

Innovation, Creativity & Urban Regions: Policy Considerations for Successful Cities

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Thank you very much for that kind introduction.

I am delighted to be here in this beautiful city. I have tremendous fondness for Utrecht and the Netherlands, and the warm hospitality I have received here over the years. I am honoured to join a panel of distinguished scholars and academic leaders today and it is a pleasure to join in this discussion.

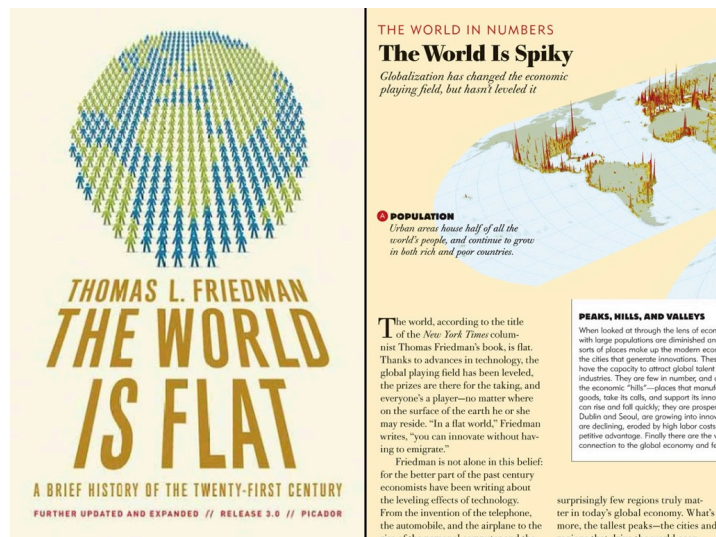
For my remarks, I would like to build on some of what my esteemed colleagues have said and offer five policy considerations for successful cities. I recognize, of course, that success takes many different forms and has many different ingredients. Each region will have its own unique characteristics – perhaps this is something my colleagues and I might address in the question and answer session.

Nevertheless, the five policy considerations I will propose are, in my view, essential to building and growing innovative, successful city clusters. They are based on my ~15 years of research with David Wolfe and colleagues at the University of Toronto.

Context

Let me begin with some context.

Many of you will be familiar with the work of Thomas Friedman of *The New York Times*, who published a bestseller a few years ago, which argued that “The World is Flat”. He used that image to convey the declining relevance of geography and international borders, thanks to the Internet and the increasing reach of global corporations.



In response to this view, our University of Toronto colleague Richard Florida argued in a widely cited essay in *The Atlantic* that the global economy is not 'flat' but 'spiky'. Florida persuasively described an emerging geography in which the importance of major urban regions is growing, not waning.

While there is undoubtedly at least a kernel of truth to each view, contemporary research largely supports Florida's view. Urban regions are increasingly identified – by both academics and policymakers – as vital contributors to local and national prosperity.

As my colleagues this afternoon have eloquently argued, cities can be wellsprings of creativity and innovation, drivers of economic growth and resiliency. Widespread experience has confirmed this observation, as residents of dynamic urban regions around the world – including the three represented here – would be quick to acknowledge.

Yet these cities' success is not accidental – though it may sometimes seem unplanned. One of my aims this afternoon is to help make sense of those forces and offer a few suggestions as to how we might harness them.

Successful urban regions are privileged sites for innovation

In this context, it is important to notice that successful urban regions are privileged sites for innovation, entrepreneurship, and the generation of new ideas and opportunities. The reasons underlying this connection are many and varied, originating from both the *supply-side* environment cities offer and the *demand* they generate. This relationship is at the very heart of successful urban regions.

Indeed, research into the geography of innovation has consistently confirmed that successful cities – Richard Florida's "spikes" in the world economy – exhibit the following two key qualities:

On the one hand, they are places that attract and retain a critical mass of top *talent*. These are also typically places where people can get together and share knowledge easily. This quality is sometimes captured in a serious technical term: '*buzz*'

And on the other hand, the talent is *connected*, both internally among various local clusters, and externally to other places and people around the world doing the same or similar things, but with different approaches, perspectives or ideas.

Let me offer a few brief reflections on each of these two themes – before going on to address some of their implications.

First, Talent and Buzz.

Urban regions offer a geographically concentrated, deep pool of resources that support entrepreneurship and the development of new products, including—first and foremost— human capital and a wide array of specialized services.

Furthermore, because innovation frequently arises from the close, sustained interaction between technology users and technology producers, cities foster innovation particularly well. They bring together producers and consumers in a close and creative dialogue.

Talent, whether supplying goods and services or demanding them, is the central driver behind urban success.

And second, connection.

At the same time, the talent in successful urban regions is highly clustered and interconnected. As the eminent urbanist Jane Jacobs liked to point out, cities excel at circulating knowledge among firms, including firms in the same or related 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.

Likewise, cities provide opportunities for national and international knowledge spillovers. Cities are gateways to global networks – knowledge networks, business networks, political and cultural networks. Insights into international challenges (or solutions to challenges) shared through these networks naturally stimulate new ideas, products, or services at home.

Consider this graphic. It is a map of collaborations between the University of Toronto and institutions or firms in municipalities around the world. Each line represents *at least 200 publications* that resulted from those collaborations between 2010 and 2015. (If I had relaxed the threshold below 200, it would have obscured much of the underlying map.)



Next is the same map for the Hong Kong region – collaborations between the region of Hong Kong and institutions or firms in municipalities around the world representing with each line at least 200 publications.



And here is the same map for the Randstad region.



In each of these remarkable visualizations, the way in which a major urban region serves as a gateway is immediately evident.

But the combination of the three maps is even more interesting, I think.



Here you can clearly see the role major urban regions play in *global knowledge networks*. Connections, in this sense, are a city's arteries, – indeed, they are the *globe's* arteries – carrying ideas and opportunities, and fueling creativity and innovation.

These observations about the forces underlying successful urban regions also suggest ideas that may be useful in helping build successful urban regions and innovative city clusters. There are dozens of examples to learn from – not least, I would argue, the three urban regions represented here.

Nevertheless, let me propose five policy considerations for successful urban regions, priorities, I will suggest that every successful city has in common. As you will see, these priorities build on the twin themes of *talent* and *connection* I described earlier.

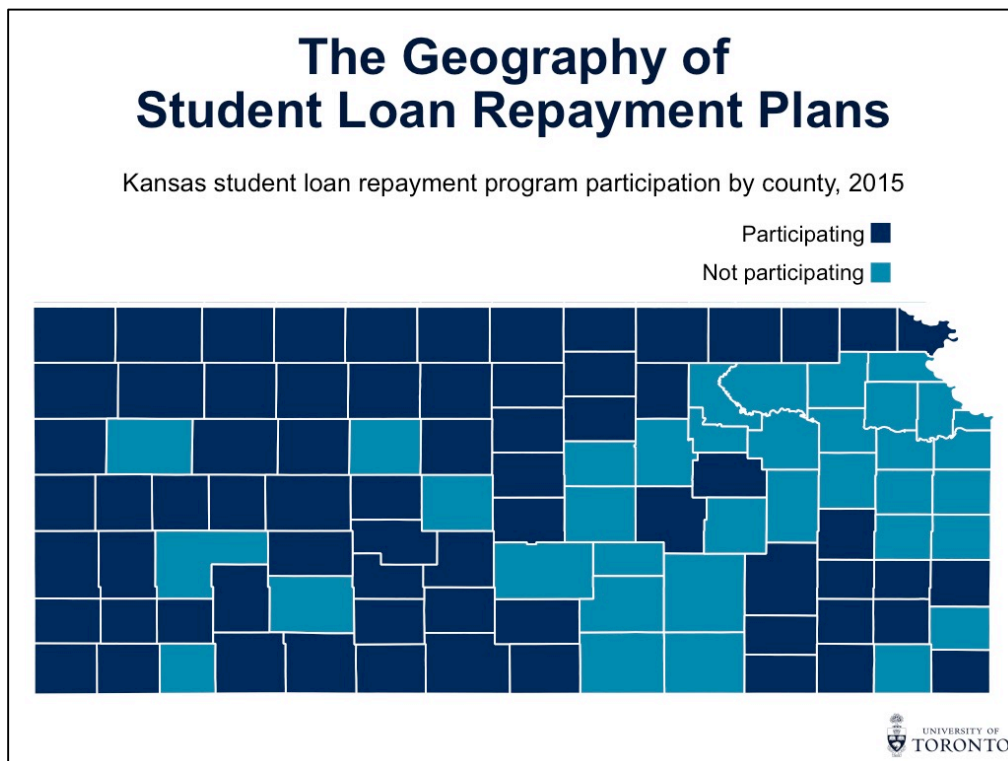
Five policy considerations

Producing, attracting and retaining highly qualified talent should be a top priority for public policy aimed at enhancing the innovative capacity of city-regions. Urban transformations are inevitably the product of many factors. Geography and physical capital are important, but human resources—creative, educated, and innovative people— are fundamental. As former New York mayor, Michael Bloomberg,

succinctly stated, ‘I have long believed that talent attracts capital far more effectively and consistently than capital attracts talent.’

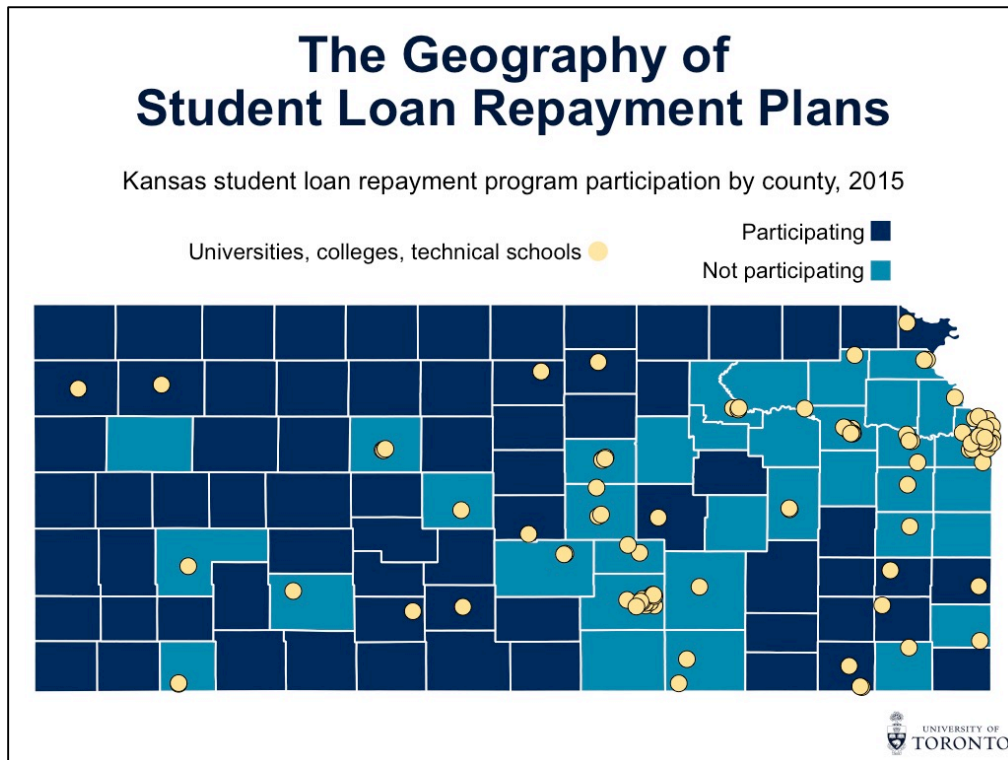
Highly educated, creative human capital is the pre-eminent factor of production, shaping the competitive advantage of firms in one sector after another. Moreover, because this kind of talent is increasingly sought after, cities that aspire to being economically dynamic need to enhance their ability to generate talent in sufficient numbers, or attract it from other locations—nationally and globally—and keep it firmly rooted once it arrives.

There are different strategies for accomplishing this, of course. For example, several US cities and state governments have created financial incentives to help attract the highly educated, creative human capital that is so important to successful regions. These incentives include offering qualified applicants funding for housing down-payments or buying back student loan debt in return for moving to specific cities and counties. Examples include Niagara Falls, USA, and downtown Detroit.



One of the most ambitious programs is in Kansas where the state has established “Opportunity Zones” and provided over \$1.2M in loan repayments in 2015 alone. This map shows the Kansas counties participating in the loan repayment program in dark blue.

There are good reasons to be skeptical of such programs and they have certainly met with mixed success. However, two points are worth noting in this regard. First, the *goal* is not in question. It is becoming clear to all that talent drives opportunity and prosperity. And second, it is revealing to see which counties are *not* participating in the repayment program.



In the above map, I have added the locations of Kansas’ main universities and colleges – including private and state colleges, municipal universities, post-secondary technical schools, and community colleges – to the map. Notice that only a tiny handful of them are located in a participating county, 14 out of 116, to be precise.

This highlights one of the central points of my remarks this afternoon: the world’s leading innovation clusters depend centrally on partnerships between local employers and local educational and research institutes.

Such institutions excel at producing, attracting, and retaining talent. Indeed, it is their most important contribution to the success of their host regions.

The relationship between urban regions and educational and research institutes is symbiotic: cities foster the development of world-class research institutions and universities while, at the same time, universities and research institutions foster world-class cities. Leveraging this relationship creates a mutual advantage, leading to prosperity for both partners.

Institutions of advanced research and higher education are in the talent business, and they make their greatest contribution to local prosperity by producing a well-educated, creative, and entrepreneurial labour force.

Of course, such institutions also impart other advantages to their host regions. Some of these advantages are obvious: research, discovery, and innovation translate into local opportunities; and entrepreneurship directly benefits a region as these institutions spin off start-up enterprises.

But some of the advantages are less obvious: these institutions generate employment, revenue, and other forms of local economic stimulus; they anchor neighbourhoods—and, indeed, entire metropolitan economies—and also exert a stabilizing influence on property values.

In a paper presented at the 2016 Royal Economic Society Conference, Anna Valero and John Van Reenen from the London School of Economics quantified some of the economic effect universities have on their host cities. They found that doubling the number of universities in a region increases the region's future GDP by a staggering 4% – even when controlling for population growth.

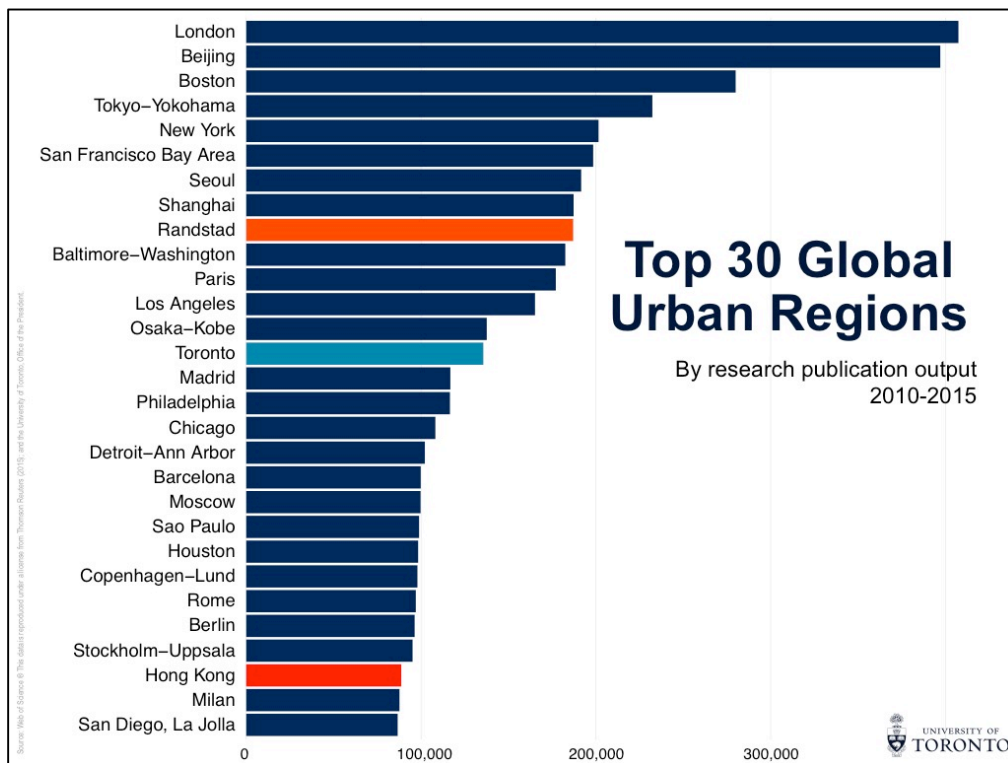
For all these reasons and more, it makes sense for local and regional governments, as well as civic leadership organizations, to forge formal partnerships with their leading institutions of research and higher education.

Similarly, this intensely local relationship is complemented by critically important global connections. Institutions of education and research are all-important gateways connecting their host city-regions internationally.

Urban regions that host leading institutions of education and research are therefore highly connected nodes within global knowledge networks. This is vital, since the prosperity of city-regions depends on their ability to access and to use not just locally produced knowledge, but also knowledge produced in other leading centres of research and innovation around the world.

Earlier, I showed a map illustrating research collaborations coming from Toronto, Utrecht, and Hong Kong. The flow of knowledge, ideas, and innovations through these global arteries is a tremendous source of opportunity and innovation for participating urban regions.

As a result, well-connected, globally networked centres of knowledge production are increasingly coming to the fore as the world's leading economic centres. This next figure shows the most research-intensive urban regions in the world by publication count, from 2010 to 2015.



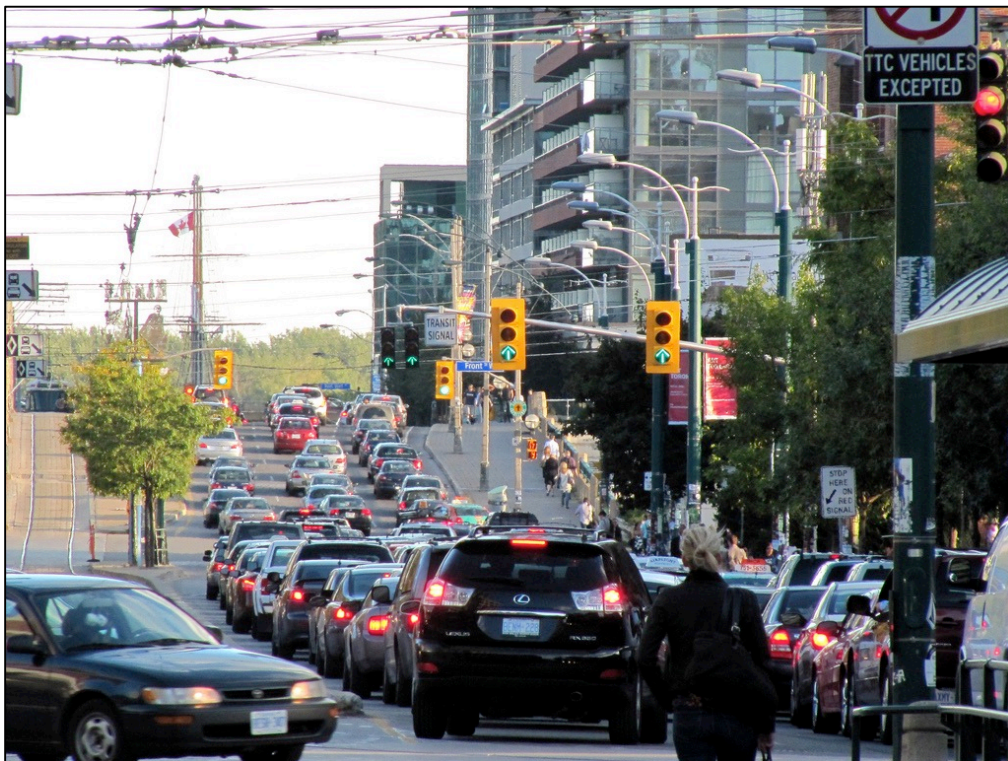
Venture capital and other forms of mobile investment now seek out these special places and the opportunities that are signaled by their world-leading research, collaborations, and talent. Strikingly, the world's top research-producing regions are also the world's most dynamic metropolitan economies.

When thinking about talent and the partnerships among institutions of advanced research and higher education on the one hand and city clusters on the other, it is important to appreciate the value of urban infrastructure, broadly conceived.

There is growing evidence that the most talented, creative, and entrepreneurial members of the labour force—those who generate opportunity and prosperity—prefer to live in urban settings that offer a high quality of place: cities that are culturally dynamic, physically appealing, with vibrant and safe neighbourhoods, good schools and hospitals, places that are open to newcomers and new ideas.

Hence, the quality of a region’s built form and transportation systems, its cultural and artistic scenes and amenities, its public facilities and parks ... these are in fact the rarely identified pillars of economic prosperity and innovative dynamism.

We get many things right in Toronto, but we are still struggling with our transportation infrastructure. Decades of delay and delinquency have resulted in one of North America’s worst commutes. A recent study puts the cost of all this congestion at \$11 billion a year, in Toronto alone. For context, that’s more than the city of Toronto’s annual operating budget.



Enterprises of every description, including institutions of research and education, depend directly on the quality of life in the city around them to attract and retain the talent that is essential for their success. That talent is increasingly mobile—the most sought-after people can choose where they want to live.

Quality of place is a crucially important determinant of the long-term success of urban regions and their institutions.

Urban economic development strategy must acknowledge that those activities with the greatest innovative capacity are not evenly spread across the national landscape, but are highly concentrated in a relatively small number of city-regions.

Public sector investments designed to stimulate innovation ought to be similarly concentrated. The goal should be to enhance and support those local firms, sectors, and institutions that demonstrate unique capabilities and competencies. In a world of highly globalized production systems and supply chains, the only reliable source of sustained prosperity is to nurture and build on those unique activities whose competitive advantage is difficult to replicate by other institutions or in other regions.

Consequently, many national and sub-national governments have clustered their public investments in research and innovation, building upon the strengths of institutions in select regions and amplifying their competitive advantages. Notably, they are concentrating capital funding for research infrastructure, differentially investing in fundamental research, targeting investments in sector-specific entrepreneurial ecosystems, and similar initiatives.

The special advisor on economic strategy for Ontario, the province in which Toronto is situated, argues that the province's future will come to depend increasingly on advanced services that have the potential to be "exported".

He singles out two key sectors: higher education and health care, noting that both have great potential to generate income and opportunity locally and attract income to the region from outside Canada. And his prescription for a brighter future includes doubling down on winning sectors such as these.

Mentioning higher education and health care in Toronto brings me to my final policy consideration.

Suppose we got all of this right. Suppose policy makers prioritized producing, attracting, and retaining talent and that partnering with institutions of advanced research and higher education was a core element of this strategy.

Suppose that municipal leaders promoted connections locally and internationally among institutions and individuals, facilitating 'knowledge spillovers' and participation in global knowledge networks.

Suppose also that municipalities invested in urban infrastructure, in the transportation systems, healthcare and education systems at all levels, cultural and quality of life resources. And that policy makers built on a region's existing strengths, clustering investments strategically rather than distributing them thinly.

Even then, there would be one more consideration policymakers need: *a commitment to sustained investment and patience regarding progress.*

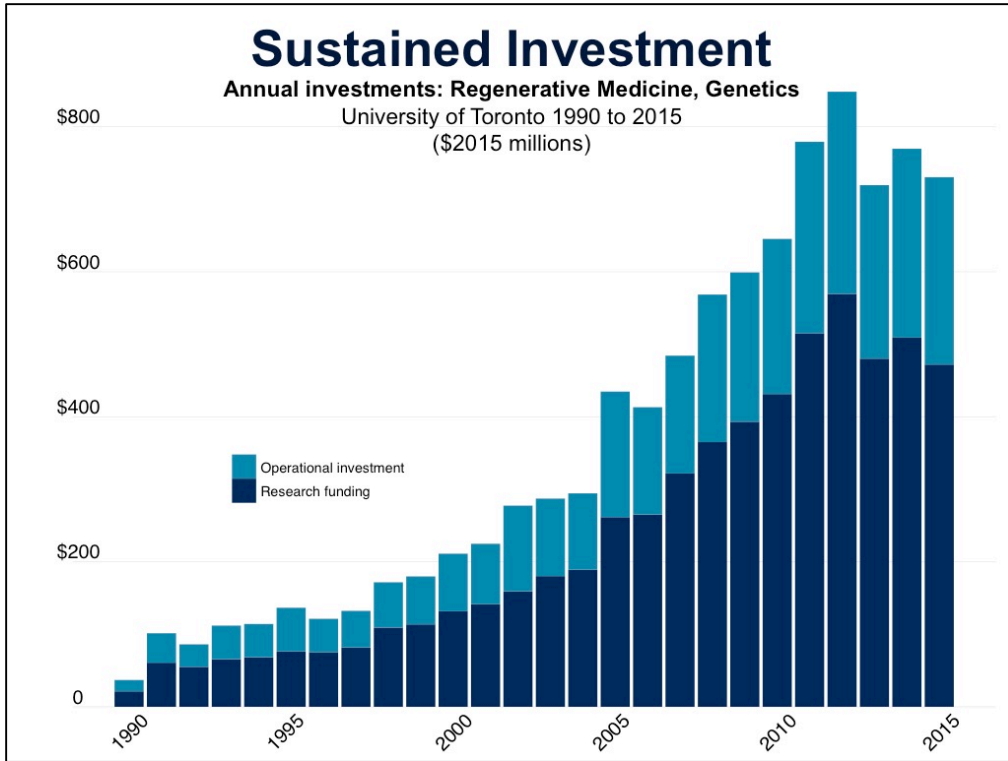
Innovation does not happen overnight. This last point is often the highest hurdle in modern democracies whose leaders must regularly face capricious electorates with high expectations and impatient timelines. This is one explanation for the growing trend towards funding for applied research and entrepreneurial incubators and accelerators. These are not bad investments in their own right – they are good investments. But they can also be counterproductive when they crowd out other investments and focus expectations on near-term results.

Let me give you two examples from the region and the university I know best.

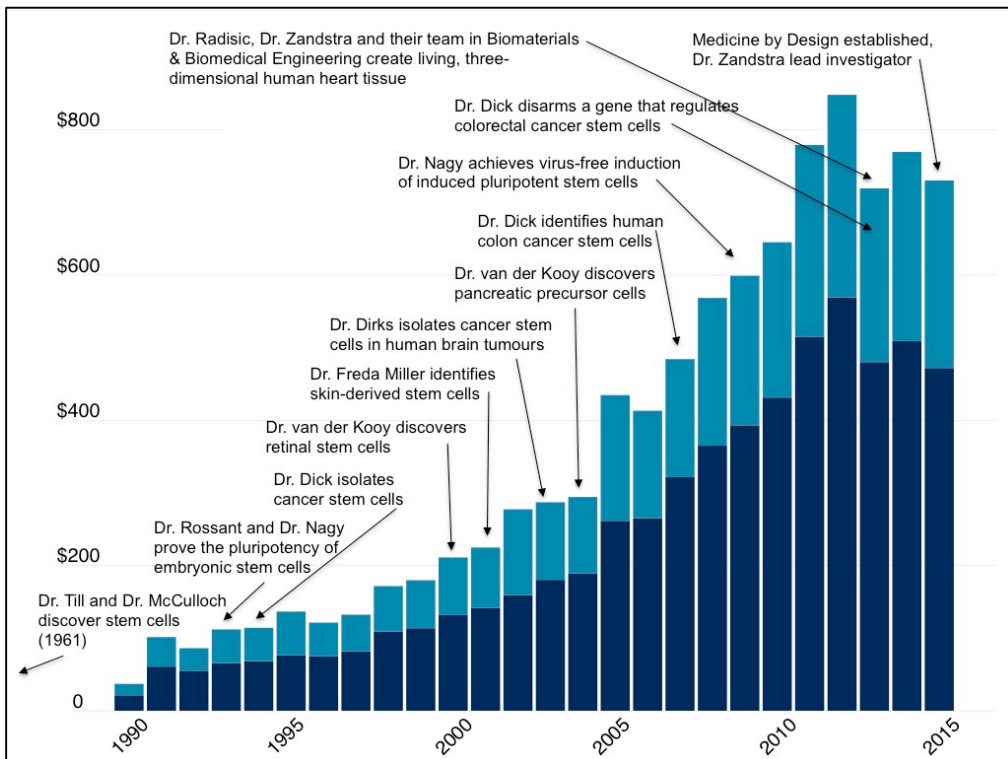
It may surprise many here to learn that stem cells were discovered at the University of Toronto on a Sunday afternoon back in 1961.

But it is only recently, more than half a century after that transformative discovery, that we find ourselves on the verge of a revolution in regenerative medicine. We haven't neglected regenerative medicine for decades. On the contrary.

Here is a chart showing some of what happened over the past 25 years. It shows annual investment in stem cell and genetic research at the University of Toronto. I've included research grants, salaries, benefits, operating expenses, and capital investments. This represents hundreds of researchers and hundreds of millions of dollars *every year*.



And in the next figure I've highlighted a few example milestones and discoveries along the way.

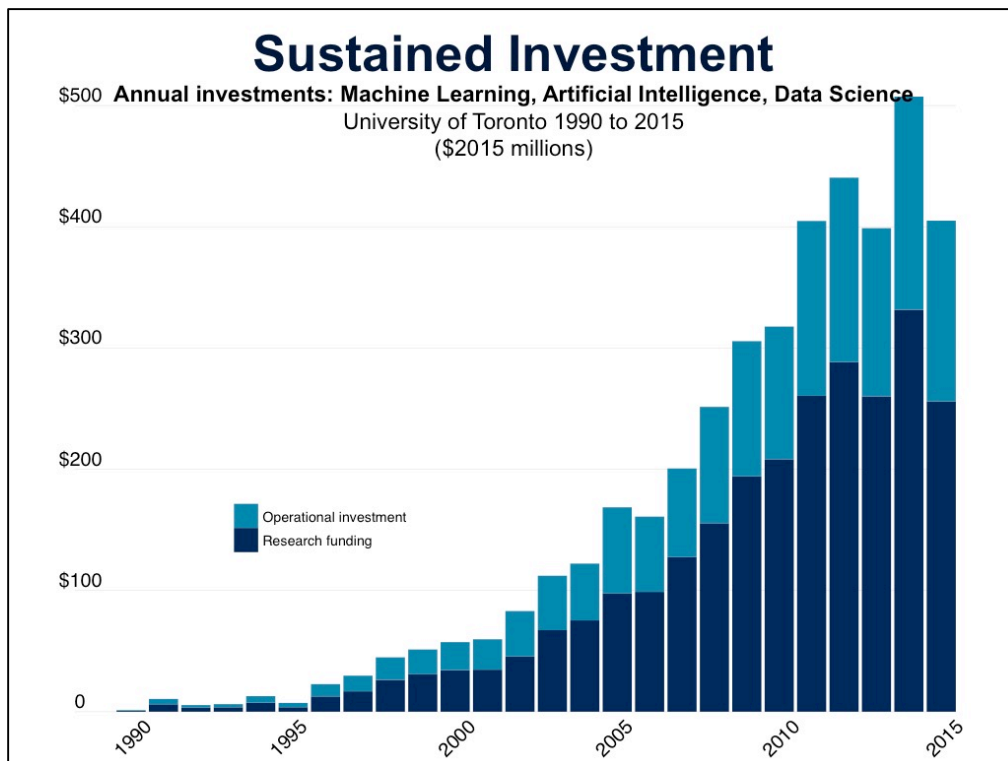


This is just at the University of Toronto. A similar story could be told in leading research clusters around the world and throughout the global knowledge network.

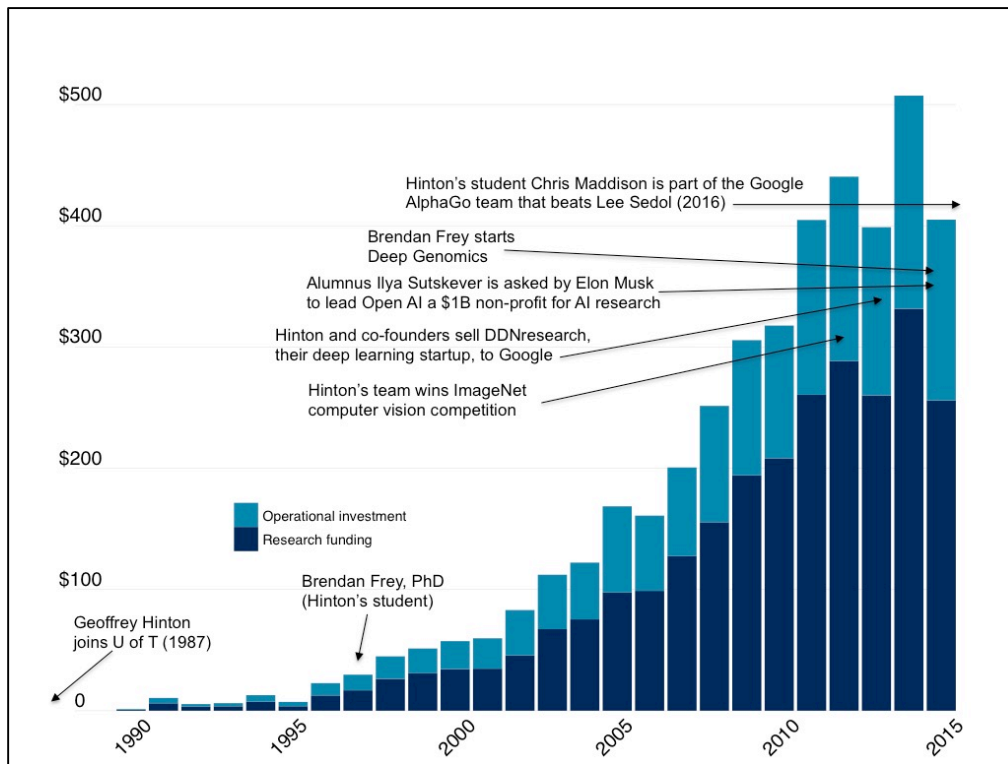
Or consider this second example: University of Toronto Distinguished Emeritus Professor and Google Distinguished Researcher Geoffrey Hinton, sometimes playfully called the “Godfather of deep learning”, first started to take neural networks out of theory and into computers in the early 1980s.

But only recently, the techniques Hinton has pioneered and continues to develop enable computers to translate languages in real-time, drive cars, and defeat the world’s best Go player Lee Sedol.

Here is the same investment graph and timeline for machine learning and artificial intelligence research at the University of Toronto. These are younger disciplines and so the figures are correspondingly smaller than in regenerative medicine. But the numbers are still staggering. Remember, these are *annual investments*.



And again, a few milestones. Notice that it takes a sustained commitment to build success.



Transportation infrastructure, cultural resources, industrial and business clusters... they all follow a similar pattern. Innovative, creative, successful urban regions are invariably the product of sustained, wise investment over many years.

Deep Genomics

Let me conclude these remarks with a final story that brings together many of the themes I have addressed this afternoon.

One of the most striking and exciting properties of the world's leading urban regions, the spikes in the global economy I mentioned at the outset, is their propensity to foster serendipitous collisions across clusters – thereby creating disruptive new ideas, fields, and industries.

This is true in Hong Kong and the Utrecht region, as it is in London, San Francisco, Beijing, and on. But again, I will draw on an example from Toronto.

Deep Genomics is a new company at the forefront of the emerging field of computational medicine. It's a brilliant example of serendipitous collision across clusters – a product of U of T's massive strength in both health sciences and computing, a phenomenon that can happen only in a “spike” such as Toronto.

The company's President and CEO, Brendan Frey, is a Professor in the Edward S. Rogers Sr. Department of Electrical and Computer Engineering. His Deep Genomics team members are world-leading experts in machine learning and genome biology.

They're inventing a new generation of computational technologies that can tell us what will happen within a cell when DNA is altered by genetic variation, whether natural or therapeutic.

Their work began a decade ago, in their efforts to create a computer system that mimics how cells read DNA and generate life. In a way no one could have predicted, it's now leading to the transformation of precision or personalized medicine, genetic testing, diagnostics, and pharmaceutical R&D.



In December I had the pleasure of speaking at a reception celebrating the launch of the company. It was an amazing gathering – Professor Frey and his team; fellow U of T luminaries Stephen Scherer (a world leader in Genomic Medicine and Autism

research) and Geoff Hinton (whom I mentioned before); and some prominent and very keen venture capitalists from Silicon Valley.

I want you to note two things from this story.

First, it demonstrates the amazing things that can happen when sustained and wise investment over many years brings together extraordinary talent and fosters connections among different fields, industries, and leading global regions.

Second, there are very few places in the world where such a gathering could happen – some of the world’s top scientists, innovators, and investors, gathering at the centre of a new field of research and at the dawn of a new era in modern medicine.

This is the allure of the world’s leading, innovative and creative urban regions.

I hope my remarks this afternoon have helped offer some insight into the forces behind these regions and how we might harness them to our mutual advantage.

Thank you for your kind attention.