



Innovation and Collaboration A Viewpoint

ACR – MIAC Research Symposium, January 31st, 2019
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What am I going to talk about?

Raise awareness of constraints to our ability to Innovate in Resource Industries

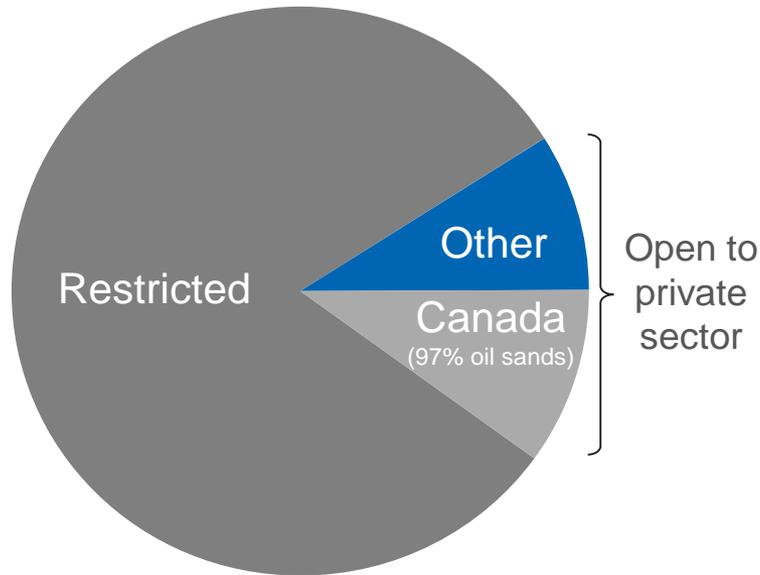
- We are our biggest constraint: A Project Example
- How to innovate – Path to Deployment
- Who Innovates – The Dragon’s Den, Innovation, & “Plug and Play”
- Operations Excellence and Technology Leadership (Plan A & Plan B)
- Intellectual Property and Commodity Technologies
- Corporate Culture & Risk Aversion (α & β risk)

A call to action

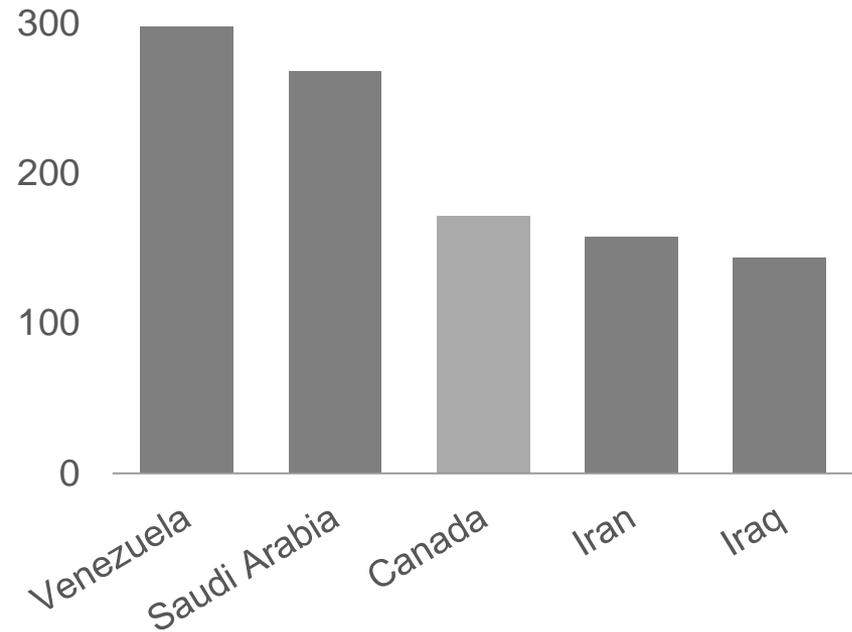
“To achieve great things one needs a plan, and not quite enough time” - Italian Proverb

Canada's opportunity

- Oil sands represent large, accessible liquids resource base
- Access to world's oil reserves



Global crude oil reserves by country, GBOE¹



¹before royalties

Source: International Energy Agency, Oil & Gas Journal, Imperial Oil

In 2100, Petroleum will continue to be used for four purposes:

- **Lubricants**
- **Petrochemicals**
- **Long Distance Transportation**
- **Agriculture**

Path to Deployment

- The process of moving from idea to concept to pilot to commercialization
 - idea → concept → pilot → demo → commercialization
- The method to overcome the “valley of death”
- Requires as much design and effort as the invention itself
- What is the constraint in “your” path to deployment

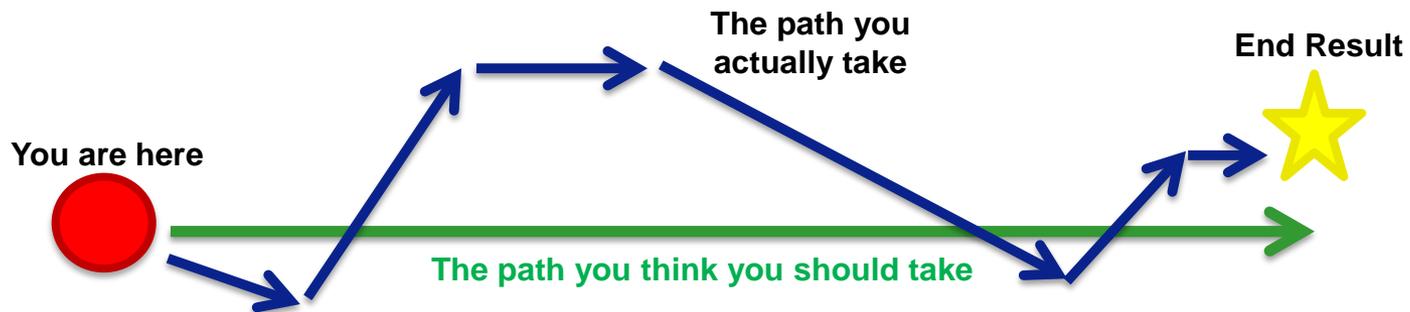
Innovation Stage

- Invention
- Concept Development
- Business Model
- Industrial Scale / Installed Capital
- Customer Reluctance

Company Action

- XPRIZE, Academic Partnership
- JDA. Innovation Alliance – COSIA
- Ven Cap, Buy out, create NewCo
- JV pilot or infrastructure invest, Commercial Demo
- Incentives to Develop Market

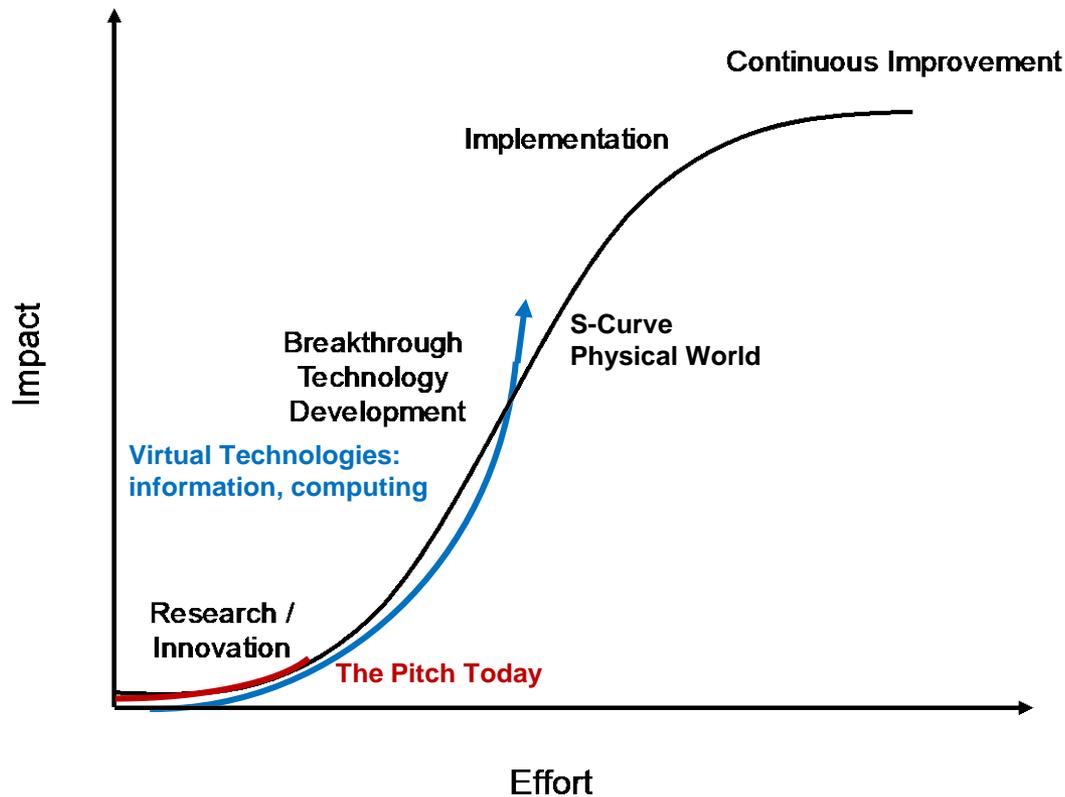
- Misallocated efforts could slow or defeat commercialization



*“The best path to disastrous innovation is over-planning”
- Dan Breznitz, Munk Chair of Innovation*

Innovation in Large Systems and Heavy Industry

- Innovation is not a new thing, it's been occurring for centuries
- Prior to last war, innovation was centered in large organizations
 - universities, industrial labs, military, large companies - Linear
- During the 60s, IT and Pharma became innovation centers
 - Introduced “exponential” technologies. Low cost of deployment
 - Created the Venture Capital Industry
- We have mistaken “an” innovation model for “the” innovation model



- The “Dragon’s Den” model works for “Plug and Play”
- Incapable of large system innovation
- Favours pitch and sell
- “Scouting” without systemic understanding is random
- The intersection of virtual technologies & physical world

*“The soft stuff is the hard stuff”
– Bib Galvin (Motorola)*

Intellectual Property, Commodity Technologies & Collaboration

- Example, a pitch for a partial upgrader
- 90 to 100% of the “breakthrough” consists of proven technologies
 - Mild Thermal Cracking, Hydrotreating, Solvent De-Asphalting
- Open Source Technology Model

Software Freedoms

- **Freedom 0** -to run the program, for any purpose
- **Freedom 1** - to study how the program works, and change it to make it do what you wish
- **Freedom 2**- to redistribute copies
- **Freedom 3** - to distribute copies of your modified versions to others

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Contribution

- Reduce Costs
- Influence Direction
- Attract Talent

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Eclipse Foundation; 2018

Industry partnerships

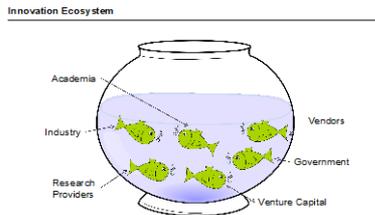
Role: Advance and accelerate industry performance (COSIA)

Technology partnerships

Role: Advance and test technology and commercialize

Academic partnerships

Role: Support and direct research into basic and applied science that support/informs strategy



Direct strategic investments

Role: Support development of and access to close-to-commercial technologies

Venture capital

Role: Access companies for investment, partnership and leading edge knowledge and innovation trends

Innovation challenges

Role: Tool for identifying technology partners (XPRIZE)



The Value Discipline of Technology Leadership

- Technical Leadership is different than Operations Excellence

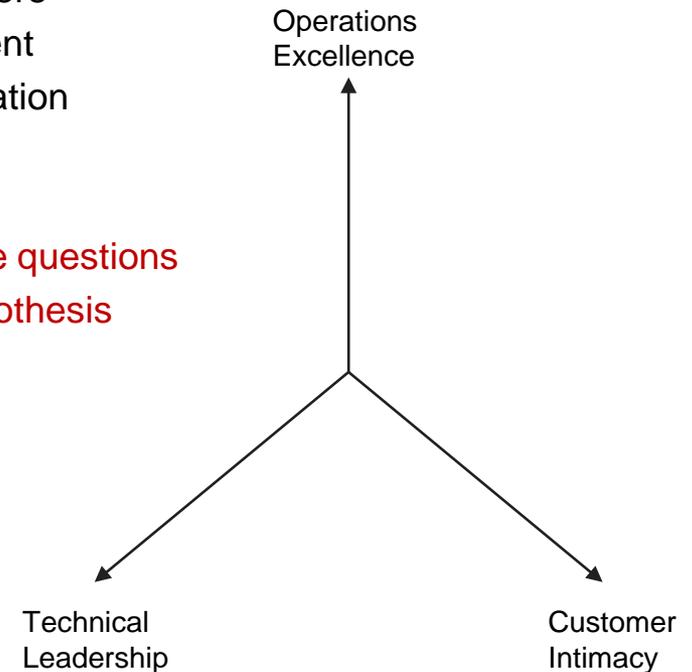
Operations Excellence

- Seek Knowledge & Understanding
- Use a Questioning Attitude
- Adhere to Procedure
- Expect Accountability
- Collaborate
- Solve Problems
- Look to data for answers
- Business model well understood

Technical Leadership

- Create an Inspiring Vision
- Be Curious & Persevere
- Organize around Talent
- Fluid (Agile) Organization
- Work Right to Left
- Create Outcomes
- Look to data to create questions
- New commercial hypothesis

- OE is concerned with α Risk
 - α Risk is the risk of something bad happening
 - β Risk is the risk of something good not happening
 - If you control for α , β will always occur



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α Risk and β Risk

- α Risk is the risk of something bad happening
- β Risk is the risk of something good not happening
- Reliability theory states that controlling for α will ensure β always occurs
- Examples:
 - “Can you “de-risk” that for me?”
 - A corporate commitment to use no better than three year old technology
- We started , and are ending with how WE are the greatest inhibitors to innovation
- Which risk should you really be concerned about?



“(Leaders) job in the new organization is not to command, it is to inspire” – Peter Drucker

Systemic Innovation

- **Have Fun**
 - The brain chemistry of humour and creativity are related
- **Make Friends / Influence People**
 - You can't do it alone, whether you're an individual, company or government
- **Make Stuff Happen**
 - Path to deployment is key – make sure it will end up in the world
 - Work with innovators

- **Thank you**



**Innovation, Motivation, and Fear:
A Novel Perspective for Unconventional Oil**

Oil Sands in Western Canada

Gary Bunio (Suncor) and Ian D. Gates (U.Calgary)



**Path to Deployment:
How to Overcome Your Fear**

Oil Sands in Western Canada

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