

Economic Diversification – Some Unexploited Opportunities

A Presentation to:

The Information Technology Association of Canada

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Canada's current debate on technology is focused on three major topics...

- ***R&D***
- ***Commercialization***
- ***Productivity***



***We need to pay more attention to....
economic diversification***

***It makes no sense for Maritimers to
have to go to Fort McMurray for jobs***

Technology is a powerful instrument for economic diversification...

Most new companies and new product lines emanate from the exploitation of technology

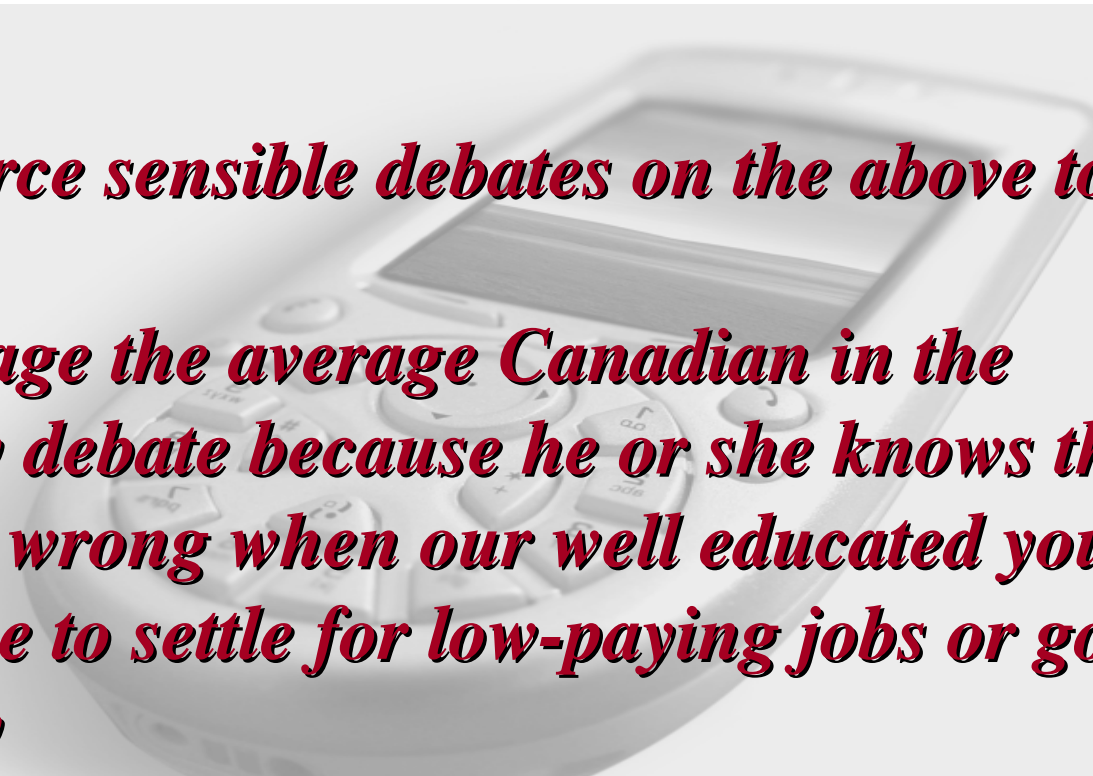



R&D – we have a Canadian industry that does not need much R&D

Commercialization – we have a financial industry that is more suited to the building of R&D branch plants than MNEs

Productivity – we have a corporate tax system that encourages MNEs to leave profits (and high paying jobs) elsewhere

A focus on economic diversification...

- ***Will enforce sensible debates on the above topics***
 - ***Will engage the average Canadian in the technology debate because he or she knows there is something wrong when our well educated young people have to settle for low-paying jobs or go to Fort McMurray***
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Our resource industries are world-class users of technology...

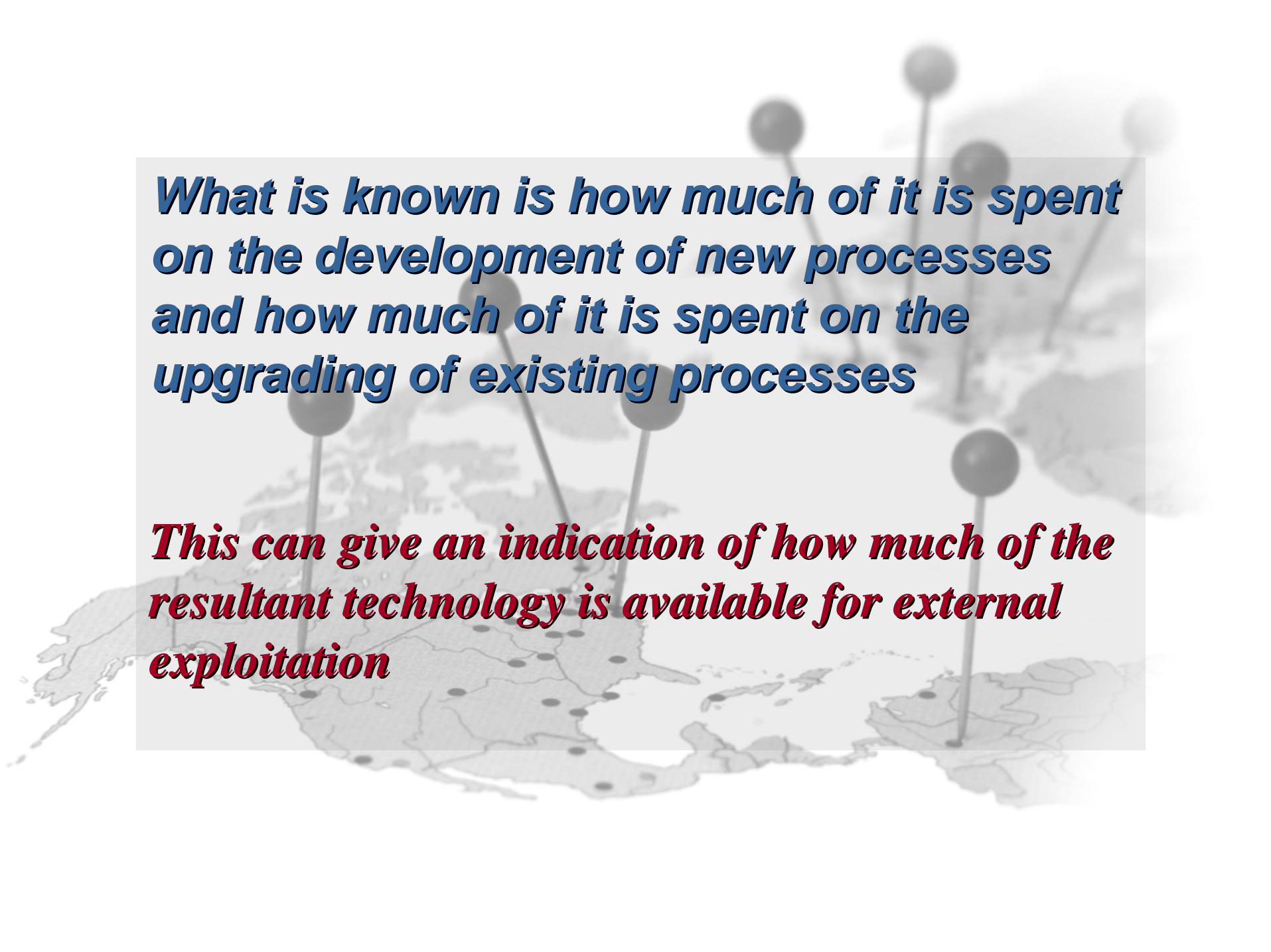
They also develop a lot of technology (particularly information and communications technology) for solving unique problems in such areas as asset and energy management

Much of this technology can be applied more broadly, not just in the resource industries but in other sectors

A 2005 study by Doyletech on twelve resource sectors showed that they spent \$1.1 billion on intramural R&D in 2002.

No data available on how much of it was ICT-related but interviews suggested that it was in excess of 50%

Major NAIC Sector	NAIC Subsectors ¹	2002 Revenues (\$ thousands) ²	2002 R&D (\$ thousands) ³
11 Agriculture, Forestry, Fishing and Hunting	113 Forestry and Logging	2,215,949	3,311
21 Mining and Oil and Gas Extraction	211 Oil and Gas Extraction	27,954,528	75,919
	212 Mining	4,058,762	29,525
31-33 Manufacturing	311 Food Manufacturing	19,299,300	61,000
	313 Textile Mills	1,454,505	29,069
	321 Wood Product Manufacturing	1,392,905	37,519
	322 Paper Manufacturing	25,902,430	276,833
	324 Petroleum & Coal Products Mftg.	41,250,728	72,523
	325 Chemical Manufacturing ⁴	21,206,686	206,162
	327 Non-Metallic Mineral Prod. Mftg.	1,633,006	7,639
	331 Primary Metal Manufacturing	19,507,758	179,210
	332 Fabricated Metal Product Mftg.	4,190,933	84,520
Total		170,067,490	1,063,230



What is known is how much of it is spent on the development of new processes and how much of it is spent on the upgrading of existing processes

This can give an indication of how much of the resultant technology is available for external exploitation

	2002 R&D CIE	2002 R&D New Process	2002 R&D Existing Process	ECF Factor	Secondary Pool
113 Forestry and Logging	3,311	x^2	x	20	662
211 Oil and Gas Extraction	75,919	6,361	4,775	25	18,980
212 Mining	29,525	14,321	13,476	20	5,905
311 Food Manufacturing	61,000	5,807	8,044	15 ³	9,150
313 Textile Mills	29,069	2,119	5,176	20	5,814
321 Wood Product Manf.	37,519	1,122	3,260	20	7,504
322 Paper Manufacturing	276,833	13,512	150,205	25 ⁴	69,208
324 Petroleum and Coal Products Mftg.	72,523	8,022	25,489	15 ⁵	10,878
325 Chemical Manf.	206,162	21,521	23,254	20	41,232
327 Non-Metallic Mineral Product Mftg.	7,639	360	850	25	1,910
331 Primary Metal Manf.	179,210	x	x	25	44,803
332 Fabricated Metal Product Mftg.	84,520	16,906	6,151	15	12,678
Total	1,063,230	----	----	----	228,724

Some Assumptions...

On average, 20% of the R&D performed by the industry ends up in “dry holes” but the resultant technology can be applied to other products, services, and processes (this figure is typical for high-tech industry as well)

It is assumed that this figure varied from 15% to 25% depending on such factors as the amount spent on new vs. old processes and confidentiality concerns.



The pool of secondary technology can be quantified by the \$228 M worth of R&D that is supposedly available for external commercialization

To put that number in perspective, see next figure...

Funding Source (& Selected Examples)	2002 R&D Expenditure (\$M Rounded)
Federal Government Sources (Data for 2001-2002)	
<i>Total Federal R&D</i>	5,500.0
<i>Natural Research Council Canada (NRC)</i>	644.0
<i>Natural Resources Canada (NRCan)</i>	335.0
<i>Canada Foundation for Innovation</i>	239.0
<i>Environment Canada (EC)</i>	222.0
<i>Atomic Energy of Canada (AECL)</i>	178.0
Higher Education (Data for 2002)	
<i>University of Toronto</i>	456.4
<i>McGill University</i>	316.6
<i>University of Alberta</i>	287.5
<i>University of British Columbia</i>	216.3
<i>University of Ottawa</i>	152.2

Some points of discussion...

Are there obvious conduits into the pools of technology on a sector-by-sector basis?

How does the “quality” of the technology compare with that of other pools of technology (e.g. NRC) available to entrepreneurs in Canada? It may actually be easier to commercialize because it is related to actual products and production prototypes as opposed to ideas or engineering prototypes which tends to be the case for publicly-funded R&D.

Can the developers of the pool of secondary technology provide useful marketing and applications information?

What are the best ways of making the technology more visible to potential exploiters?

Some points of discussion (con't) ...

Is there a way of addressing senior management's concerns about losing key people to the commercialization process?

What are the prospects of a Canadian resource-based company diversifying its operations to the extent that 3M or Nokia (which started out as a resource-based company) has?

Is there a role for IRAP to play in interacting with the resource sector over and above its present role?

Is there a venture capital firm that stands out as having experience in investing in such opportunities?

The 3M Experience...

Established in 1902 to extract minerals for making abrasives

Found the product to be unsuitable

Switched to sandpaper because they got to know a lot about abrasives

Supplied wet abrasives to the automobile manufacturing industry

Masking tape was next

The Nokia Experience...

Founded in 1846 as a wood products company

Then supplied rubber products

Very dependent on the Russian market because Finland had to pay war reparation to Russia after the war

In 1977, Kari Kairamo became president

Had spent some time in the U.S. and learned a lot about the electronics industry

Expanded into electronics and expanded its markets to other countries

Expanded into telecom; now has 40% of the cell phone market

Summary...

Our resource industries may be an untapped source of technology that could help to diversify Canada's economy

Whether the opportunities get exploited inside the sector or outside, the sector does have a significant pool of financial and management resources that could be applied to the exploitation process



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