 100 leading researchers, 40 industrial partners, dozens of governmental and nongovernmental organizations, and 6 international part-

nerships. The goal is to develop the knowledge, the tools and the policies that will facilitate 25% of the fuel used in Canada to come from advanced biofuels, within 10 to 20 years.

Innovation rarely happens in isolation. Collaboration, whether between two researchers or on the large scale such as the BioFuelNet, is the key to answering big questions. For instance, the Natural Sciences and Engineering Research Council of Canada's (NSERC) CREATE program helps science and engineering graduate students add job skills to their academic achievements. CREATE recently awarded funding for six years to McGill projects in green chemistry, and medical image analysis. Launched in 2010 by UN Secretary-General Ban Ki-moon, The United Nations Academic Impact (UNAI) is a powerful initiative bringing together postsecondary institutions from around the world with the joint goal of advancing ten basic principles, including addressing issues of poverty, promoting universal access to education, and encouraging global citizenship. Currently, more than 700 institutions in over 100 countries and some 40 academic networks have joined the initiative.

It is our position that targeted large-scale, international research consortia of distinction can create networks of scientists, scholars, practitioners and public and private-sector decision-makers that, on a wide scale, can usefully advance the development of solutions to global challenges. The strategic creation and expansion of targeted international research programs to achieve innovation breakthroughs may be one of society's most powerful strategies to tackle the world's "grand challenges". They can provide exciting opportunities for public, research-intensive universities to lead in creating synergies in research and innovation, while furthering the development of tangible projects with concrete results for a sustainable future.

## CONCLUDING REMARKS

Unlike the State of California, Canadian provinces and many other regions in the U.S. and Europe have taken more of a unitary approach to university funding: a one-size-fits-all criterion favouring headcounts over more sophisticated distinctions of funding based on mission, quality, and results. But increasing global demand and a domestic demographic deficit, along with greater global population mobility, shrinking public resources and emerging online learning models, among other factors, challenge the role of all public institutions of higher education — especially top-ranked public research universities. Greater recognition of the differentiation of postsecondary institutions stands to enhance the strategies and contributions of all universities while increasing the benefits of the world's top public universities to the jurisdictions and nations in which they reside. Public research universities require re-configured relationships with governments, the private sector and civil

society in order to build on their strengths and reaffirm and strengthen their contributions, domestically and internationally. This will require a move away from highly regulated and bureaucratic government oversight to funding-based performance contracts, at the level of institutional-contracts that recognize mission specific goals and reward according to performance.

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