

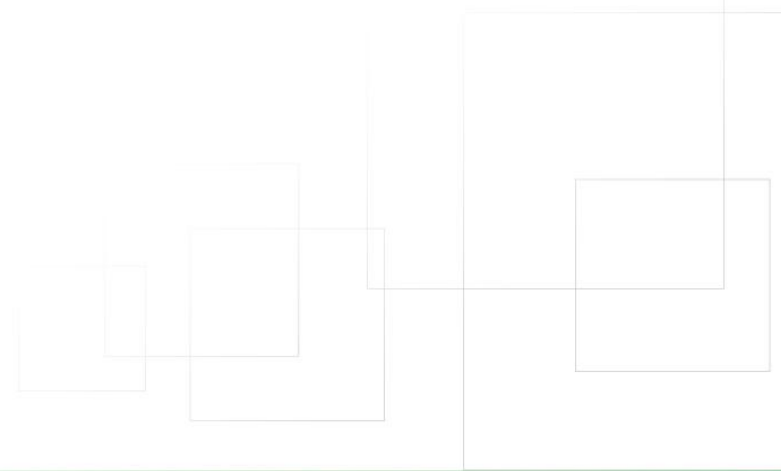


Canada's Commercialization Challenge

Canadian Science Policy Conference
Thursday, November 21, 2013 - 2:00pm to 3:30pm

- Introduction
 - Harold Schroeder
- Innovation Overview
 - Andrew Maxwell
- Innovation: The Art and Science of Entrepreneurship and Competitiveness
 - Harold Schroeder
- Case Study: Commercialization of Medical Imaging Technology
 - Aaron Fenster
- The Canadian Commercialization Challenge, with a bit of precision
 - Tom Brzustowski

- In this presentation, our focus is on the private sector – looking at the topic from 4 different perspectives
- We have adopted a definition of innovation = invention + commercialization i.e. wealth creation
- Our overall perspective is that innovation requires both a right and left brain perspective – the “art and science” i.e. both human processes and the technology



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Innovation – Triple I Approach

- **Innovation**
 - Process of transferring a new idea or process to use (commercialization)
 - Includes products/technologies, services, processes, or business models
- **Importance**
 - Creates regional wealth for both developers, stakeholders and users
 - Higher impact of regional deployment (often through new ventures)
- **Iterative**
 - Commercialization is a process, with a high rate of failure
 - Benefits of identifying opportunities for process improvement
- **Insights**
 - Can't assume that technology developers are commercialization experts
 - Success requires alignment of intent (triple helix)

Can't improve the rate of success if we don't understand the Innovation Process



Essential Elements of The Innovation Process

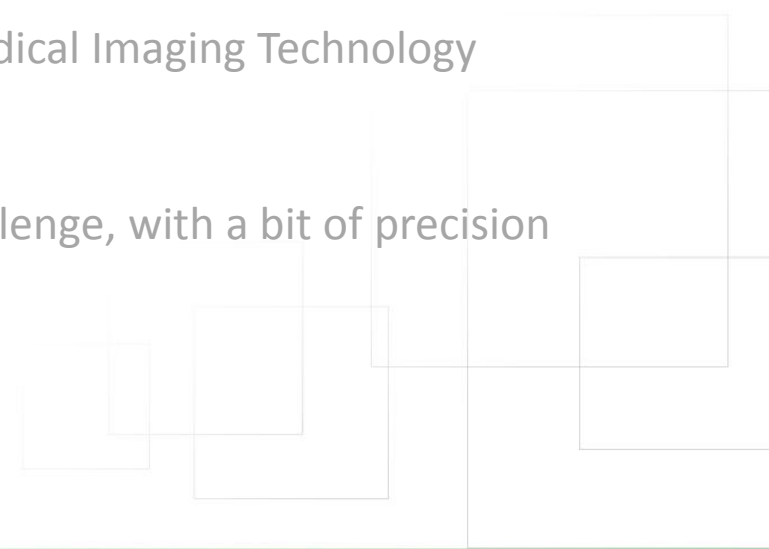
- **Quality improvement perspective**
 - Break down the process into a number of stages, analyze causes of failure at each stage
 - Install measurement systems to ensure process alignment and performance improvement
- **Customer adoption perspective**
 - Focus on barriers to adoption and understanding of user/customer decisions
 - Recognize importance of understanding behaviors
- **People and resources perspective**
 - Utilize improved process understanding to allocate resources and inform go/no go decisions
 - Recognize different traits and capabilities required for success at each process stage
- **Improving innovation success requires a social (not physical) science approach**
 - Better understand individual motivation, and opportunity recognition/exploitation
 - Better understand how individuals build relationships, form teams and accept risk

Understanding the Innovation Process helps to address Canada's Commercialization Challenge

Top Ten Recommendations to Increase Canada's likelihood of successful innovation

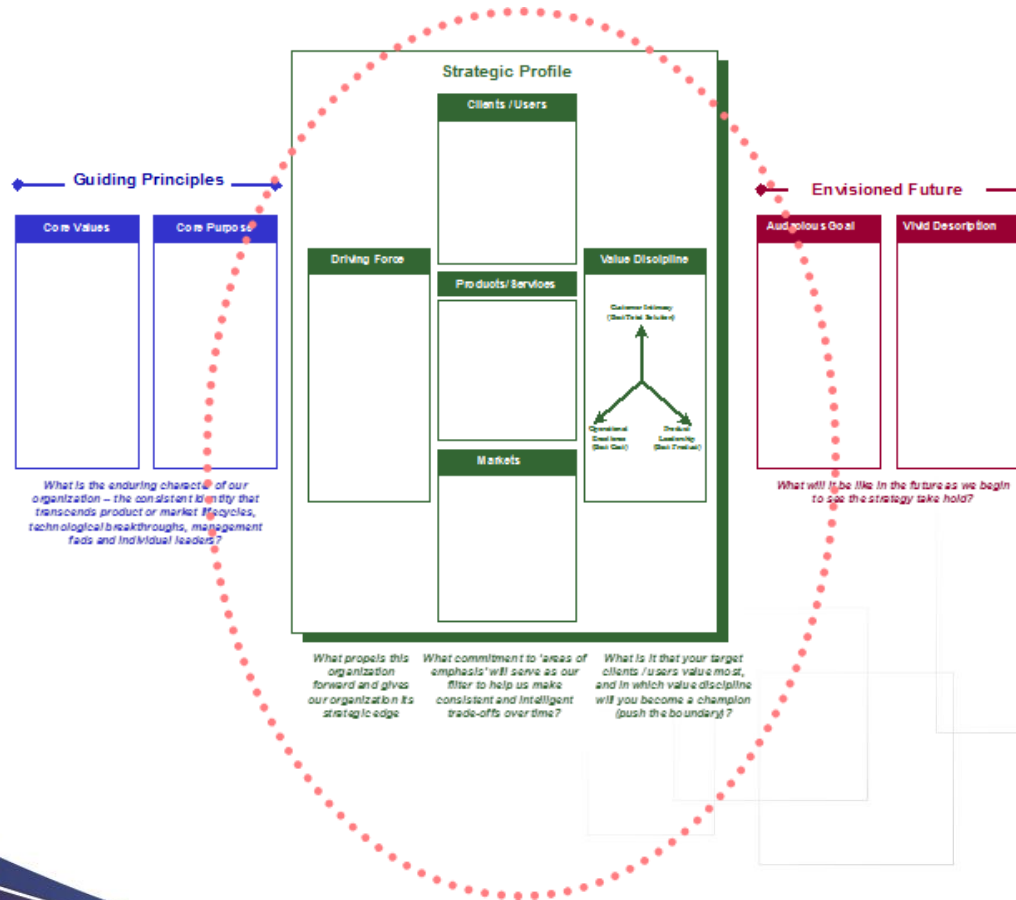
1. Clarify what successful innovation means for Canada and how it will be measured
2. Recognize the need to use a social sciences approach to increase success rates
3. Challenge assumption that innovation process starts with idea + ends with adoption
4. Embed market validation into the technology development process
5. Contest idea that inventors (and universities) suited to be commercialization drivers
6. Focus on building receptor capacity to facilitate transfer of ideas to market
7. Foster collaboration between technology inventors, business and government users
8. Align government policies and programs to reinforce commercialization process
9. Develop and enhance entrepreneurial/commercialization skills and expertise
10. Create risk mitigation programs to foster innovation adoption

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Competitive positioning

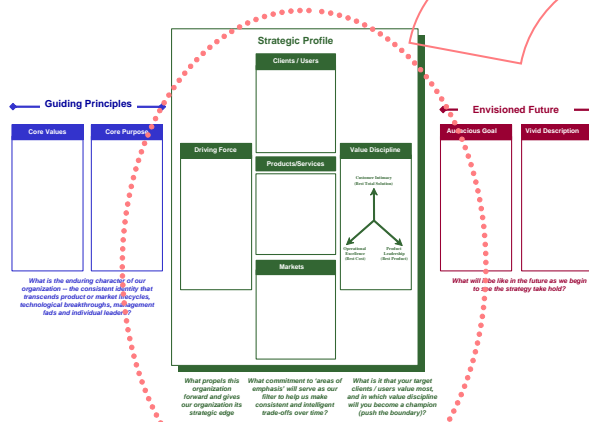
- The purpose of innovation is to become and /or remain competitive. We therefore need a way for companies to examine and assess their competitive position and roadmap for the future and to consider bold (or disruptive) innovations.



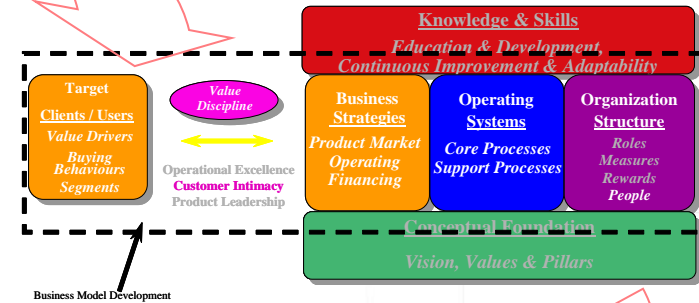
Strategic innovation focus

- Innovation investments must focus on those specific areas where the company needs to be “leading edge” competitive. This includes not just improvements in product and/or services offered, but also in the operations of a company in relation to what their target market is looking for.

Strategic Positioning & Road Map



Operational Strategy



Implementation Plan

Financial Pro-Forma Statements

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue					
100M Potentials / Project Funding	\$ 178.0	\$ 301.8	\$ 453.3	\$ 581.9	\$ 1,023.2
Operating Costs					
100M Operational Costs	\$ 1,202.8	\$ 1,497.8	\$ 1,749.8	\$ 2,002.8	\$ 2,487.7
Capital Costs					
Total Capital Costs	\$ 192.0	\$ 15.7	\$ 22.7	\$ 24.7	\$ 24.7
Financing Requirements					
Operating Funding Requirements	1002.76	1186.50	1296.50	1420.90	1464.25
Capital Funding Requirements	192.00	15.70	22.70	24.70	24.70
Total Funds Required	1204.75	1202.20	1319.20	1445.60	1488.95

- A set of questions can be used to assess an organization's innovation readiness (including innovation culture, risk assessment and management, skills, and financing)

Example:

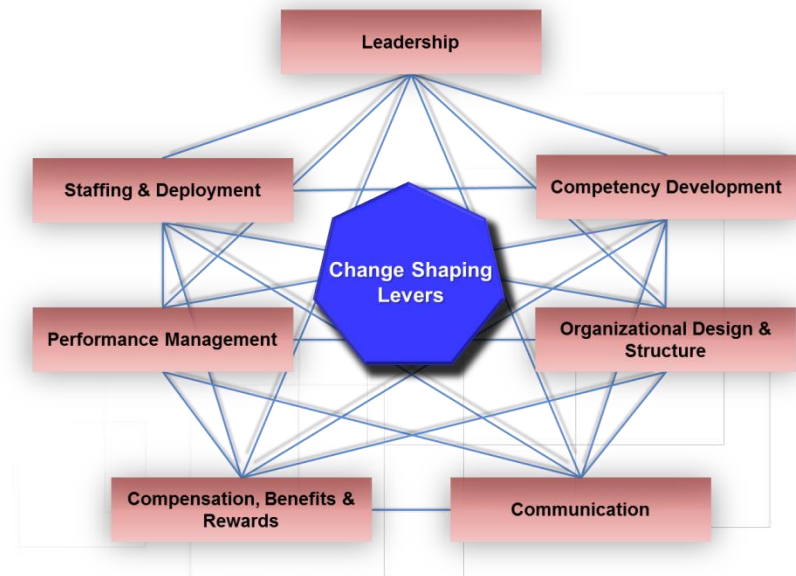
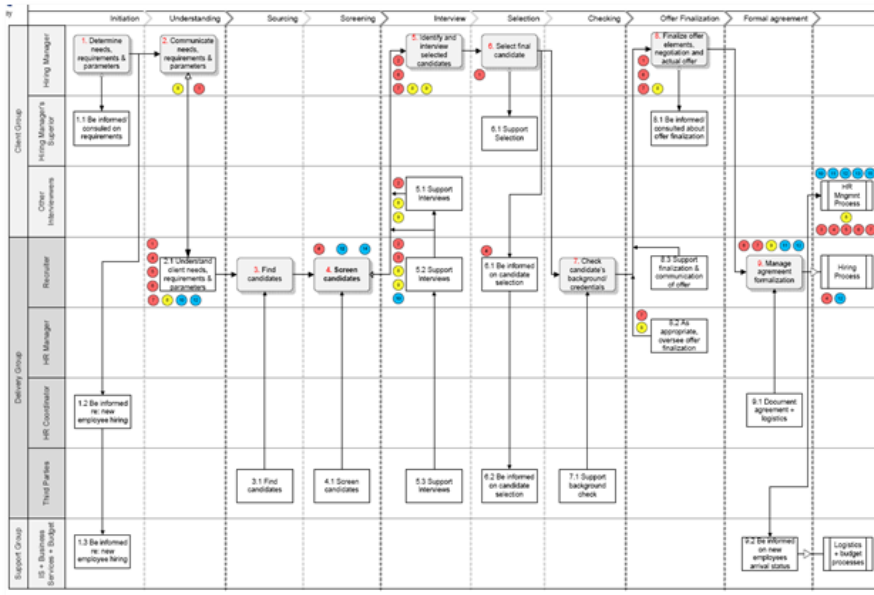
Innovative Culture

- *Does your company currently have an innovation culture and mindset?*
- *Do you understand the cost the company will bear?*
- *Is the benefit from a strategic perspective understood as well as the financial benefit?*
- *Will the new innovation fit naturally within the business model or are significant changes required? Are you prepared to implement those changes?*

Risk Assessment

- *What is your tolerance toward risk on a scale of 1-10 (10 being the highest)? How about your Leaders, and then your Employees, Customers, etc.?*
- *How would you describe your attitude toward taking risks in your business, i.e. risk adverse, high risk taker, cautious, etc.?*
- *How would you describe the attitude of your leaders regarding risk?*
- *If you or your team is adverse to risks, describe what emotional factors are involved with your attitude?*
- *Would you say key strategic decision making is centralized or dispersed across the organization?*

- Based on the strategic innovation focus of the company, various models and frameworks can be used to assess what operational transformation the organization needs to go through in preparing it for and enabling successful innovation initiatives.

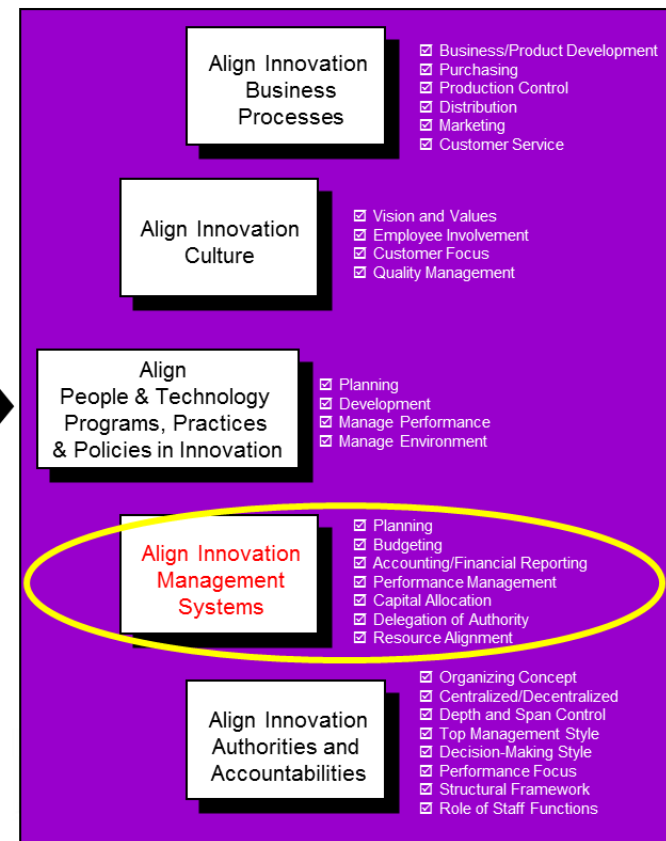


- The organization also needs a way to measure and manage its innovation initiatives and performance results.

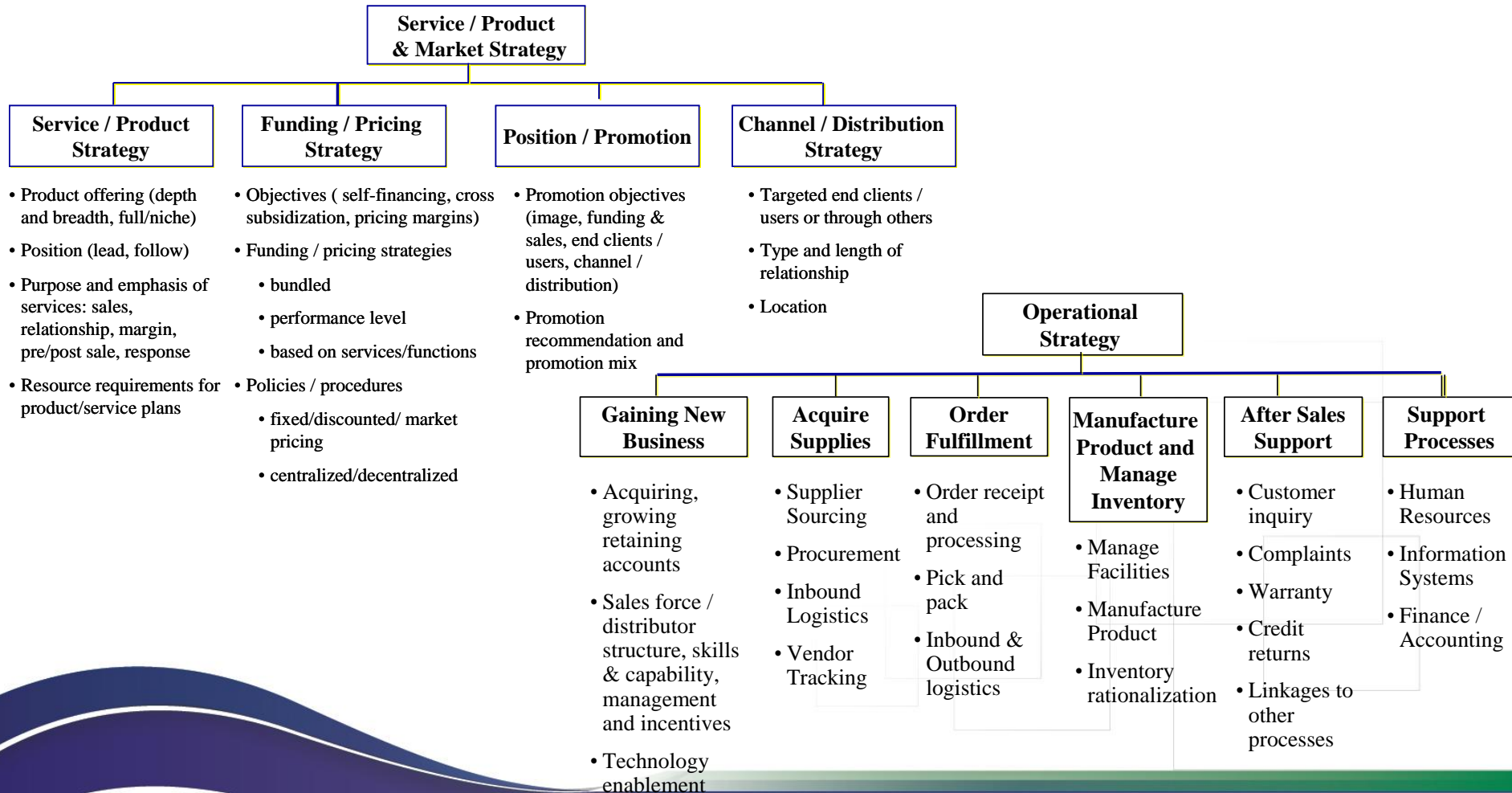
Innovation Strategy



Innovation Implementation






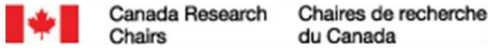



- Ultimately, the organization needs to deliver its “innovation(s)” to the target market place. A model can be used to assess and align needed the commercialization focus



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Canadian Investment in Imaging Research

Funding Agency	Number of Grants	Investment over Five Years
Canadian Institutes of Health Research 	109	\$19 million
Canadian Cancer Society Research Initiative 	21	\$1.2 million
Terry Fox Foundation 	1	\$7.5 million
Ontario Institute for Cancer Research 	2	\$23 million
Ontario Research Foundation 	9	\$40 million
Canada Research Chairs 	7 Tier 1 6 Tier 2	\$10 million
Canadian Foundation for Innovation 	85 (Over 12 years)	\$386 million (Over 12 years)

Global Imaging Market

- Diagnostic imaging used in ~ 25% of medical cases and growing
- Annual global market ~ \$21 B
- Increasing by 4% per year
- Sales from Canadian imaging equipment companies
 - \$185 M in 2008
 - < 1% of the global market
- There have been a few remarkably successful spin-offs, but there is potential for many more
- Spin-offs often stuck in “valley of death”
- Under commercializing academic discoveries



Sentinelle Vanguard

CIMTEC: Opportunity to bridge the “gap”

- An opportunity to move Canadian Medical Imaging Industry forward in a major way
- An environment that can make it work

Excellence

- Excellent leaders with international track records
- Source of new discoveries

Culture of commercialization

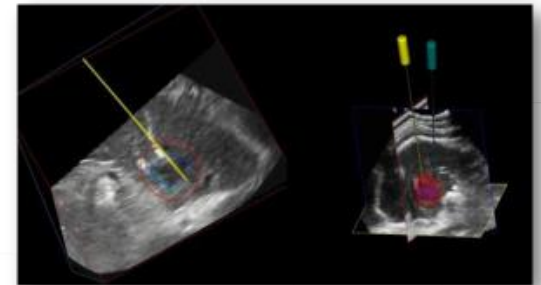
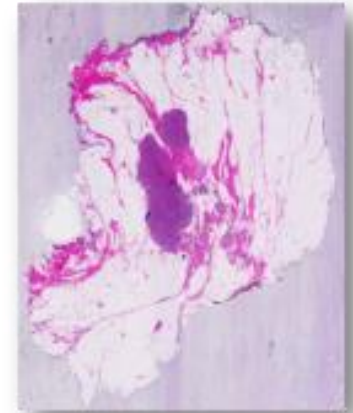
- Track record of translation into clinical use and commercialization with spin-offs and licenses

Infrastructure and HQP

- Over \$385 M in state-of-the-art facilities
- Outstanding training environments - HQP

What is needed

- Mechanisms to overcome barriers to commercialization for academic groups and small imaging companies



Overcoming Barriers

Barrier	CIMTEC Solution
Islands of Expertise	Single point access to full spectrum of expertise needed to translate from discovery to commercialization and clinical use
Access to Imaging Facilities	Access to existing state-of-the-art facilities (CFI) in research labs
Clinical Trials Expertise	Professional clinical trials management, support and link to clinicians (integration of imaging in clinical studies, software development capability, test phantoms)

Barrier	CIMTEC Solution
Pathology Validation	Expertise and services to carry out validation of imaging technology using digitized pathology sections
Regulatory Filing	Service/guidance on Health Canada and FDA submissions to industry and academia
Business Executive Management	Expert support for development of investor-ready business plans and links to Executive-in-Residence programs

CIMTEC: Bridging the “gap”

- CIMTEC is a CECR, Centre of Excellence for Commercialization and Research
- A program of the Canadian federal government’s Networks of Centres of Excellence created to bridge the gap between innovation & commercialization.
- Funded in 2011, \$14.3M plus \$4.5M
- Offices in London & Toronto
- Working with 11 SMEs and many university investigators, hosting workshops, trade meetings



Government of Canada
**Networks of Centres
of Excellence**

Gouvernement du Canada
**Réseaux de centres
d'excellence**



NCE RCE

Networks of Centres of Excellence of Canada | Réseaux de centres d'excellence du Canada

CIMTEC: Our Vision & Mission

- **Vision:** To be a driving force in the advancement & growth of the Canadian medical imaging sector.
- **Mission:** To enable & accelerate commercialization of medical imaging innovations ensuring that Canada's investment in imaging technology translates into economic growth & job creation.

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The **public** goal for increased innovation in the Canadian private sector is to increase wealth creation in the economy and restore the relative decline in Canada's productivity and prosperity.

The **private** goal for innovation in a company is to keep the firm competitive and profitable, grow sales and maintain high margins.

Private-sector innovation is not research, and not invention. It is more than that:

innovation = invention + commercialization

Therefore, support for innovation must include both support for invention and support for commercialization.

Research funding is an essential part of the support for invention, but it doesn't support commercialization.

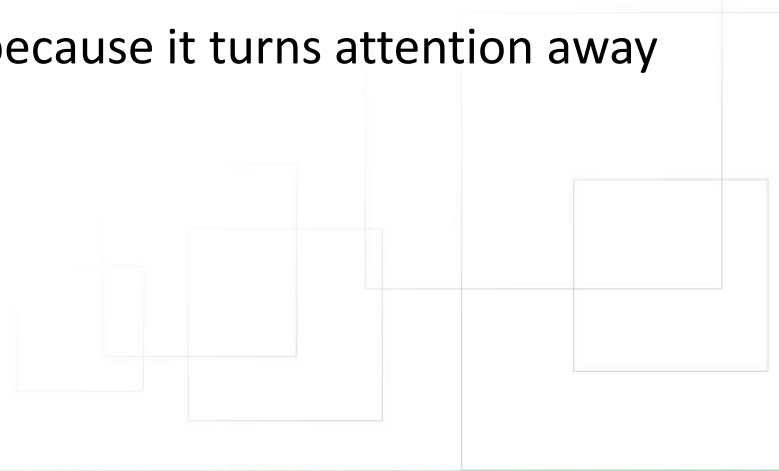
Unfortunately this is not as widely understood in Canada as it needs to be.

Some government programs support some aspects of commercialization, but there is no commercialization policy as such.

In fact, one still hears occasionally that

“our researchers must become better at commercializing their research”.

This is nonsense, and not constructive because it turns attention away from what really needs to be done.



Innovations have a limited shelf life. The successful ones are quickly commoditized by the competition.

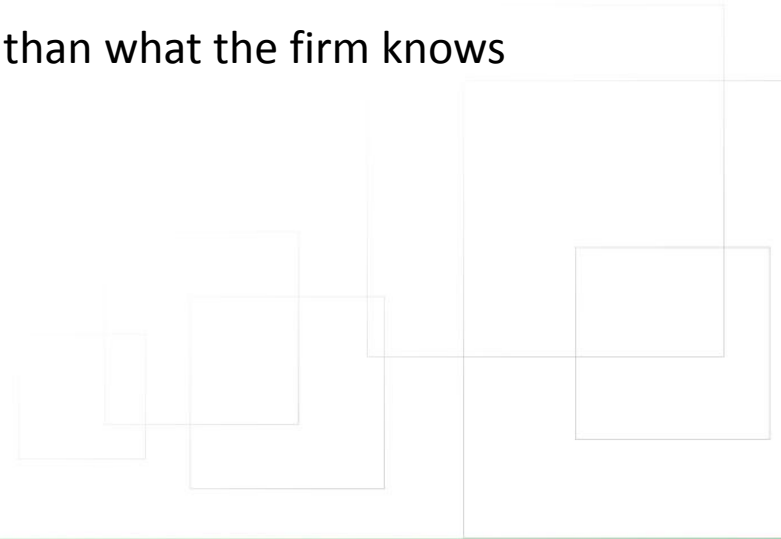
The only remedy for commoditization is repeated innovation.

The old proverb needs to be brought up to date:

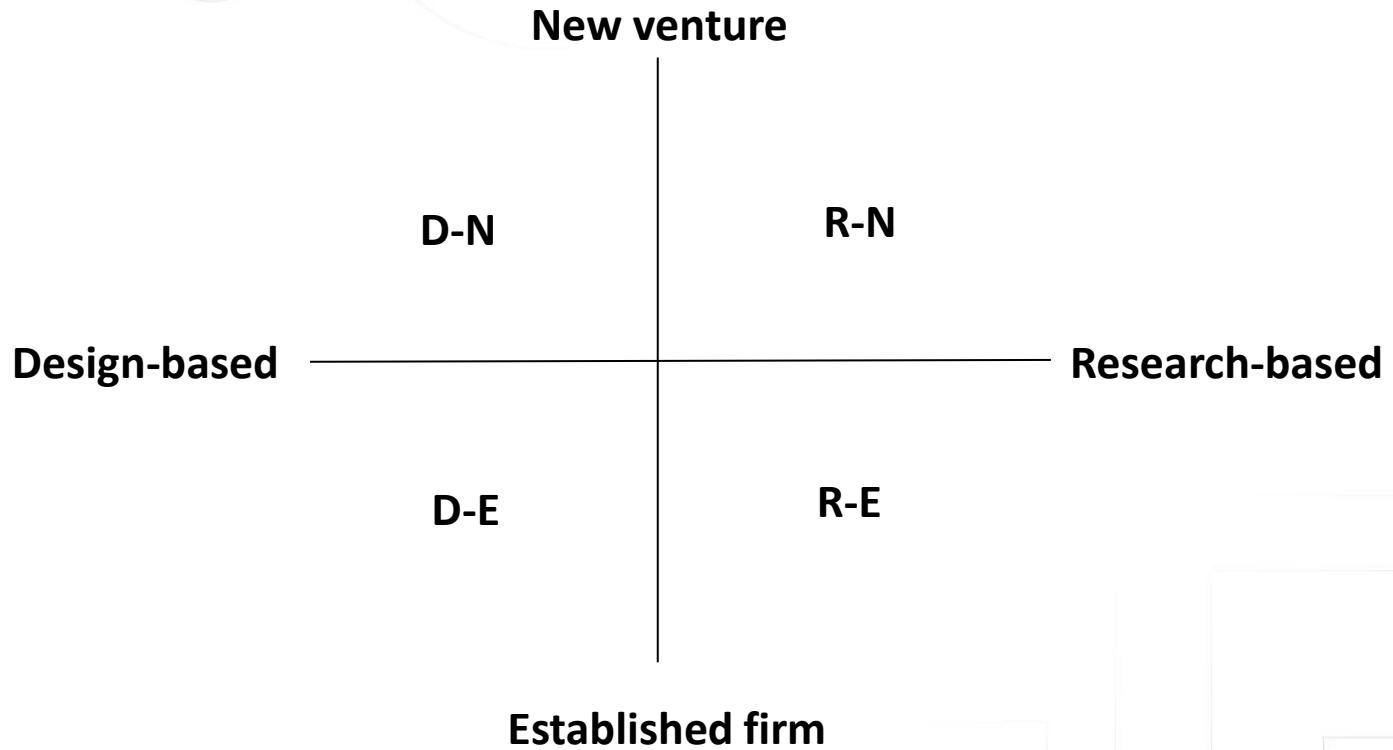
***“Necessity may be the mother of invention,
but competition is the father of innovation.”***

The challenges of commercialization are very different if the invention is research-based (new use of new knowledge) or design-based (new use of prior knowledge), and if it is commercialized by a new venture or by an established firm.

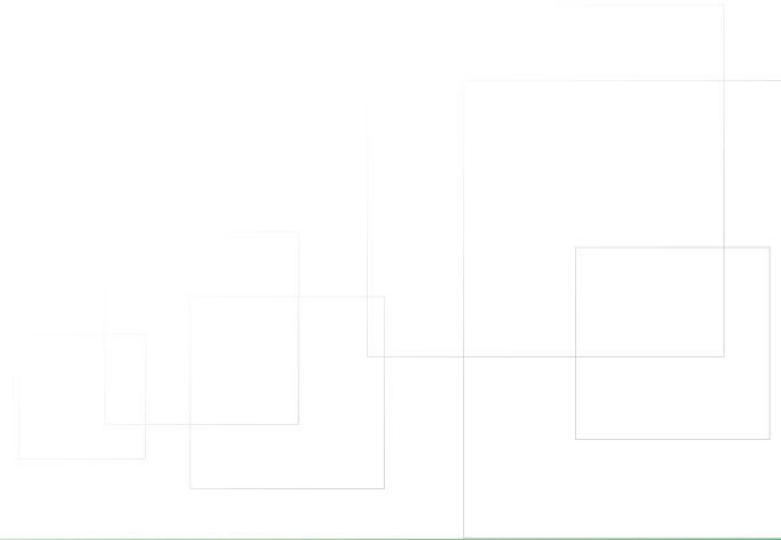
The size of the firm matters far less than what the firm knows about commerce.



Four quadrants in innovation space



Government support for commercialization of inventions should include financial support and procurement where these measures make sense, but it should also include active leadership in shaping any new market through regulation and standard-setting.



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