

Universities and the “Innovation Economy”

A talk for the BCBC, 1 November 2016

Thank you very much. It’s a real honour to be invited to speak at this important summit of BC’s business leaders, coming together to chart a course for economic growth and prosperity in a time of change and uncertainty.

I don’t have to tell an audience of this nature just how important planning is. We need to have a clear idea of where we’re going, and how we’re going to get there; we need to create timelines and contingency plans; we need to have confidence in the future, even though we cannot know what that future may bring.

Who in 2007 would have dreamed that in 2008 the Lehman Brothers would go down? Who in 2014 would have foreseen oil at less than \$50 a barrel just a year later? Regardless of all the predictions by experts, the reality is that we cannot know the future, nor how we might evade all the twists and turns that it may contain.

What we do know is the past—what worked and what didn't—and just as importantly, we know the present. Learning from the past, we can exercise control over the present; and in exercising that control wisely, ethically, and creatively, we can hope to influence our future in positive and fruitful ways.

Last week I had the pleasure of meeting some of the business community in Kelowna. The south Okanagan, as you may know, has depended for its prosperity on agriculture, especially fruit growing and wine production. But that is changing.

According to the Canadian Federation of Independent Business, Kelowna is the most entrepreneurial city in the country—that is, the best place to start and grow a business. To achieve this kind of status, you must have the right kind of infrastructure in place, and according to the Federation, Kelowna is in that position.

It has a highly skilled workforce; it has two important educational institutions, UBC Okanagan and Okanagan College; it has a bustling airport, and in the words of the *Kelowna Daily Courier*, it has “a welcoming business community, and a quality of life that attracts entrepreneurs, workers, students, families and retirees alike.”

The *Courier* goes on to point out something potentially even more significant: the city's growing capacity in connectivity, which provides "massive internet capabilities for businesses that need it." "That connectivity," says the article, "has helped the Okanagan become home to more than 750 high-tech firms that have created a \$1.3-billion-a-year sector employing more than 7500 people."

Connectivity, high-tech, and a highly-skilled work-force: this is a foundation for the future, and it's already in place in Kelowna.

These are key elements in any plan to lay the groundwork for the future prosperity and wellbeing of our population locally, regionally, and nationally. And to derive the maximum amount of advantage from them, we need to think out of the box: we need to bring new ways of thinking into the equation, to draw on the capacity for innovation that marks every successful enterprise—whether it's in business, in technology, in medical research, or in the arts.

The business I'm in is education: and the spirit of innovation is very much at the heart of what we are trying to do in our schools, colleges, and universities today. Traditional methods of teaching and

learning are being transformed as we prepare our students to meet the challenges of a world very different from the one encountered by their parents and grandparents.

The era of the “sage on the stage” has passed, and students have progressed far beyond the passive recipients of information they were in the old days. Today, professors tend to be facilitators, creating the right environments for students to acquire information in a variety of dynamic ways. Courses in many areas, such as law, medicine, and engineering, are often case-based or problem-based, requiring students to work collaboratively in teams to find solutions—and preparing them for the way problems are tackled in the working world beyond university.

At UBC we are responding to pressures for change by introducing new courses to prepare students for work in fields that barely existed a decade ago. A student in Arts can now take a program in Cognitive Systems, in which the participating units are Philosophy, Psychology, Linguistics, and Computer Science. Through the interrelated study of these fields, the student gains a comprehensive understanding of human cognition, and learns to apply this knowledge to create intelligent artificial systems.

The traditional barriers between disciplines are disappearing as we try to prepare students for the demands of the working world. So, for example, a student in Applied Science can twin her studies in hydraulic engineering with a program in entrepreneurship, so that she is prepared for the post-university challenges of commercializing and monetizing her skills.

And then of course there's the whole area of information technology. The huge expansion of digital tools has revolutionized the business of teaching and learning. Many courses now take a blended approach, mixing face-to-face presentations with online or video presentations. Students now have instantaneous access to vast electronic databases, and require a sophisticated understanding of software tools to access and use that information.

So you can see that the university is laying the groundwork for a highly skilled and tech savvy workforce, a workforce that will be ready to build on the technological and scientific advances we see taking place around us every day.

An important component of this strategy is the expansion in numbers of our international students. At one time the idea of internationalizing the university was seen as something threatening and undesirable, because it was thought that such students were taking seats that should be reserved for domestic students only. But under my predecessors, UBC began to expand international enrolment, recognizing that there is a huge pool of potential talent, investment, and immigration that will be of immense benefit to this country. UBC is now acknowledged to be the most international university on the continent. Recruitment of top international students brings with it future networks and linkages that will reinforce and increase trade with our international partners, notably in east and south Asia.

In these ways, then, universities are helping our society to prepare to meet the challenges facing regional and national economies. The challenge is real: we need to recognize that Canada, despite its great natural wealth and its industrial expertise, is falling behind in terms of the productivity, competitiveness, and trained workforce needed to stay abreast of the competition. In global terms, we're in a period of economic stagnation; if we are to regain our position as a leader in world trade, we must find new products, new methods of production, new markets for our goods: in a word, we must innovate.

To respond to this challenge, the federal government has recently launched two important initiatives: a fundamental science review and a consultation on Canada's innovation agenda. Combined, these two initiatives aim to address how best to foster an innovation-based economy in the 21st Century. In doing so, they are asking important questions about the globally competitive levels of research funding, best practices for "big science", and whether or not Canadian innovators and researchers have the right kinds of support to achieve their goals.

Our province is responding in similar fashion. The BC government is just as concerned to find ways of giving our economy a jump-start and laying a strong foundation for future growth.

Since 1998 the province has provided important matching dollars through its Knowledge Development Fund to ensure universities attract Canada Foundation for Innovation funding for research infrastructure. Through this and other provincial programs such as Genome BC and the Michael Smith Foundation for Health Research, UBC and our sister institutions in BC have been able to build the kind of solid foundation that makes advanced research possible and encourages innovation.

The province has created its own blueprint for innovation, in the form of the BC Tech Strategy announced earlier this year. Through grants and other financial incentives to employers and educational institutions, the provincial government hopes to stimulate applied research, create a highly-skilled workforce, and encourage job growth. This is an important acknowledgement of the role the tech sector is playing in our provincial economy as a complement to the resource sector; BC is coming to terms with the reality that our economy is increasingly dependent on science and technology, and so is investing heavily in research and innovation.

And as I hope you know, UBC itself is a major player in the research enterprise. We are the second largest research institution in Canada. In the past year we have attracted \$600 million in research funding, supporting almost 9,000 research projects across the university. From year to year, we conduct 90% of the industry-sponsored research in BC. In 2016, UBC was in the 92nd percentile for start-up company creation among North American universities, and in the 97th percentile among Canadian universities. So you can see, UBC is a significant participant in the research strategies promoted by our regional and national governments.

One of the most important ways in which UBC is contributing to the innovation agenda is through our commitment to the development of research clusters. These are interdepartmental networks of leaders in particular fields who are brought together to investigate large problems that resist individual solutions, but are opening up their secrets in the face of collaborative research.

So, for example, a cluster has been formed by bringing together researchers from the Faculty of Forestry, Botany, the Michael Smith Laboratories, Biodiversity, and the Faculty of Land and Food Systems: they have formed a forestry and plant productivity group studying plant genomics and bio-products from renewable resources.

Another cluster that has brought scholars from a variety of fields together is one with the title “Remembering and Commemorating Trauma.” Taking its cue from the work of the Canadian Truth and Reconciliation Committee, scholars in this interdisciplinary group are interested in the impact of traumatic events on the individual, on society, and on marginalized groups within society. It’s made up of researchers from History, Social Work, Creative Writing, Critical Studies, Psychology, Indigenous Studies, and Philosophy. An important aspect

of this research is its examination of the ways in which our responses to trauma can be used to heal, reconcile, and empower.

As this last example illustrates, such clusters encourage scholars to break through disciplinary barriers and engage with one another in innovative ways, leading to both knowledge creation and knowledge translation—that is, the application of new discoveries for the health and wellbeing of society. Of course, the principle of pooling resources and collaborating across sectors is not limited to universities; it's already working in industry, as we can see in such projects as the regional innovation clusters produced in Germany over the last half-century by the **Fraunhofer** [**Frown-hawfer**] institutes of applied research. Here in Canada we should make such collaborations a priority, both within universities and between universities and industry, because experience has shown that this approach does lead to innovation and technological breakthroughs.

I hope it's clear from what I've been saying that UBC's commitment to innovation does not stop at our gates. As a major research university, consistently ranked among the top 40 in the world, UBC is supplying both the technical know-how and the qualified graduates to help move our industries to the forefront of world

markets. We contribute to the development and evolution of new companies, products, and services, and create the new technologies that industry will need to remain productive and competitive. UBC students have the benefit of the largest co-op education program in Western Canada, gaining invaluable work experience before they graduate, and facilitating the exchange of knowledge between industry and academia.

To further promote research-industry collaborations, UBC's University-Industry Liaison Office—the UILO—helps start-ups and spin-offs, and provides the kind of network and know-how that enables researchers to bring their discoveries into the marketplace. The UILO is comprised of two distinct groups: the Sponsored Research Group and the Technology Transfer Group. Both groups are recognized nationally, negotiating more than 2,500 contracts, issuing hundreds of patents and licensing agreements, and spinning off new companies each year.

Collaboration of this kind, between university research and industrial application, is becoming more and more significant, and it is this kind of collaboration that really defines what we're calling the "innovation economy."

Let me take you back to Kelowna to give you an example: UBC Okanagan has begun to develop a 30-acre Innovation Precinct to accommodate productive long-term engagement with industry and non-profits. This will bring together industrial partners who want to draw on our research excellence to develop and test new products. Earlier this year UBC Okanagan signed an agreement with Avcorp Industries from Delta BC, a leading supplier of integrated composite and metallic aerostructures. The agreement is to develop a “Learning Factory for Advanced Composites,” which will integrate industrial production with learning and research in high-tech, drawing on the expertise of our faculty and giving our students hands-on experiential learning.

This kind of partnership holds great promise, not only for the university and industrial partners, but also for the economy of the region, since over the longer term such arrangements have a ripple effect, bringing training for students, creating manufacturing jobs in the private sector, and offering the promise of new industries and a diversified economic base in the Okanagan.

There’s an added dimension to growing the innovation economy through university research. I recently had the pleasure of participating

in a conference with the president of the University of Washington, at which we explored the possibility of creating a “tech corridor” in the Pacific Northwest. The “Cascadia Corridor” would bring together some of the finest minds on the continent to create the kind of synergy you find in Boston or the Silicon Valley.

In conjunction with the University of Washington, we’re exploring ways of creating an innovation hub that would see the great universities of the Pacific Northwest collaborate with each other and tech giants like Microsoft and Google, in the development of new tools and applications that would transform the economies of the region. And since that conference, UBC has been taking a fresh look at areas like biomedical engineering and digital media, with a view to optimizing our research capabilities through joint projects.

So the future holds great promise—that is, if we make the kinds of investment that will pay large dividends: investments in interdisciplinary learning and research; in cross-border collaboration; in incubators and start-ups; in the preparation of a trained and flexible workforce; in research clusters that combine complementary strengths in a variety of fields; and in partnerships between universities, governments, and industry.

But perhaps the most important investment we can make to ensure the success of an innovation-based economy is in the development of human capital: the education of a highly-skilled, flexible, and creative population. It's a cliché, perhaps, but the wealth of a nation lies in the capabilities and resourcefulness of its people; and the key to tapping those capabilities, that resourcefulness, lies in education. Great universities like UBC nurture and stimulate the capabilities, imagination, and leadership qualities that are the foundation of a society's prosperity.

I'm speaking now not only about economic prosperity, but social prosperity too. We need to develop new ideas, not just in science and technology, not just in industrial production, but in meeting the social challenges that still lie before us. We need to find ways to bring First Nations fully into the circle of economic prosperity, and to realize the potential in First Nations youth. We need to break the cycle of poverty and ill-health in our big cities, and to solve the seemingly intractable problems like drug use and homelessness. Innovation is needed here too—big ideas, original thinking, a rejection of the status quo.

Such challenges demand innovative thinking by every sector of society, working together for the common good. UBC is doing its part there too; but that's a subject for another day!

Thank you.