PARTNER PERSPECTIVE

PRACTICING WHAT WE TEACH: Innovative Universities for the 21st Century

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Universities in Canada have been challenged as never before with new forms of competition, the erosion of funding, increasing demands for accountability, and questions about their very mission. Questions centre around value for money, the payback from investments in research, the quality of teaching, and their universities' contribution to innovation and economic and social development. Discussions on the innovation gap and Canada's descent in global innovation rankings, have driven widespread talk of strategies to build a "culture" of innovation and the role of the university. It's time to take a fresh look at what we do and how we do it.

Not only is Canada's Information and Communications Technology sector critical to our economic growth, but digital technologies also have the potential to transform virtually every sector. Evidence shows that under-investments in technology impede growth and productivity improvements – whether in advanced manufacturing, health care, or education. Among small and medium-sized enterprises (SMEs), recognized as the engines of economic growth in Canada, more than 40 per cent do not have even basic technology infrastructure. And our recent study of mobile technology shows that although Canada is a leader in consumer adoption of these tools, our companies, government, and educational institutions are global laggards in the use of these technologies. As such, our efforts to drive innovation must not just focus on creating new technologies but must also recognize the factors that drive or impede their adoption.

Entrepreneurship focuses on the creation of something new, a product or a service. Innovation, on the other hand, requires the adoption of something new – a new product or service – to fundamentally change the way we do things. While it is true that many transformative discoveries have emerged from labs and had impacts that could not have been planned or predicted, we also know that there is need for market-driven research with specific aims to solve real-world problems. The prevailing lab-to-market model of innovation, the assumptions that underlie it, and the programs aimed at accelerating it tend to focus primarily on the supply of new technologies without reference to the demand.

Consider this comment on e-health, which appeared in the Journal of the Medical Records Association: *The future of medical computing is bright. Obstacles to the practical use of the computerized medical record exist, but we may expect these to vanish within a few years. We have a golden opportunity to avoid a new round of escalating medical costs.* It was written in 1990 – 25 years ago! The technology needed to improve the management of health information has existed for decades. Technology is not the primary obstacle to moving forward. The critical challenges are human and organizational factors – politics and regulatory issues.

There is no doubt that strong grounding and investments in Science, Technology, Engineering and Math (STEM) are fundamental. However, a focus exclusively on the invention or creation of technologies, on the supply side, tends to obscure the critical importance of the social sciences and humanities (SSH) and design disciplines in addressing the factors that actually drive and impede innovation. At Ryerson, researchers work closely with partners to develop next-generation technological solutions, but they also explore the strategic, organizational, and individual factors affecting the adoption of these technologies in order to inform approaches to innovation.

For example, Ryerson's Centre for Cloud and Context-Aware Computing (RC4) partners with industry to develop leading-edge technology and tools, but also examines the impediments and drivers of mobile technology adoption and develops evidence-based strategies to promote them. We know, for example, that short-term business priorities often prevent companies from investing in ICT solutions even though, over time, these investments improve growth and productivity. Our action-oriented research, with partners like the Ontario Chamber of Commerce and our new Innovation Portal, is designed to help SMEs develop the capacity to innovate.

In our Advanced Manufacturing, Design and 3D Printing Lab, researchers work with leading 3D augmented reality companies to develop applications that solve real world needs for both consumers and businesses. And we also have interior designers, social psychologists, and consumer behavior experts working with aerospace engineers to design aircraft interiors that will create outstanding user experiences.

In health care, our researchers have built a game-changing surgical navigation system and complementary surgical tools for use in spinal fusion surgeries. But we recognize that it is not a shortage of leading-edge technology that is impeding innovation in Canadian health care. To help drive transformation, we also examine patient-centered care, health innovation processes, organizational structures, and policies.

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Too often, we talk about innovation as if it is a single process. We need to recognize that while innovation models have common features, there are enormous differences in the stakeholders, the investments, the processes, and the timelines between, for example, the search for a cure for cancer and the development of a new app. The implications for programs and supports are immense.

If we look at the programs currently in place to support commercializing university-based research and to incubate university-based start-ups, the underlying assumptions have tended to be predicated on lab-to-market models, and often the assumption that we need to turn researchers into entrepreneurs. Although some academics do become successful entrepreneurs, the mindset, personality traits, and interests that drive someone to scholarship are not necessarily the same as those driving entrepreneurs. Too much of our innovation strategy has rested on a hope and a prayer that someone will discover something in a lab and take it to market. We need to recognize that there are many exciting and commercializable discoveries in labs and on benches around the country, but we currently lack the right kind of infrastructure to identify these opportunities and to successfully take them to market. While many rightly decry the erosion of funding for fundamental research, we also need more appropriate support for collaborative, research focused on solving real world problems.

There needs to be better alignment between the stated commitments to commercialization and innovation and the supports and incentives in place to promote them. The criteria, the adjudication processes, and the people making the decisions need to fit with the goals. Today, professors are generally rewarded – hired, given tenure and promoted – for publishing articles and sometimes for teaching, but not for the impact of their work.

Fundamentally, many of the old dichotomies that dominated universities in the past need to be eroded. This includes the medieval battles which pitted the "town versus the gown", more recent debates about a focus on theory and critical thinking, skills versus practical skills and employability. The relative importance of teaching versus research and the centrality of STEM versus SSH. And, most importantly, the tension between research excellence versus relevance. Universities for the 21st Century are critical to Canada's economic, social, and cultural development, and our place in the world. We need to rethink institutions that were designed for a very different time and very different challenges, retaining what is valuable while adapting to a new reality.