Foundations for Canada’s Prosperity: Signposts & Directions

Address to
The Empire Club of Canada

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Friday, May 22, 2015

Check against delivery.
Good afternoon.

Thank you for that kind introduction, Andrea [Wood, President, Empire Club of Canada]. I am grateful to you, and the Empire Club of Canada, for the opportunity to address this distinguished gathering.

I am also grateful to Tim Kocur on behalf of our sponsor, the Carpenters & Allied Workers Local 27, and to Ms M.J. Perry, Vice-President of Mr. Discount Ltd., for sponsoring a table of students, the constituency that very much represents the foundations of Canada’s future prosperity.

It is lovely to see such a wonderful turnout, including so many friends and colleagues. I would like to extend an especially warm greeting to The Honourable Vivienne Poy, Chancellor Emerita of the University of Toronto.

Ladies and gentlemen, I am honoured and delighted to be speaking to you today.

This Club has a long and esteemed record of hosting important discussions about our country and its future direction.

It is in this spirit that I wish to offer my remarks.

My main argument is a simple one: at a time when our traditional sources of prosperity are being challenged by both cyclical and longer-term change, we need to instigate a local, provincial, and national conversation about where our future prosperity will come from.

I am going to explore one possible answer this afternoon:

The Foundations

“Canada’s cities are building the foundations of our future prosperity.”
Canada’s cities are building the foundations of our nation’s future prosperity. Although there is growing recognition of urban regions as the sources of our prosperity, I will argue that their importance remains underappreciated in Canada. To position our country for success in the future, we will have to focus our collective efforts on identifying our most promising assets – both sectorally and geographically – and then leveraging them fully.

I am going to make three points this afternoon:

First: The geopolitical landscape is changing quickly. The impact on Canada has been – and will continue to be – profound.

Second: Around the world, urban regions are increasingly recognized as national assets driving innovation, wellbeing, and prosperity. I will explore this with an example we all know well.

Third: This has important policy implications for Canada – and I will make a few suggestions for how we might respond.

**Part One: The geopolitical landscape is undergoing major change**

But let me start at the beginning.

![Oil Prices](image)
We live in a world of rapid change, and Canada has certainly not been immune to these powerful forces. While we fared better than many countries during the last Global Recession, our recovery has been slow and uneven. Recently, our economy and our dollar have been buffeted by the plunging price of oil.

The reverberations continue to play out, but we are learning once again how perilous it is to rely too heavily on a single dominant source of growth and prosperity.

Indeed, because of declining oil prices, the OECD recently revised their global GDP projections, predicting faster growth in many of the world’s leading economies in 2015 and 2016, but slower growth in Canada.

Here in Ontario, there is hope that the recently devalued Canadian dollar will spur a resurgence of our manufacturing export economy. Thus far, the evidence of such a recovery remains elusive – perhaps not surprising since such adjustments take time, especially in a world of currency hedging.
But we have learned from past business cycles that a low dollar, on its own, does not constitute the basis for long-term, sustainable economic growth. Our automotive sector is a key case in point.

Automotive investments in Canada totaled about $750M (US) last year, and automotive production rose accordingly – cause for some optimism. At the same time, manufacturers of cars and auto parts invested a monumental $7B (US) in Mexico, much of it going towards the construction of seven new assembly plants. And this year, Toyota has decided to move production of the Corolla from Ontario to a new $1 billion plant in Mexico, and we learned recently that GM is relocating Camaro production from Oshawa to Michigan.

So despite last year’s increase in Canada’s automotive output, our share of North American vehicle output shrank to 14% as Mexico’s climbed to nearly 20% (from just 3% in 1987).
While automotive assembly and parts production – particularly in the higher-end segment of the market – will remain important components of Ontario’s economy, the longer-term prospects for this sector are somewhat unclear, given the dramatic southern shift in the centre of gravity in this industry.

Given the obvious risks associated with relying on oil to power our economy, and with the uncertain prospects facing our traditional manufacturing heartland, it seems obvious to be asking ourselves a larger, existential question: where will the future prosperity of our city, province and nation come from?
Part Two: The Value of Urban Regions

It is here that I suggest we turn our gaze towards our cities, and the sectors that are driving the economies of our major metropolitan regions.

Most obvious among these – particularly in the case of Toronto – are financial services, which have long been an important pillar of our regional economy. Our banks in particular have fared well coming out of the last recession, and Toronto has emerged as the world’s leading centre for mining finance and one of the world’s most important centres of expertise in the management of long-term assets such as pension funds. More recently, this sector has spawned the emergence of innovative financial software and applications companies – known collectively as ‘Fintech’.

Then there is the burgeoning creative economy, comprised of a diverse array of sectors such as film and TV production, fashion, food, digital media, visual and performing arts. We might also add tourism to the list…
…as you can see from the slide, The Hulk recently visited Toronto, evidently mistaking it for New York.

Closely related sectors such as information and communications technology and services should also be acknowledged for their importance.

These economic activities all share one interesting and important characteristic: *they are fundamentally urban activities*. They thrive in the rich and stimulating environment provided by metropolitan regions such as Toronto, Montreal, Vancouver, Calgary, and other major cities across the country.

The literature on the economic geography of innovation confirms what entrepreneurs, venture capitalists, and creative types seem to know instinctively: cities are privileged sites for innovation, entrepreneurship, and the flourishing of ideas and opportunities. The forces underlying this connection are many and varied.
By providing interesting and important problems to solve, cities naturally stimulate the development of new ideas or products to address them.

Cities offer a deep pool of specialized services and well-educated human capital that support entrepreneurship and the development of new products.

Indeed, the most talented, creative and entrepreneurial members of the labour force prefer to live in urban settings offering a high quality of place: cities that are culturally vibrant, safe, physically appealing, with good schools, and open to newcomers and new ideas.

Such cities foster the circulation of knowledge among firms – including those in the same industries, as well as those in seemingly unrelated industries. The capacity for cities to facilitate such ‘knowledge spillovers’ and localized learning provides tremendously fertile conditions for innovation, even in a time when information technologies make it easy for information to be shared instantly over long distances. This is one of the most interesting paradoxes of our time.

Importantly, these same cities are increasingly interconnected. Urban regions are gateways to other centres of knowledge production around the world, bringing ideas, opportunities, and energy to the local milieu.
The Toronto Biomedical Example

Let us take a closer look at a place we know well – Toronto – and another one of its emerging (yet still very much underappreciated) economic pillars.

Many are surprised to learn that the Toronto region is home to the third-largest biomedical cluster in North America, trailing only San Francisco and Boston. It is striking not only because of its size, but also its diverse composition, with research strengths in everything from immunology and vaccines to cancer care, children’s medicine, cardiac science and brain research.

Moreover, it hosts a large and dynamic collection of firms in biomedical technologies and devices: in diagnostics, imaging, testing, and assistive devices. This diversity has created unparalleled opportunities for convergence across these individual areas of strength to produce unique and highly innovative new activities.

Underpinning this cluster are several key foundational assets.

The University of Toronto is the primary research and teaching hub, home to the country’s largest Faculty of Medicine, as well as the full range of health science faculties: Nursing, Dentistry, Pharmacy, Public Health, Social Work and more. Add to this the Institute for Biomaterials and Biomedical Engineering, and the
Donnelly Centre for Cellular and Biomolecular Research, two remarkable interdisciplinary research and teaching centres that draw on our convergent strengths in medicine, engineering, dentistry, cell biology, computer science, chemistry, physics and related fields.

Together, these faculties, along with our Mississauga Academy of Medicine, anchor a phenomenal health sciences network that includes our nine fully affiliated, partner hospitals – which have stellar global reputations for their own strengths in research, education, and clinical practice – as well as many other community affiliate hospitals in the region.

Accelerators, incubators, and innovation hubs – chief among them the MaRS Discovery District, MaRS Innovation, and the Centre for the Commercialization of Antibodies and Biologics – provide space, support services, access to capital and a nurturing environment for startups in a broad array of sectors. MaRS Innovation alone provides vital ‘connective tissue’ that links together more than a dozen universities and research hospitals in a single commercialization ecosystem.

Toronto is at the heart of a biomedical cluster with few equals in the world.

How does one measure the significance of this cluster?

One obvious way to benchmark its strength globally is through the scale and impact of its research.

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In all the health and life sciences, only Harvard University publishes more research than U of T and its affiliated hospitals – and when it comes to impact, publications from the University of Toronto are cited more frequently than research from all other universities except Harvard and Johns Hopkins.

Another way to appraise research quality and performance is by looking at who our researchers partner with, and how frequently.

There are good reasons to believe that such metrics are becoming increasingly important. A recent editorial in *Nature* argued that collaboration among researchers on a global scale is becoming essential in fostering scientific progress. Moreover, in this age of growing global collaboration, “Excellence seeks excellence, so elite national universities are also leading *international* collaborators.”

The data behind this idea are absolutely striking.

Here is a network graph of the most frequent *international collaborators* among the world’s top 10 research-intensive institutions by overall publication count. The dark blue circles represent the universities with the greatest number of scholarly publications from 2000-2014.
The size of the circles is proportional to the number of publications produced by each institution in all fields. As you can see, the University of Toronto is second in the world only to Harvard. The lines connect each of the top ten institutions to its top ten international collaborators, and the thickness of the lines is proportional to the number of co-publications.

The prominence of elite research groups is clearly evident. Notice how often the same institutions are interconnected – these institutions are central nodes in a global knowledge-producing network.

Why does this matter?

Quite obviously, in Toronto, Boston, London, Los Angeles, and Tokyo, our present and future prosperity depends on our ability to access and use knowledge; not just the knowledge we produce locally, but also knowledge that is produced in other leading centres of research and innovation around the world. Our collective prosperity hinges upon collaboration.

Hence, the University of Toronto and its teaching hospitals serve as vital portals to global knowledge networks, bringing important benefits to Toronto and Canada.

A recent paper in the Handbook of Creative Cities captured this idea succinctly:

“[W]ell connected research cities are likely to be important cities in the global economy; nodality in research often corresponds to nodality in other parts of the economy.”

In other words, well-connected, globally networked centres of knowledge production are increasingly coming to the fore as the world’s leading economic centres. Venture capital and other forms of mobile investment now seek out these special places and the opportunities that are signaled by their world-leading research and talent.

Again, the evidence is compelling.
These data show the top 25 urban agglomerations by number of research publications for the period 2011-13. Notice how consistently this list includes the world’s most dynamic metropolitan economies.

On the global stage, public policy in many countries has moved increasingly to exploit this intimate connection between cities and a nation’s capacity for innovation, resilience, and long-term prosperity. For example, in the UK a few years ago, the Cameron Government created a Minister of State for Universities, Science and Cities – think about that for a moment: a cabinet-level position with a mandate for universities, science, and cities.

Against this global backdrop, our own efforts in Canada are improving, but still pale in comparison. Within a constitutional framework that renders cities as ‘creatures’ of the provinces, federal intervention is sporadic and piecemeal, and has resisted the fundamental idea of tying investments in innovation-generating activities to investments in our major city-regions.
Part Three: A Few Implications for Public Policy

What does all this mean for Canada’s future wellbeing and sources of prosperity? This leads me to the final part of my remarks: a few suggestions for public policy.

First and foremost, we need to rethink our approach to innovation policy, acknowledging that those activities with the greatest innovative capacity are not evenly spread across the national landscape, but are instead concentrated in a relatively small number of our urban regions.

Public investments designed to stimulate innovation ought to be similarly concentrated, rather than allocated in a diffuse and overly dispersed way.

In a world of highly globalized production systems and supply chains, the only reliable path to sustained prosperity is to focus on those activities whose competitive advantage is difficult to replicate in other regions, or by other firms. Therefore, the goal of economic development and innovation strategy should be to enhance and support those firms, sectors and urban regions that possess unique capabilities, competencies, and innovative capacities.

The implication of this analysis is clear. Canada needs to provide more thoughtful, strategic support for its urban regions. We need to craft public policies locally, provincially and nationally that leverage more fully the inherent potential of our leading city-regions. Transportation funding, housing support, and other investments that enhance the livability and functional efficiency of our cities are the obvious places to start. The commitments made in this year’s Ontario and Federal budgets to invest in transportation infrastructure represent a welcome start, but we have many years of underinvestment to make up for.

Second, international connections, partnerships, and openness are vital. We need to foster more international collaboration – among universities, yes, but also among industries and municipalities. These are the global networks that will contribute immeasurably to our success.

In this spirit, we need to capitalize on the remarkable allure of our leading city-regions when it comes to attracting and retaining talent from around the world.

That means continuing to promote immigration, as Toronto and Canada have done for generations, as a key feature of our economic resiliency, our cultural vibrancy and our quality of place.

Toronto is already the world’s most ethnically diverse urban region and this has benefitted our city tremendously over the course of our history. While we have a strong legacy here, we need to improve opportunities for new Canadians, and
facilitate career transition as well as credential recognition and re-certification.

That also means attracting more international students, faculty, and researchers at every level, who open doors with new ideas and connections, whether they stay and become Canadian citizens or return home as ambassadors for Canada. The rising global stature of institutions like the one I have the privilege to lead enables us to attract stellar applicants from around the world in growing numbers. For the good of the city, the province and the country, we need to do everything possible to leverage this potential global influx of talent, rather than putting up barriers.

Third, Canadian innovation policy should stimulate investment in business R&D, an area in which Canada routinely places near the bottom of the OECD. When industry invests in research, it builds a region’s capacity to absorb and harness the knowledge, discoveries, and – most importantly – highly qualified personnel being generated by the higher education and advanced research sectors. The world’s most innovative regions host ecosystems where scientists, entrepreneurs, venture capitalists, and industry leaders translate research into prosperity.

In the Toronto region, such an innovative ecosystem is just beginning to flower. It needs active cultivation. And as it grows, it will be a powerful complement to the remarkable flourishing of entrepreneurship we are witnessing.
In fact, over the past decade, faculty, staff and students at the University of Toronto have been at the heart of one of the fastest-growing entrepreneurial clusters on the continent. And since 2010, no single university in North America has helped create more startup companies than U of T and its partner hospitals.

If we focus our analysis just on the biomedical and related fields I mentioned earlier, we see that our long-established research strength is having an important impact on the region.

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**Regenerative Medicine**

Commercialization Indicators, 2010–2014

| 318 Invention Disclosures |
| 182 New Patents Filed    |
| 10 Start-up Companies     |

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Indeed, Toronto is especially strong in the burgeoning and incredibly promising field of stem cells, regenerative medicine, and biomedical engineering. This is no accident, since stem cells were originally discovered right here in Toronto. U of T researchers Ernest McCulloch and James Till uncovered the first evidence of pluripotent stem cells on a Sunday afternoon back in 1960, and published their results in 1961.

I have already mentioned the key role played by MaRS in this landscape, and its activities are supplemented by a number of more specialized incubators and accelerators in the region. For example, the Centre for the Commercialization of Regenerative Medicine, housed in U of T’s historic Banting Institute, provides access to early-stage capital and centralized research infrastructure to support the successful commercialization of discoveries in the field of stem cell- and biomaterials-based products and therapies.
Among the many noteworthy biomedical startups in Toronto is Xagenic, a molecular diagnostics company, and 2015 Life Science Company of the Year. U of T Pharmacy Professor Shana Kelley is founder and CTO of the company, which recently announced $25.5 million in Series B financing, bringing the total it has raised to date to about $48M. The lead investor, Domain Associates, is based in San Diego, with offices also in Princeton, NJ.

Following a similar trajectory is ChipCare, whose hand-held blood-testing platform for HIV and other diseases in remote settings is based on technology commercialized out of the lab of Professor Stewart Aitchison of U of T’s Electrical and Computer Engineering Department. ChipCare recently closed its Series A fundraising round of $5M, led by Puffin Partners of Dallas, TX.

What is especially telling about these cases – and others like it – is that, even a few years ago, the US-based VC firms that made the lead investments in these companies would very likely have required them to relocate to San Diego or Dallas. But today, the same investors consider the location in Toronto to be a valuable asset, because of the research and teaching strengths of its local universities and hospitals, and the quality of our human capital.

Providing further evidence of this region’s emergence as a global destination for biomedical investment capital, the Structural Genomics Consortium led by Professor Aled Edwards, based in the MaRS centre, recently announced a $7.5M
investment by Merck in its pre-competitive, open-source drug discovery research program, the latest in a string of similar investments by global pharma companies such as Pfizer, Novartis, GSK and Janssen. Interestingly, SGC operates within a globally distributed network model, with other major research centres at Oxford University and University of Campinas, Brazil.

Announcements such as these will soon be followed by other major investments by global players in biomedical products, making significant bets on the scientific research – and the skilled human capital – coming out of the Toronto region. As this capital and business development expertise continue to flow here, it complements and supports the blossoming local start-up culture, and fills in the maturing innovation ecosystem.

As an unnamed venture capital fund manager put it recently: “Ultimately, money flows where ideas flow.” I can’t think of a better example to draw all of the threads of my argument together.

The Toronto region’s remarkable and diverse strengths are already a major force in Ontario’s and Canada’s prosperity. I have argued today that we can do better – and I have made a few suggestions as to how we can build on the strengths of our cities and their great universities (and hospitals) to create sources of prosperity to power our future.
Conclusion

The story I have told this afternoon is based on the case I know best, of course. But analogous arguments could be made for our other leading metropolitan regions and universities, such as Montreal and the influence of McGill and the University of Montreal; or Vancouver and UBC; or Edmonton and the University of Alberta. And a more complete rendering of the Greater Golden Horseshoe story would acknowledge the contributions of sister institutions such as McMaster, Waterloo, York, Ryerson, Guelph, OCADU and others.

So this isn't just about Toronto. It is about Canada. Canada’s urban regions and its urban universities are building the foundations of our nation’s future prosperity. I believe we need to instigate a local, provincial, and national conversation about how we can best help them.

Thank you for your kind attention.