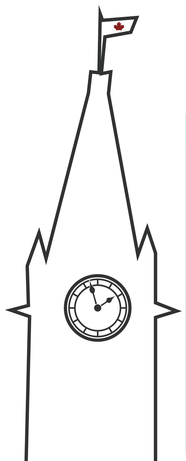
CANADA'S **REAL** INNOVATION GAP

Innovation has been a popular idea in the 21st century. The processes of innovation drive forward many aspects of life, society, and the impact we have on many elements in the world around us. In Canada, innovation is tied to our national capacity to build successful enterprises that can do business competitively both at home and abroad. From mining to agriculture, manufacturing to energy, Canadian enterprises are recognized for having invested both time, talent and money into generating new ways of doing business, better.

Despite these successes, we still tend to measure ourselves against the enviable success of the Americans and the innumerable hubs dotting that nation and that are spawning legions of disruptive technology firms. When we compare, we are prone to fall into a national anxiety, a paralyzing fear that we have or are already rapidly falling behind. Understandably, agricultural advances are less sexy than technology - but they are just as innovative and disruptive! As Canadians, though, we tend to forget this and instead focus on what is just out of reach as opposed to what is within our grasp.

Join us on our divergent journey as we converge around the core concepts that shape, and are shaped, by the diverse forces - economic, social, political - at play within Canada's economy, history and culture; and explore what this means for Canada's Innovation system today… and tomorrow!



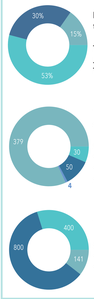
What is innovation?

Innovation combines an idea with requisite talent and capital supports to solve a problem and generate new value.

What is happening in Canada?

Appetite for innovation vs. money spent

Canadian companies have a strong appetite for innovation, yet the percentage of revenue spent is lower than the rest of the world



In a 2015 Edelman Trust survey*, respondents stated that they believe that the pace of change in Canada is...

Too fast (53%)
Just right (30%)
Too slow (15%)

The 2016 Federal budget focuses it's innovation spending on...

$379 million to space exploration (over 8 years)
$50 million to National Optics Institute (over 5 years)
$30 Million to Agri-Food and Agri-Tech
$4 million to Canadian Technology Accelerator Initiative

The budget also allocates additional funding to...

$141 million to innovation granting councils
$800 Million to support innovation networks and clusters
$400 Million to support Canadian Venture Capital

*33,000 people were surveyed from 27 countries around the world

SYSTEMIC ELEMENTS AT PLAY

"Our research suggests two systemic elements may help or hinder innovation within the Canadian economy:

Structural - such as government trade regimes, tax, incentives, and granting programs; patents & IP provisions; industry-specific regulatory policies; regional consumer markets; and, state of physical infrastructure

Cultural - such as the presence of the entrepreneurial mindset, the risk tolerance or risk aversion, or the hardened garrison mentality, and the paradox of the water buffalo vs. the gazelle, which describes the challenge that businesses face when attempting to scale

"Canada's technological myopia, a subsuming element of 'technological solutionism', goes beyond theory and impacts the allocation of talent and capital within the Canadian economy, incentivizing one sector while neglecting the multidimensionality and breadth of the Canadian innovation ecosystem. It's tragic!"

PERCEPTION GAP

The perception that Canada is failing to innovate is not inaccurate, it's just not the complete story. While Canada tends to receive mixed ratings on how well it "innovates", the reality of is more nuanced than what most articles might reveal. For example, there is a strong perception that Canada lags other nations and fails in comparisons to the US; but this is the result of a fixation on technology-centric innovation (e.g. software and hardware). Meanwhile, the reality is that Canada's strategic advantage in innovation resides in other, less sexy, sectors and industries (like advanced manufacturing or agriculture). The disparity between this perception & the reality results in incongruent approaches on how to address the structural/cultural barriers to innovation. Ultimately, these elements underpin a frayed concept of the 'idea / knowledge economy' and what this means to Canada's economy and long-term growth. To remedy this, we need to change the conversation.

KEY STAKEHOLDERS

There are many stakeholders within the innovation space in Canada- businesses, individuals, agencies, and a multiple levels of government to name a few. For the purpose of this research project, our team selected the Federal Government as our primary stakeholder. This decision was made with consideration to their dominant role within the system and for their unique ability to influence aspects of the structural and cultural factors that help or hinder innovation in Canada.

- Government of Canada
- Big Business
- Citizens
- Large Enterprise
- First Time Entrepreneurs
- Serial Entrepreneurs
- Venture Capitalists
- Investors
- Innovation Hubs/RICs

Please see report for full list of references

THREE RECOMMENDATIONS

FOSTER THE IDEA ECONOMY

The world is changing, and Canada needs to understand how the tenets of the idea and knowledge economy will best flourish across the primary sectors that drive the broader Canadian economy. Building regional collectives to advance innovation is only one step, whereas our findings suggest the need to take a collective leap and author a White Paper that will activate a national approach on the new, ideas-based economy. In doing so, the Government of Canada will engage a collective of stakeholders, thought leaders and businesses both large and small to lead a national dialogue on how innovation ought to play out across Canada's diverse communities, companies and campuses.

How did we get here?

Two key systems traps are limiting the success of Canadian tech innovation.

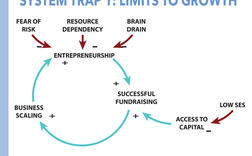
Limits to Growth

First, pressures on the system at many scales and from many directions are preventing the system from scaling up. This Limits to Growth archetype is powerfully constraining, as these myriad factors impact the system on a variety of levels. Two come from Canadian history: our dependency on natural resources, and a culturally unique aversion to risk. Third, entrepreneurs are sometimes prevented from scaling their ideas because of a lack of access to the necessary networks – an absence of privilege. Finally, these barriers compound, making Canada an unfavorable environment for entrepreneurs and investors in the tech sector causing brain drain of entrepreneurs and investors.

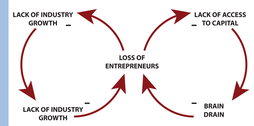
Escalation

Brain drain of entrepreneurs and investors further leads to a second systems trap: escalation. The more unfavorable the Canadian system is and the more attractive other systems are, the more entrepreneurs brain drain out of Canada. These patterns become double-reinforcing loops and cause escalation.

SYSTEM TRAP 1: LIMITS TO GROWTH



SYSTEM TRAP 2: ESCALATION



SYSTEMIC INTERVENTIONS: CENTRALITY ANALYSIS

Centrality analysis is a statistical method of network analysis used to identify important attributes of a given graph or system. We used several measures of centrality to identify key leverage points in the system. These leverage points represent different ways of quickly and powerfully addressing the systemic challenges Canada faces in enabling an innovation-based economy. Here we show two such explorations, but more can be found online at **http://systemicdesign.kumu.io/centrality-analytics**

High Torque Elements

We can identify elements with high "torque" in the system by assessing each element's reach efficiency weighted by its indegree. Elements with high torque are relatively easy to affect change through, and have a high amount of influence when doing so.

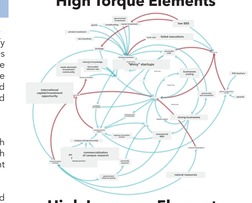
Some elements with high torque include "shiny" startups (unicorns that tend to be over-valued), the commercialization of campus research, a weak domestic investor community, and failed executions. Each of these factors are less entrenched in the system than others, and yet hold a large sway over the system's activities. Policy interventions targeting these elements might be easily implemented and accelerate the system rapidly.

High Leverage Elements

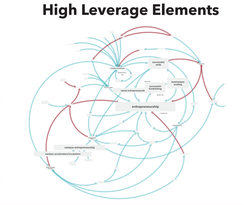
If we measure an element's size but weight it by the element's torque, we get a picture of the elements in the system that have the greatest phenomenological "leverage"; these are the levers that shift everything else in the system the greatest amount. These elements are not necessarily easy to shift, however.

Entrepreneurship itself is obviously a high-leverage element, but others include encouraging serial entrepreneurs and entrepreneurial programming on campus. This is validating, as many of the country's current interventions in the system emphasize entrepreneurial education.

High Torque Elements



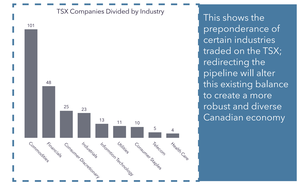
High Leverage Elements



Want to see more? Our full system map and further examples of centrality analysis are available online at http://systemicdesign.kumu.io/centrality-analytics

CHANGE THE NARRATIVE

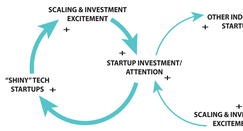
Innovation is happening, but it is taking place in sectors and industries different than the ones we tend to pay attention to. Increasing awareness about the need for, and impact of, innovation within advanced manufacturing, natural resources and agriculture will help cross pollinate the economy with more robust, productive approaches and solutions. This will also help to shift the culture of entrepreneurship by empowering a generation of Canadians to create sustainable value and ensure they and their communities prosper.



This shows the preponderance of certain industries traded on the TSX, redirecting the pipeline will alter this existing balance to create a more robust and diverse Canadian economy

"There are examples of innovation in other industries. You do get things like drone mining exploration and automated driving – new ideas that get people out of the danger zone. But to be honest, those companies are generally just not that successful. Tech is sexier."

SYSTEM TRAP 3: SUCCESS TO THE SUCCESSFUL + DELAYED BALANCE



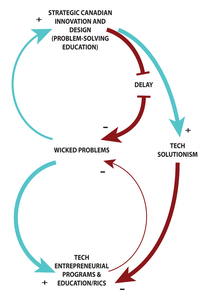
How did we get here?

Two systems traps combine to cause the real innovation gap in Canada. 21st-century focus on technology startups leads to increasing excitement in technology innovation. This leads to further investment, creating a reinforcing loop. Simultaneously, other industries compete for this attention and receive less. At the same time, innovation in non-tech industries typically costs more and takes longer to scale, reducing further the attention they receive. The behaviour that emerges from this trap is an overemphasis on tech startups and a disregard for entrepreneurship in other industries.

REDIRECT THE PIPELINE

The ultimate step is to increase the carrying capacity of the system to generate value for entrepreneurs from outside the technology sector. Drawing sectors and industries together with the innovation ecosystem will build deeper and more diverse connections. Diverting the flow of resources – talent and capital – and binding it with existing infrastructure and institutional support will build a depth that will support a more robust Canadian economy. Furthermore, investing in improving the structures that nurture prosperity – incubators, accelerators, entrepreneurship, and innovation programs – and bringing them together with campuses and companies already making an impact, will propel Canada forward.

SYSTEM TRAP 4: SHIFTING THE BURDEN



How did we get here?

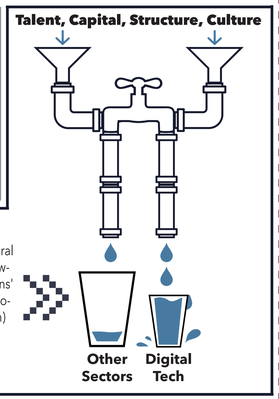
The 21st century focus on tech solutionism creates a systems trap that reduces the education and resources we provide to foster ideas and innovation in non-tech industries. Entrepreneurial education, incubators, and other programs currently focus predominantly on developing tech ideas. These tech solutions contribute modestly and quickly to problem solving. Meanwhile, deeper problem solving and innovation education that builds on strategic Canadian capabilities is underemphasized, and solutions that come from these efforts take longer to come to fruition. This ultimately means that the burden of solving wicked problems is shifted to tech solutions.

Harness the Power of RICs in Canada

Case Study: Futurpreneur Canada's Impact
Data updated as of December 31, 2015

- Supported 8,664 young business owners
- 342 Community and referral partners
- Helped launch 7,220 Canadian businesses
- More than 2,800 skilled volunteer mentors
- More than 34,600 jobs created
- 57,000 people have used our interactive Business Plan Writer
- More than $216 million in estimated tax revenue
- Nearly 40% of our entrepreneurs are women

Research and Innovation centers fuel the entrepreneurial passion of Canada's young enterprise by providing financing, mentoring and support tools to aspiring business owners. RIC's have the ability to influence the direction of innovation in Canada by changing the narrative.



The current innovation system's structural and cultural supports are focused on flowing the majority of the nations' talent and capital supports towards the one industry (tech) at the cost of others

UNDERSTANDING THE SYSTEMIC BARRIERS

INDIVIDUAL INNOVATION

The entrepreneurial journey is one fraught with varying amounts of challenge and opportunity. While this project focused on evaluating the systemic challenges, such as the structural and the functional, that prevent the realization of innovation across the Canadian economy; the team recognized that for successful entrepreneurship to take root, certain elements had a direct and measurable impact on an individual capacity to successfully innovate. These go deeper than the basic elements outlined above, such as the need for talent and capital. In detail, the research team understood that to embark on an entrepreneurial journey, an individual ought to have a degree of access to a combination of the following factors. These include, Ideas, Education, Socio-Economic Status, Risk Tolerance, Knowledge, Network access, and Awareness. In addition, Luck and Opportunity play a direct role to facilitate the entrepreneurial journey. To the right, one may explore this journey in greater detail and explore how these elements, or variables, can come together in a formula to facilitate or hinder the entrepreneurial journey.

Where do you fit in?

$$SE = \left[\left[I\left(\frac{SES + E}{RT + K}\right)(N+A)\right]O\right]L$$

Explore this journey and how these elements, or variables, can come together to facilitate or hinder the entrepreneurial journey

To understand the impact of certain variables on the likelihood of successful entrepreneurship, input numbers along a 10-point strength scale: 1 being weaker and 10 being stronger. (E.g. the weaker the attribute manifests itself in an individual, the lower the rating; the higher their manifestation, the higher the rating*.)

For Luck and Opportunity, these are measured as binary values whose presence or absence is represented in this equation on a binary scale of 1 or 2: 1 being absent (and having no impact on final values) and 2 being present (and thus doubling the likelihood).

To understand the impact of certain variables on the likelihood of successful entrepreneurship, the equation generates a score that represents a generalized likelihood of success for an individual at any given point of time in their journey**.

*Optimally, these ratings would be devised through a survey that measures each variable independently, but for the time being, self-rating along this scale can still provide insightful responses on the impact of various factors on the likelihood of success for an individual embarking upon the entrepreneurial journey. Note, these scores may change over time and is dependent upon an individual's self-reflection on their journey.

**Where one falls in the categories above at a given time is not meant to be neither predictive nor condemnatory: individual's scores (and ratings) can change dramatically over time. Rather, this equation is merely an evaluative tool to demonstrate how certain variables impact overall likelihoods. Again, a score is never fixed and depends on where someone may find themselves on their entrepreneurial journey within both time and space.

FACTORS THAT HELP OR HINDER THE ENTREPRENEURIAL JOURNEY

IDEA: A good (or bad) idea is the starting point for any entrepreneurial journey. It often begins with a problem, real or perceived, from which an individual seeks to generate value.

OPPORTUNITY: Having a set of circumstances available to an individual that allows them to do something, potentially accelerating the likelihood of success.

LUCK: The uncontrollable factors that can bring success or failure, for the entrepreneurial journey this can reverse many previous misfortunes.

NETWORK ACCESS: Whether personal or private, organic or established, networks will frequently beget access to the requisite talent and capital.

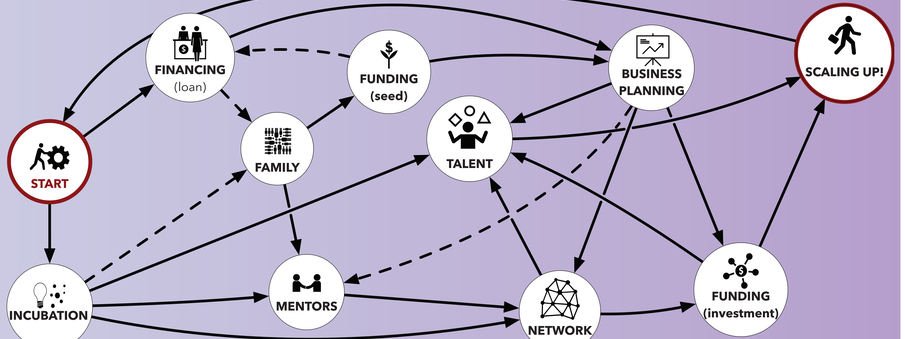
AWARENESS: An individual's awareness of programs, supports and opportunities can sometimes have a direct bearing on the likelihood of long-term / immediate success.

KNOWLEDGE: An indirect corollary of education, relates to the understanding an individuals might have concerning the viability of their idea to generate value.

RISK TOLERANCE: The capacity to take a gamble or a risk is a choice, often influenced by other factors; likely indicative of a capacity to push towards success.

EDUCATION: The level of education an individual achieves in their life will impact many likelihoods; for entrepreneurship, more education is not necessarily better, but formal training in any field often buoys success.

SOCIO-ECONOMIC STATUS: Similar to Education, privilege and its varied presence or absence within an individual's life, is likely to have a direct bearing on that person's capacity to pursue their desires, goals and success.



Alternative Route
Preferred Route

Michael Berman, David Fascinato, Robyn McCallum, Ryan Murphy