

The Role of the University in the City

McMaster University Lecture series

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Introduction

Thank you, Patrick. I am delighted to be back. Thank you for such a warm greeting!

Let me also extend my thanks to President Deane for the kind invitation to join you today.

It is simply extraordinary to see how many things have changed since I was an undergraduate student here. There is a fantastic vibe at McMaster and throughout Hamilton these days.

In fact, this afternoon I want to talk about that vibe and how McMaster is both helping to create it and benefiting from it. I will argue that McMaster and its host city-region of Hamilton are a striking example of an increasingly important global phenomenon.

In regions around the world – from Boston to Beijing, from Toronto to Tokyo – the partnership between research-intensive universities and their host city-regions is a fundamental catalyst for innovation, resilience and prosperity.

I want to develop two themes in my remarks this afternoon:

- First – starting with a point that is undoubtedly obvious to all of you – I will argue that the presence of an outstanding scholarly, research, and pedagogical entity such

as McMaster has helped transform the city of Hamilton and surrounding region in very positive ways (and continues to do so)

- And second, I will explore how the city and the region are returning the favour.

Part 1 – A Tale of Two Cities

Let me begin some 650km to the south and east of here, in Bethlehem, Pennsylvania.



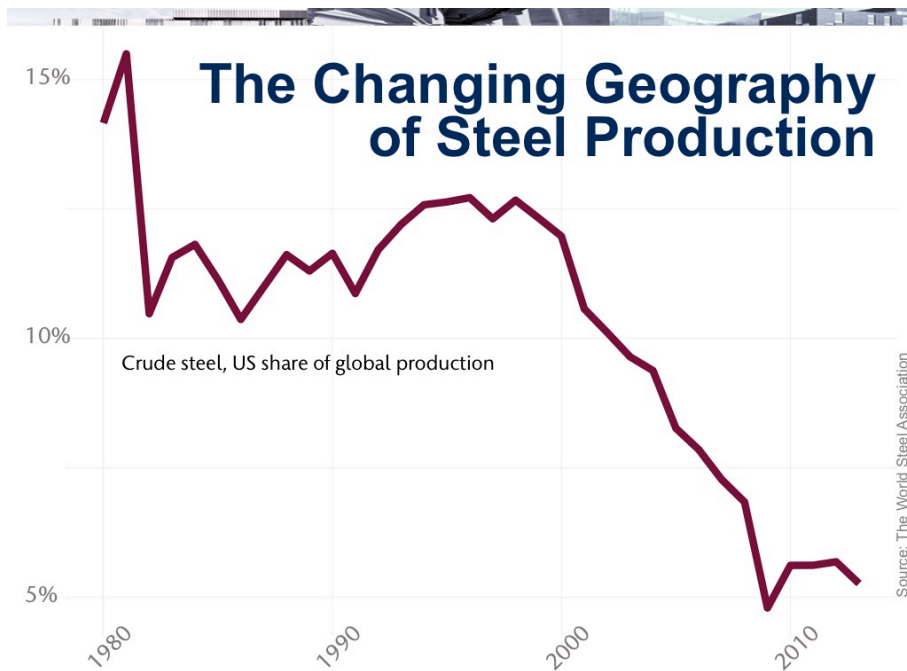
Bethlehem was once the second largest steel-producing town in the US. Astonishingly, in 1941, Bethlehem produced more steel than the entire United Kingdom. In 1943 alone, Bethlehem supplied the steel for 380 navy and cargo ships built in its shipyards on the east coast of the United States. That's more than a ship a day.

The image [above] is one of Walker Evan's iconic photos of Bethlehem. It was taken in 1935 when Evans was working for the US Farm Security Administration.



And here is a photo from the same street, taken recently by a Google Maps car... The trees are taller and the cars are different, but the scene is remarkably similar. The population hasn't changed very much from its high point in 1960.

Of course, we all know what has happened to Bethlehem's leading industry...



The city is belatedly struggling to reinvent itself as an arts and tourism destination – with what we would have to call mixed success. But while Bethlehem PA and dozens of similar rust-belt cities have struggled as a result of the shifting geography of steel production, Pittsburgh PA – with a similar heritage – has thrived.

Today, Pittsburgh is a leader in healthcare, education, technology, and financial services. Steel still plays a major part in Pittsburgh’s economy, but the city has dramatically diversified and reinvented itself over the past 50 years.

In many ways, Hamilton is the Pittsburgh of Canada. Evidence of Hamilton’s transformation is all around us.

A 2014 City of Hamilton Investment Update captures the mood well:

“Hamilton, Ontario is a city of renewal, of positive change, and once again Canada’s Ambitious City. Over the past several years, Hamilton has transformed into one of the top economic centres in Canada, and has consistently been ranked one of the top investment cities in the nation from various outlets. ... And, in the past five years alone, Hamilton has averaged over \$1 Billion in building permit values, making it one of the strongest economies in the Province of Ontario.” [Hamilton Economic Development, City of Hamilton, ‘Investment Update’ 2014]

Part 2 – Location, Location, Location

So why have Hamilton and Pittsburgh thrived while Bethlehem and others have struggled?

There are, of course, a multitude of reasons, including stable governance, astute investment decisions by the business community as well as all levels of government, and – most importantly – a well-educated, dynamic and creative population.

Above all, Hamilton has benefited from the propulsive effect of the region’s post-secondary institutions whose graduates have formed the backbone of an educated, diversified, and highly creative workforce for years – 85 years, in McMaster’s case, to be precise. Just as Pittsburgh has benefited tremendously from the impact of the Carnegie Mellon University, the University of Pittsburgh, and other local universities, the ability Hamilton to reinvent itself can be explained in large part by the local impact of McMaster University and Mohawk College.

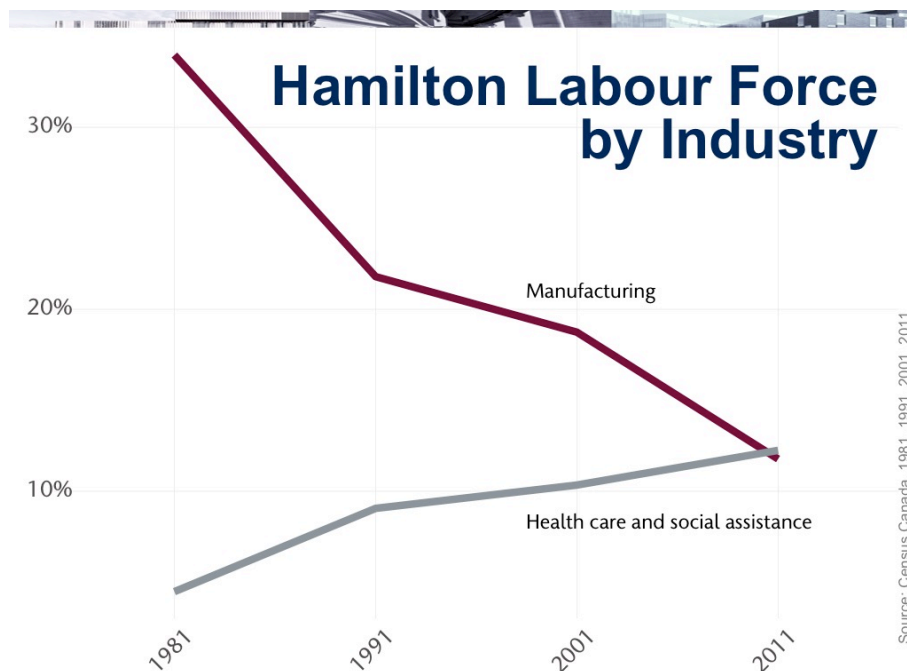
Similarly, city-regions like Boston, San Francisco, Raleigh, and Austin have benefited from the influence of MIT, Harvard, Stanford, UCSF, UNC-Chapel Hill, Duke, the University of Texas at Austin, and dozens of smaller, less famous schools. This is equally true across Canada – in places like Toronto and Vancouver – and the same is true overseas – think Singapore, for example.

Throughout much of the 20th century, Hamilton’s proximity to Canadian and US markets, to the St Lawrence Seaway, to transportation and logistics hubs, and to metal-using industry in Southern Ontario helped drive prosperity.

These factors still matter a great deal to the local economy. But now I would put the presence of McMaster University and a cluster of institutions of advanced research and higher education at the top of the list.

Here is one way to picture the transformation and the impact of local institutions: according to the 1951 Census of Canada, more than 50% of Hamilton's labour force was engaged in the manufacturing industry, mostly in primary manufacturing: steel production, and the like. In 1951, *every other member of the labour force was employed by the manufacturing sector.*

Even as recently as 1981, manufacturing accounted for fully one-third of Hamilton's labour force.



Over the next three decades, the share of Hamilton's labour force employed in manufacturing has declined steadily – while at the same time the share of the labour force involved in health care and social assistance has nearly tripled.

Manufacturing and steel remain an important part of Hamilton's economy, but today Hamilton Health Sciences and McMaster University are the #1 and #2 employers in the region.

As part of this reinvention process, manufacturing itself has been transformed: it is now focused more on advanced manufacturing, on higher-technology and complex manufacturing, on advanced materials, on state-of-the-art custom fabrication and finishing, and on similar kinds of value-added manufacturing.

And McMaster University has been at the heart of this transformation. The rise of McMaster and its growing influence have been nothing short of remarkable – and, in typically Canadian fashion, largely a well-kept secret.

McMaster is not only one of Canada's strongest universities, but is routinely included among a small handful of top Canadian institutions that are globally recognized and ranked for its innovations in research and teaching. And its pre-eminence matters a great deal when it comes to its host region.

So what is it about the local presence of a world-class university that stimulates regional reinvention, innovation, and prosperity?

Part 3 – Universities and urban regions

As it turns out, back when I had time to be a scholar, I focused much of my academic career on studying the economies of urban regions and the role that major institutions such as research universities play in their development.

I would argue that there are at least *three ways* in which research-intensive universities like Mac propel regional innovation, prosperity, and reinvention.

- First, research universities impart *dynamism and resilience* to the economies of urban regions.
- Second, research universities are *gateways*. McMaster – and the university I am privileged to lead – *connect* their host regions to the world, and vice versa.
- And third, universities are tremendously important *stabilizing forces* in urban economies, and in the local neighbourhoods they inhabit.

Let me take each point in order.

Part 3.1 – *Dynamism and resilience*

As everyone here knows, universities are research performers. This is especially true of Canada's more research-intensive universities, like the University of Toronto and McMaster.

The numbers are impressive. The forecast for the 2015/16 research budget here at McMaster is nearly \$200 million.

While most of that \$195 million dollar budget comes from federal and provincial funding councils, some of it arises from collaboration with industrial, institutional, and not-for-profit partners, including local and regional businesses and community-based organizations.

As we'll see a bit later on, this kind of partner-based research often leads to new research insights, both fundamental and applied. When local partners work with a university, faculty and students are both the *providers* of new ideas, and the *beneficiaries*.

In addition, much of the research conducted within our institutions ultimately finds its way into the marketplace through a variety of channels, as measured by technology licensing agreements, patents, start-ups, and other markers of commercialization.



It is equally clear to this audience that educating human capital – or what we might call *embodied knowledge* – represents the *single biggest contribution* by universities to our regions and our nation. Despite all the press given to the other kind, educating students is by far our most important form of ‘technology transfer’.

McMaster is home to more than 30,000 students and U of T is home to more than 80,000 students. More than 92% of our graduates are employed within two years – many of them locally. This represents a very powerful injection of talent into the local economy.

It is also a powerful injection of creativity, engagement, and energy into a *community*. We often hear the view, expressed in the media or around the water cooler, that Canada needs more graduates in science, technology, engineering, and mathematics – the so-called STEM disciplines. That’s undoubtedly true. These fields are crucial, of course, and both U of T and Mac host excellent departments and faculties covering all aspects of STEM.

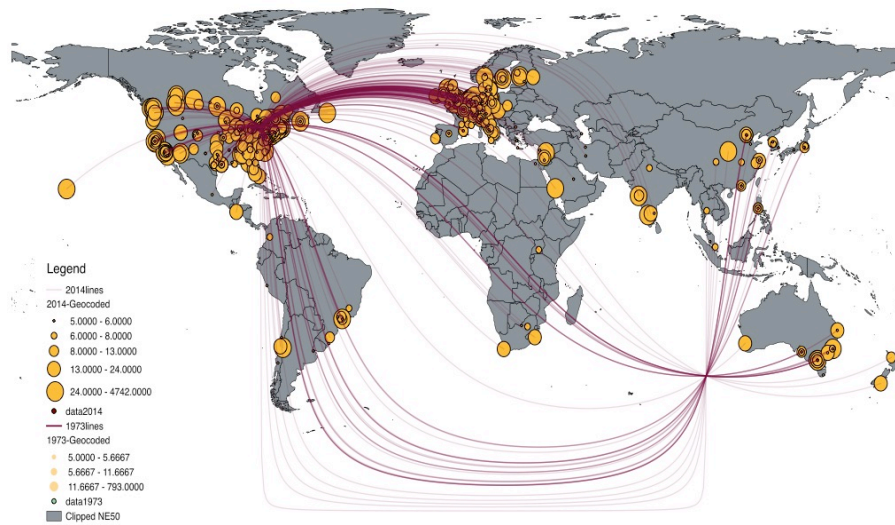
Nevertheless, it must be said – as clearly as possible – that graduates in humanities and the social sciences engender dynamism and resilience as much as STEM grads do. The humanities and social sciences enable us to think broadly and deeply about our problems and the values that guide us in forging solutions. They foster cross-cultural understanding, communication, and leadership. In the digital age, facts (and many non-facts) are instantly available to anyone with an Internet connection. But one must also be able to analyze information critically and imaginatively, marshal key points to form persuasive arguments, listen to and learn from other perspectives. And this is just a starting point.

The humanities and social sciences are not only relevant – they are essential to individual and societal progress and wellbeing, locally and nationally.

Part 3.2 – Gateway

Turning to the second point, research universities play a vitally important role in connecting their host city-regions to the world, and the world to their host city-region.

Let me demonstrate this with respect to one aspect of McMaster’s global linkages and its role as a gateway to the world.



This map shows collaborations in the form of publications jointly authored by scholars at McMaster and other universities worldwide in 2014. Each line represents collaborations with scholars at another institution that generated at least 5 publications that year. The size of the yellow circles is proportional to the overall number of publications with partners at that particular location.

The map is most eloquent in demonstrating how McMaster connects Hamilton to the world and vice versa. The question is: why does this matter?

Quite obviously, the present and future prosperity of Hamilton or Toronto depend on our ability to access and use *not just* the knowledge that is produced *locally*, but *also* the knowledge produced in *other* leading centres of research and innovation around the world. Increasingly, it also depends on the knowledge we produce *jointly* with research partners in other leading institutions across the globe, through the kinds of collaborations documented on this map.

Participating in global knowledge networks generates ideas that fuel innovation, both locally and abroad.

The recent partnership between McMaster University and Germany's Fraunhofer Institute for Cell Therapy and Immunology is a perfect example. I understand that BEAM – the Biomedical Engineering and Advanced Manufacturing research facility – at McMaster Innovation Park will improve the production of cell therapies and reduce the cost of treating degenerative diseases. The partnership will make countless lives better, in Canada, Germany, and elsewhere. It will also create 100 jobs and will further enhance Hamilton's reputation as a leader in life sciences.

Part 3.3 – Stabilizing Anchor Tenants

I want to spend a little longer on the *third* point: universities as stabilizing forces. First and most obviously, the sheer size of institutions like Mac generates substantial economic impact within the region. As I mentioned earlier, McMaster University is now Hamilton's #2 employer.

But universities also exert an important stabilizing influence at the neighbourhood level. To borrow a concept from the retail sector, our institutions can be thought of as 'anchor tenants' in local communities. Not only does a university's presence generate substantial economic activity for nearby businesses of every description, but it also keeps local property markets buoyant. And they don't move very often – they are here for the long run!

It is worth remembering that, 85 years ago this month, McMaster welcomed its first students in Hamilton – after the Hamilton Chamber of Commerce had launched a campaign to move the university from Toronto – and the people of Hamilton themselves contributed more than \$7,000,000 in today's dollars to help pay for the relocation. It was a visionary investment. The transformation of Hamilton's built environment is testament to this, and demonstrates another way in which universities stabilize and valorize the urban environment they colonize.

I started with a set of 'then and now' images from Bethlehem PA. Here's an image from the corner of Bay and Main taken in the 1960s, looking toward the future site of Jackson Square.

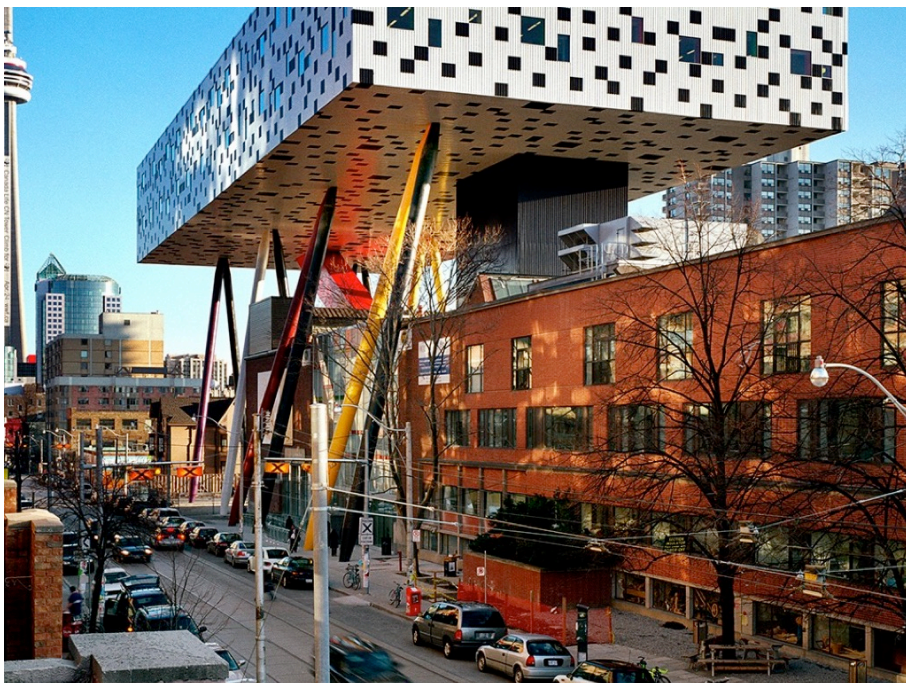


The building immediately in the foreground is now the David Braley Health Sciences Centre on the downtown McMaster Health Campus site pictured below.



This example is not just a case of *rebuilding*; it's symbolic of the *re-invention* that McMaster has led in this city.

Toronto is full of similar examples, too. I am thinking of, among many others, the Terrence Donnelly Centre for Cellular and Biomolecular Research, on College Street, designed by Behnisch Architects and architectsAlliance... the the Ryerson Student Learning Centre on Yonge Street which opened just a few months ago, courtesy of the Norwegian architects Snohetta. It occupies the site of the famous old *Sam the Record Man* store.



And pictured above is Will Alsop's award-winning Sharp Centre for Design at OCAD University, just behind the AGO on McCaul Street.

So universities perform a leading role in regenerating the built form and urban fabric of the city – often kick-starting subsequent investment by private sector actors. That's one reason why so many municipalities in Ontario have pursued post-secondary institutions as sources of new vitality for aging downtown cores: Stratford, Kitchener, Cambridge, Brantford, Windsor...the list goes on and on.

Of course, there is yet *another* dimension to universities' stabilizing influence that should be mentioned here: the positive local impact of *outreach activities* by their faculty, staff and students on surrounding communities and neighbourhoods.

I know that McMaster has its own well-developed network of campus-community partnerships, but let me give you a couple of examples from the institution I know best.

- U of T dentistry students served 78,000 patient-visits in their clinic last year as part of their education and training. Half of these patients were children or seniors and 87% were without dental insurance.
- A group called IMAGINE – led by students in medicine, nursing, pharmacy, social work and other professions provides free health care in downtown Toronto, for those experiencing homelessness or mental health issues, and new immigrants not covered by OHIP.



Image source: iStock.com 2011



Part 4 – Symbiosis

The topic of partnership with nearby communities brings me to my next point, and the second of my two themes this afternoon.

So far I have concentrated for the most part on the positive role universities play in shaping the dynamism, resilience, and prosperity of their host city-regions. I want to switch gears now and argue that these city-regions return the favour.

The partnership between cities and universities is *fundamentally symbiotic* and mutually enriching. While we have spent the past 20 minutes or so examining how universities benefit their local communities, there are many ways in which *universities draw their strength from the urban environment around them*. It is this symbiotic relationship that provides the rationale for growing and deepening the partnership between universities and their host city-regions, *for the benefit of both parties*.

This relationship is *most* evident in the way it enhances the ability of universities to attract and retain the *talent* they need to thrive. The most talented, creative, and entrepreneurial members of the labour force generally prefer to live in urban settings offering a high quality of place: cities that are culturally vibrant, physically appealing, safe, with good schools, and open to newcomers and new ideas.

The ability of universities to attract great faculty, staff, and students depends directly on the quality of life in the city around them. Increasingly, research universities find themselves recruiting prospective employees *and* students in international markets, facing strong competition for the best prospects. So quality of place becomes a crucially important determinant of the long-term success of research universities.

Quality of place is *also* an important asset in supporting research and pedagogy. As I noted a minute ago, students at McMaster, as at U of T and many other institutions, work with community partners in neighbourhoods across the region. In doing so, they derive huge value through 'learning-by-doing'. But there are *other ways* in which research universities benefit from being situated in metropolitan regions.

The literature on the geography of innovation and prosperity shows that urban regions are privileged sites for innovation, entrepreneurship, and the flourishing of ideas and opportunities – the very lifeblood of institutions of advanced research and higher education. The forces underlying this connection are many and varied, originating from both *supply*-side and *demand*-side characteristics of cities.

First, cities offer a geographically concentrated, deep pool of inputs that support entrepreneurship, innovation, and the development of new products. Foremost among these is well-educated human capital, as well as finance capital, and specialized services.

Urban regions are also home to large concentrations of sophisticated and demanding customers and deep, diverse, and highly competitive markets that spur innovation. By providing interesting and important problems to solve, cities naturally stimulate new ideas or products to address them.

Furthermore, because it is now widely recognized that, in many sectors, innovation is an *interactive* process, not a *linear* one from the lab to the market, cities foster innovation particularly well. They bring technology users and technology producers together in a close, mutually beneficial, interactive dialogue.

Similarly, as the renowned urbanist (and former Toronto resident) Jane Jacobs was fond of pointing out, cities foster the *circulation of knowledge* among economic actors – including those in the *same* industries, as well as those in seemingly *unrelated* industries. The capacity 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.

These and other features of cities create significant advantages for innovation, entrepreneurship, economic opportunity, and prosperity.

In this connection, it is worth highlighting that the same features that make cities privileged sites for innovation, entrepreneurship, and the flourishing of ideas and opportunities *also make cities ideal sites for strong universities*.

For example, universities thrive in part by solving problems brought to them by demanding local customers – who become partners in an interactive innovation process. The creativity and ingenuity of their faculty and students is enhanced by their exposure to interactive learning opportunities and rampant knowledge spillovers locally.

Indeed, the partnership between cities and universities has a propulsive effect – whereby each enhances the strengths of the other. Leveraging this relationship creates mutual advantage, leading to prosperity for both the university and the city-region that hosts it.

To put it even more directly: cities foster the development of great research universities, while at the same time research universities foster great cities.

The following observation supports this hypothesis.

Of the top one hundred universities ranked by *Times Higher Education* in 2014 – a group that includes McMaster – 89 are situated in the environs of a metropolitan region with a population greater than a million people – and *all but one* of the top thirty.

The correlation is even more pronounced when you consider *Times Higher Education's* ranking of the world's *top young universities*. Of the top fifty universities under fifty years old, *all 50* are situated in the environs of a metropolitan region with a population of a million or more.

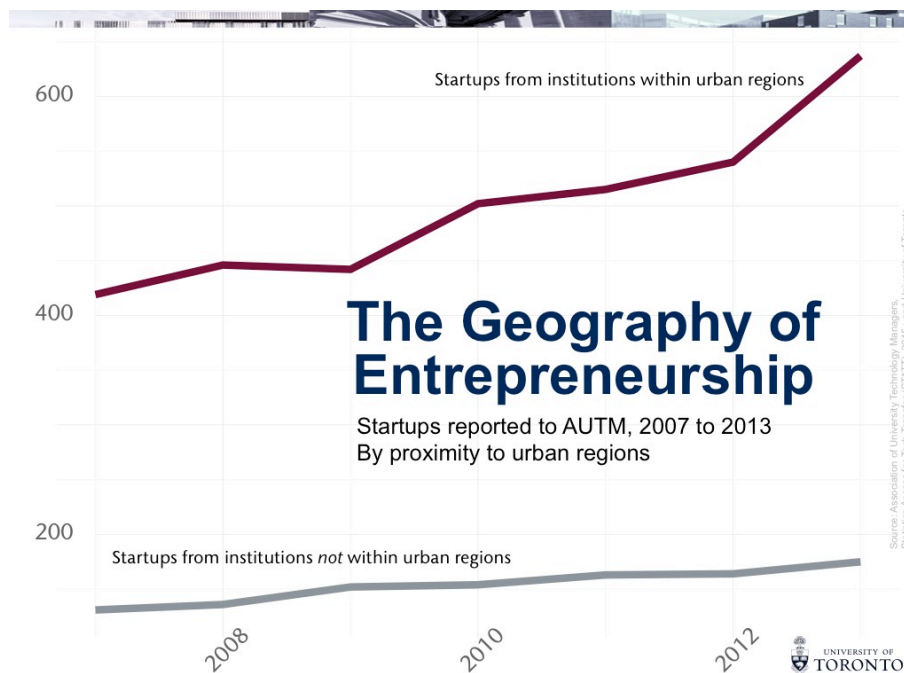
Part 5 – Entrepreneurship

But this is only part of the story. Leading metropolitan regions are increasingly powering a surge in entrepreneurship, the very essence of urban resilience and reinvention. Between 2007 and 2013, the Association of University Technology Managers (AUTM) has reported an increase of nearly 50% in the number of startups reported to them. University faculty and students play a vital role in innovation and entrepreneurial clusters, actively creating companies, jobs, and entirely new industries.

Here again, Hamilton and McMaster provide a compelling example. The start-up and entrepreneurial community around here is burgeoning, with examples such as:

- The Innovation Factory in the Atrium@McMaster Innovation Park.
- The Forge (a dual location accelerator that brings together McMaster University, the Innovation Factory and Mohawk College).
- Spectrum (which supports and develops McMaster students interested in entrepreneurship).
- There are a huge number of smaller initiatives, too, from HackIt Mac to Startup Weekend.

Whether here in Hamilton, down the QEW in Toronto, or on the west coast in Silicon Valley, nearly all of this entrepreneurial activity has one thing in common. It thrives in urban regions.



Notably, *82 percent of the startups* reported to AUTM were spun out of universities within the environs of urban regions with populations greater than half a million people. This is no accident, of course. Startups depend for their success upon the supportive environment found only in urban regions. New ventures of all sorts require access to capital, marketing, design, advertising, IT services, product development and testing, IP lawyers, management, packaging, logistics, and highly qualified personnel. These elements provide an essential catalyst for entrepreneurship and a powerful spark for innovation.

In a virtuous circle, new businesses in turn spawn investment, employment, and partnership opportunities, along with local spillover and knock-on effects. They build a

region’s capacity to absorb and harness the knowledge, discoveries, and – most importantly – the highly qualified personnel being generated by the higher education and advanced research sectors. These complex interrelationships form the engine of the world’s most innovative regions: ecosystems where scholars, scientists, students, entrepreneurs, venture capitalists, and industry leaders *translate* knowledge into prosperity.

Part 6 – Conclusion: Towards the future

Let me bring these remarks to a conclusion with *two observations*. First, the Hamilton region is flourishing. The vibe, as I mentioned at the outset today, is fantastic. A recent piece in the Hamilton Spectator offers the perfect example and draws together many of the threads I have been talking about. I’ll read it:

In 2001, the last time Hamilton hosted the Junos, none of the pre- and post-show festivities actually occurred here. The music industry descended en masse just before the show started at Copps, then promptly took their limos back to their after-parties in Toronto.

This time around, the entire Canadian music industry spent the entire weekend in Hamilton. This time around, we have the hotel rooms, the restaurants, the venues, the expertise, the cultural vitality and the backdrop of James Street North to play host to such a large national celebration.

My *first* observation is that it is hard to imagine the transformation of Hamilton that is implied in this quote having taken place *without McMaster’s vital contributions*.

My *second* observation is that this is *not* a local – or even regional – competition. Certainly, from the Spectator quote and others like it, you might get a different impression. Sibling rivalry (and the Labour Day Classic between the Argos and Ticats) are one thing. But Hamilton’s rise does not come at Toronto’s expense or vice versa. On the contrary, it is increasingly clear that we will rise or fall together.

Consider these last two charts.

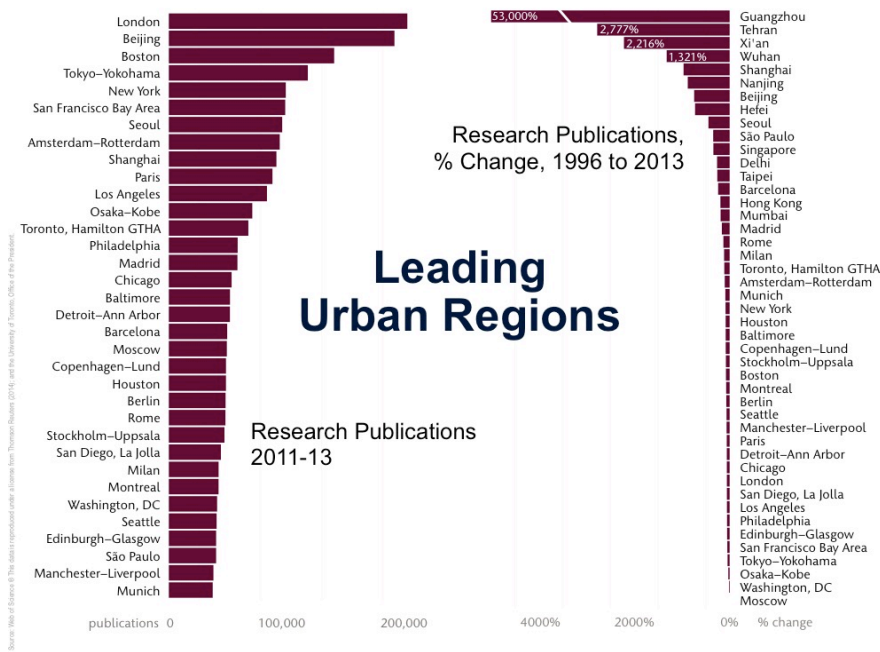


Here you see the world's leading centres of research productivity by publication count for the years 2011-13.

The definition includes universities within about an hour's commute – so Oxford and Cambridge are included within the environs of London, and Hamilton and Toronto are included together in the GTHA.

Notice how this list includes the world's most dynamic metropolitan *economies*.

But it would be wrong to be *complacent*. This is by no means a *static* environment – on the contrary, in fact. These next data show the percent change in urban research productivity from 1996 to 2013.



Even setting aside the spectacular outliers, the growth in emerging regions has been startling.

Research output in Shanghai grew by 970%, in Seoul by 450%, in São Paulo and Singapore by 340%, and in Hong Kong and Mumbai by 200%.

Recognizing the *propulsive effects* of globally recognized research universities, many national and sub-national governments have geographically clustered their investments in 'knowledge infrastructure', building upon the strength of select, leading universities. And more often than not, those institutions are situated in these nations' major metropolitan regions.

This analysis – and the broader arguments I’ve been making here this afternoon – also holds important implications for universities, at a time when the financial sustainability and reputation of many institutions are at risk. It is becoming clear that, for *research universities in major urban regions*, the ability to leverage the benefits of their favourable location – to advance their research, teaching, entrepreneurship and outreach missions – constitutes an *increasingly important source of competitive advantage*. Moreover, as they do so, these institutions *also* enable their host city-regions to address their biggest social, economic, and environmental challenges, and achieve their full potential. As this mutually beneficial dynamic takes hold, *the urban foundations of research universities’ success become ever more strongly accentuated*.

Against that background, here is my concluding proposal. Let’s deepen the collaborations across the Golden Horseshoe. Let’s promote regional strategic planning at every level of government, combining and harnessing the strengths of our leading institutions and municipalities. Let’s engage with each other and with our greater region to build on our successes and advance our collective wellbeing and prosperity.

Thank you all for your kind attention.

I would be very happy to take a few questions...