

# Innovation and long term economic growth in small natural resource exporting economy

May 23-24, 2018 | Herb Emery, Vaughan Chair in Regional Economics

# UNB

## Lately, Canadians and NB'ers see the resource sector as a Sunset, rather than Wealth Creating, sector

- **So time to do something else like:**

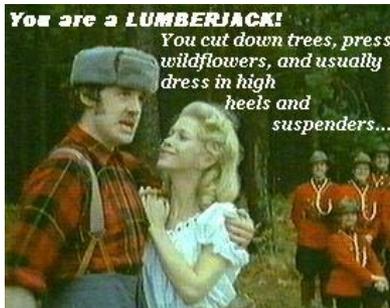
- Autos and more autos
- Bombardier
- SuperClusters like AI
- Warehouse for Amazon
- Infrastructure other than pipelines

There is a prevailing view across the country that our energy is a harbinger of great calamity — we are a one-trick pony, we're a "staple" economy, unstable, dependent, a single-resource producer. But this argument has been countered by influential thought leaders such as Bank of Canada Governor Mark Carney. In a September 2012 speech in Calgary, he stated that high commodity prices were unambiguously good for Canada and, rather than debate their utility, we should focus on minimizing the pain and maximizing the benefits of our resource economy.

# Canadians have been trying to change their identity away from “Hewers of wood”

We Canadians are finding it difficult to make the transition from a resource-based, behind-tariff-walls economy to a human capital based economy (i.e. from boards and mortar to mortar-boards)

Tom Courchene, Policy Options, Jan-Feb 2000, page 102



in the world. Former industry minister, now vice-chairman of the CIBC Jim Prentice accurately sums it up: “There’s no shame hewing wood and drawing water as long as you are the best in the world at it.”

Ben Brunnen and Tom Kmiec, Policy Options March 2013, page 44

- **Important economies are not natural resource exporters**

- Resource economies are “old economies”
- Sexy economies have transitioned away from resources

## But, we are still today specialized in resource production

- **and contrary to popular opinion,**
  - we have all gained from that specialization
- **Ian Keay (2009) “Resource Specialization and Economic Performance: A Canadian Case Study, 1970-2005” *Canadian Public Policy* 35(3), 291-313.**

Even at the beginning of the twenty-first century, Canada's aggregate economy was still specialized to a considerable degree in resource production, particularly energy production. The resource sector as a whole, even without energy, does not appear to have been constraining per capita performance, and as long as we include energy, the natural resource industries appear to have comprised a leading sector in the domestic economy, with positive spillovers driving down domestic raw material prices and generating demand for non-resource-intensive production. In addition, we cannot find any evidence consistent with input price or currency crowding out. In total, therefore, the evidence seems to suggest that since 1970 resource specialization has been closely associated with forces that have contributed both directly and indirectly to the improvement of per capita economic performance in Canada.

Seen as an old static sector, innovation and technical progress in resource industries exceeds that of most sectors



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Keay

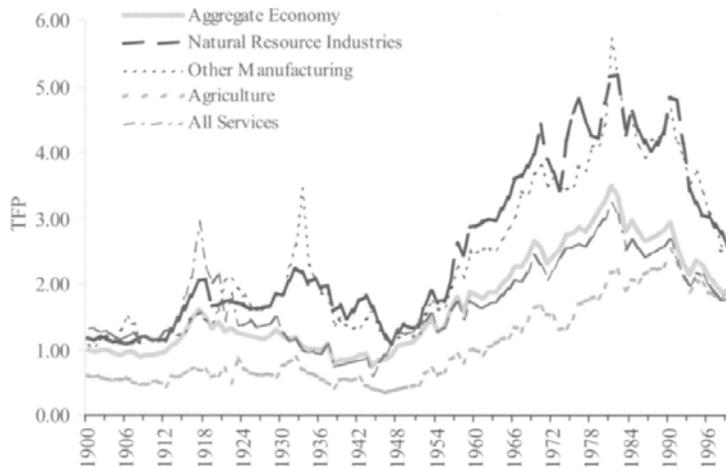
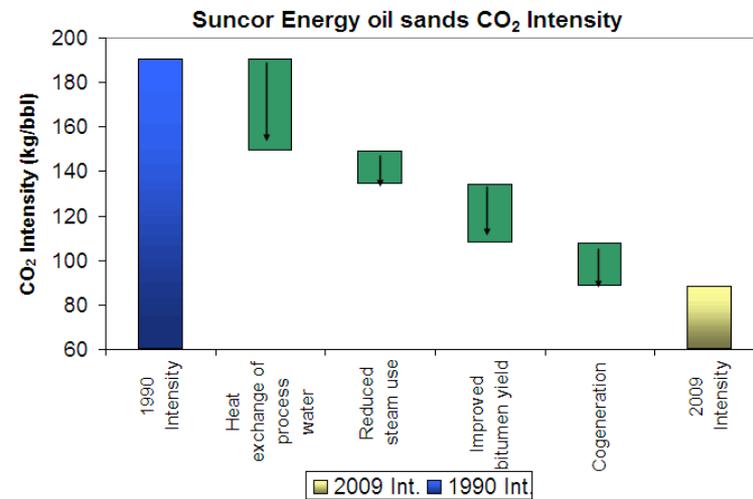
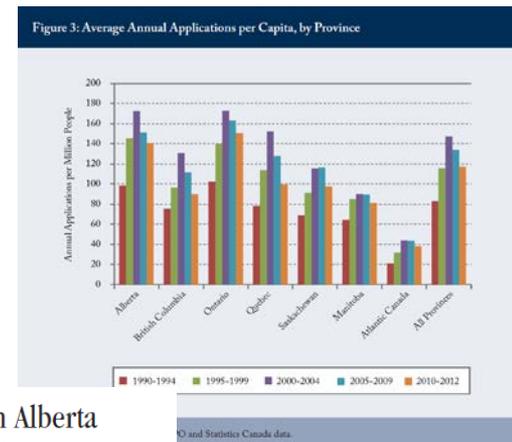
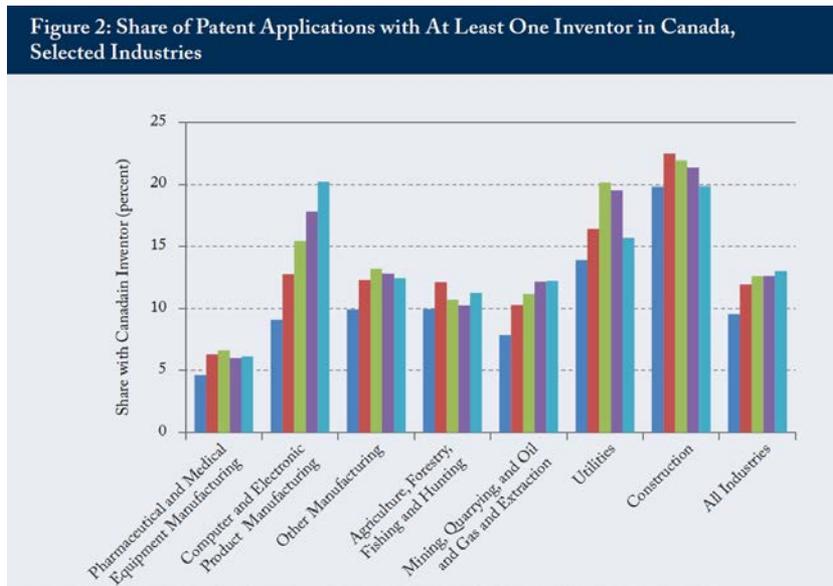


FIGURE 5  
TFP INDICES BY SECTOR  
(aggregate economy 1900 = 1.00)



TFP=Total Factor Productivity – GDP growth not explained by increases in inputs (e.g. K and L); more output per unit of input

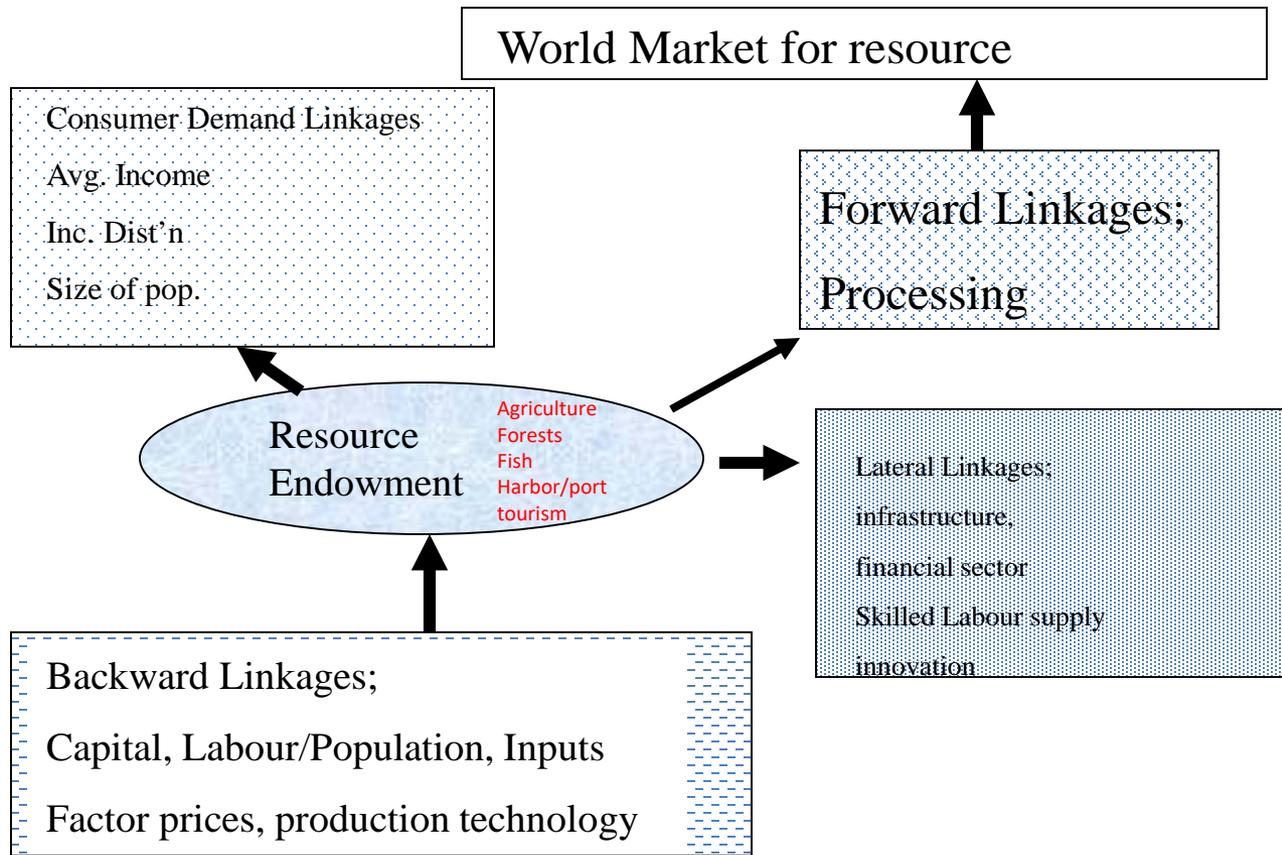
High level of innovation in resource industries, including agriculture evident in terms of patenting, outside of Atlantic Canada...



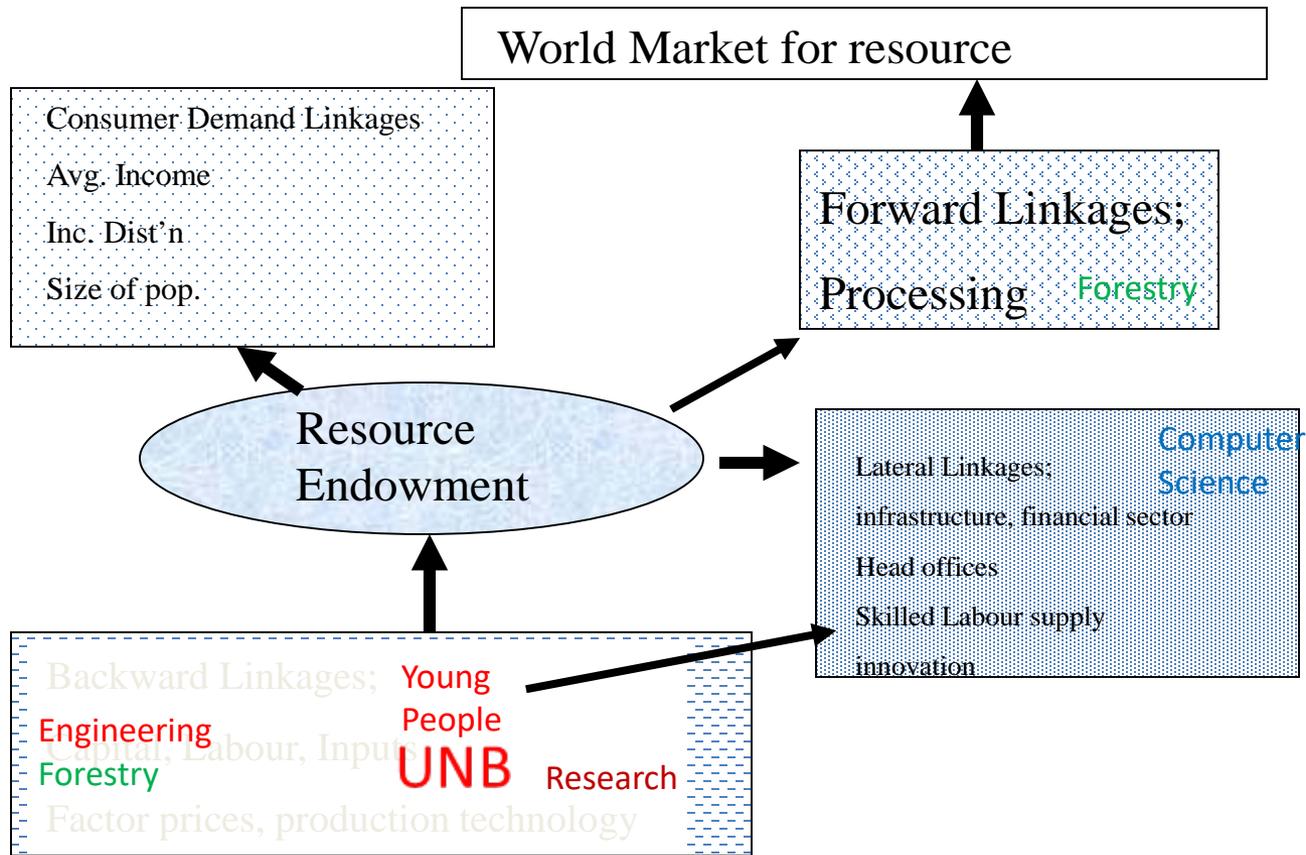
The above results put a new perspective on the value-added debate and show that researchers in Alberta and in the utilities and construction sector – areas that are often seen as producing little “value added” – are outperforming researchers in many other parts of the economy in applying their work to the Canadian market.

# NB as a Staples Economy:

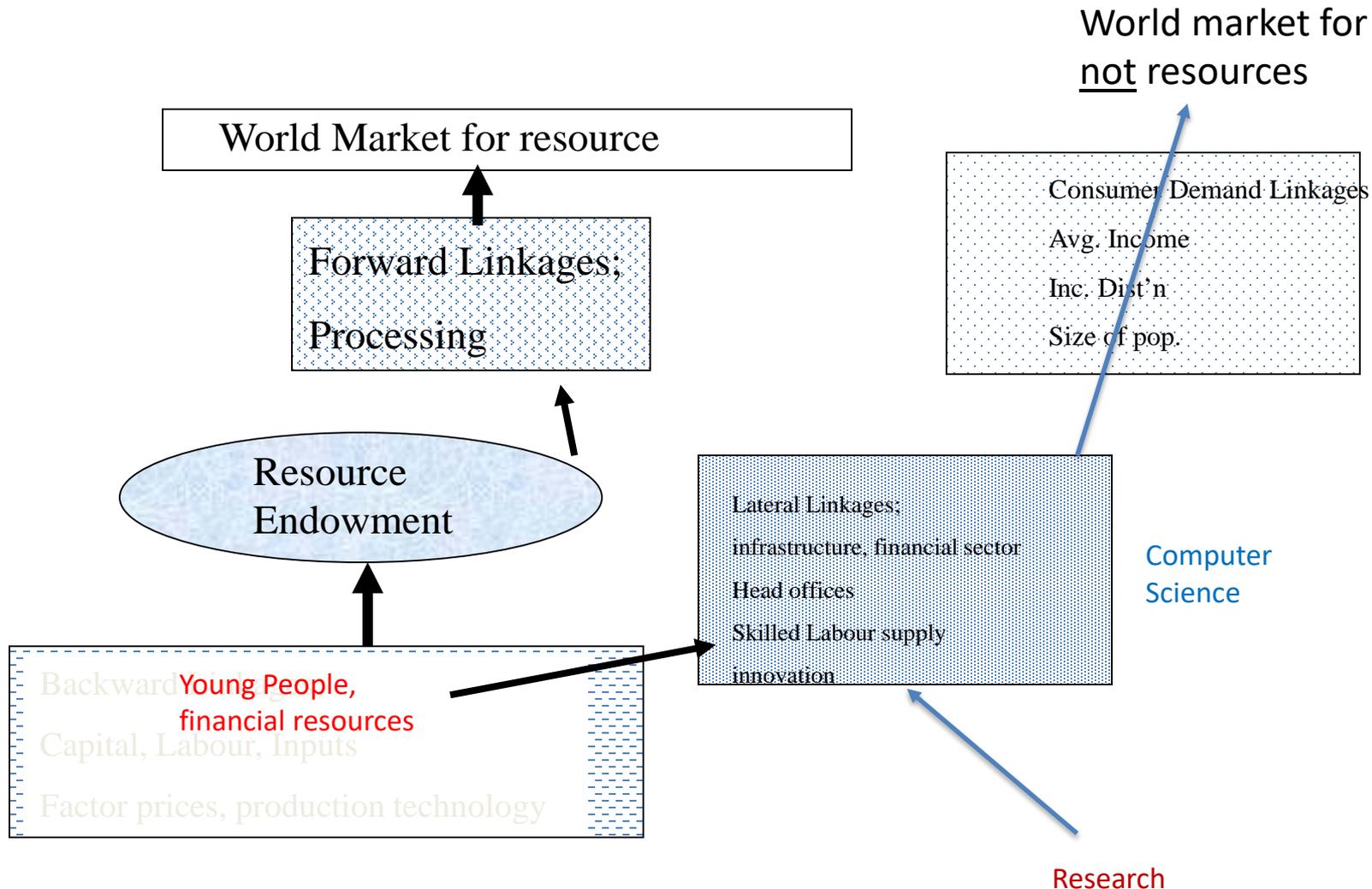
Natural resource exports and the retention of “Linkages” (Spread effects)



Historically, innovation and technical change were strengthening linkages and capturing linkages locally...

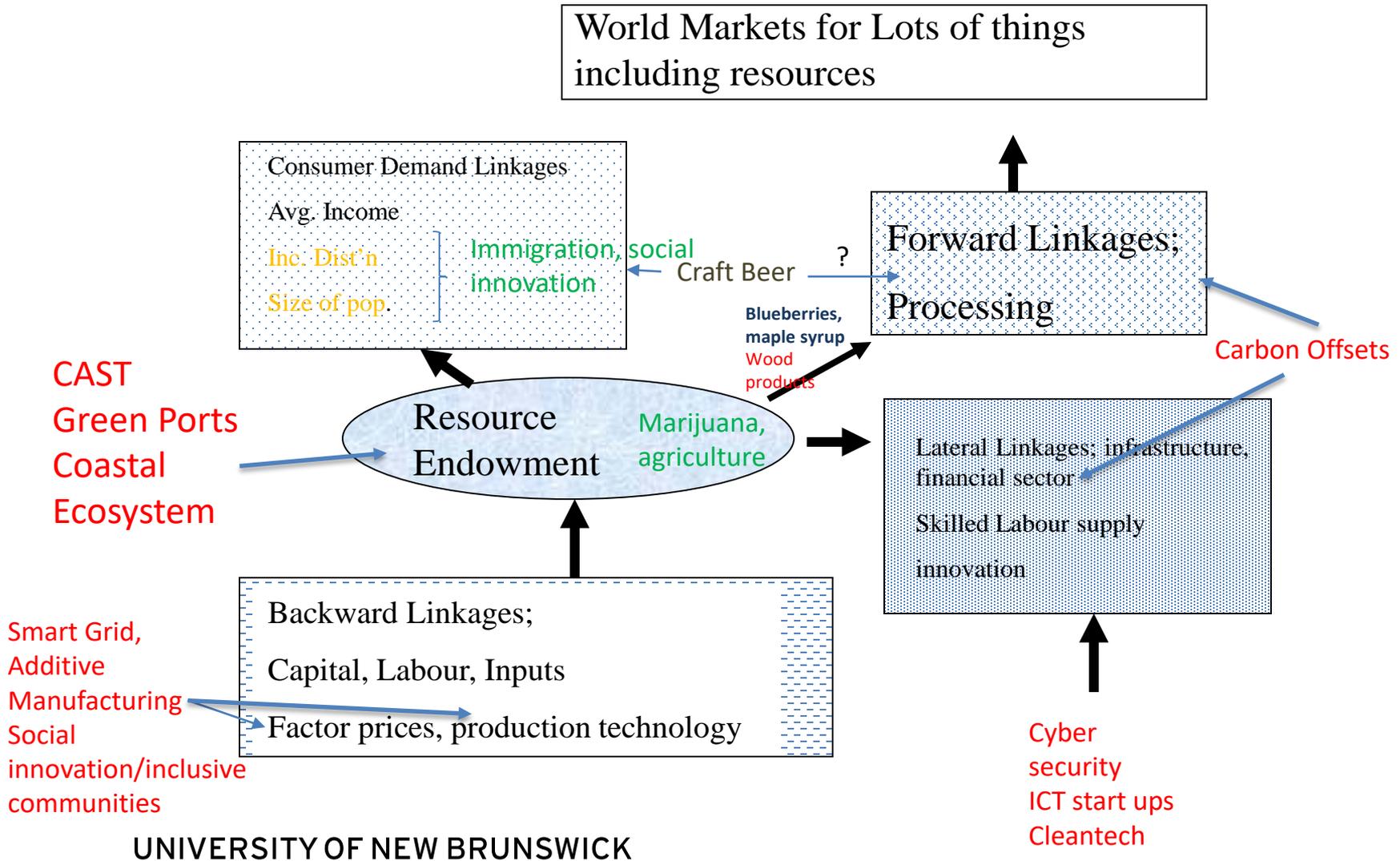


More recently, bigger focus has been on developing a lateral linkage  
– diversification into non resource related sector like ICT



# BUT, Innovation takes place all over the schematic

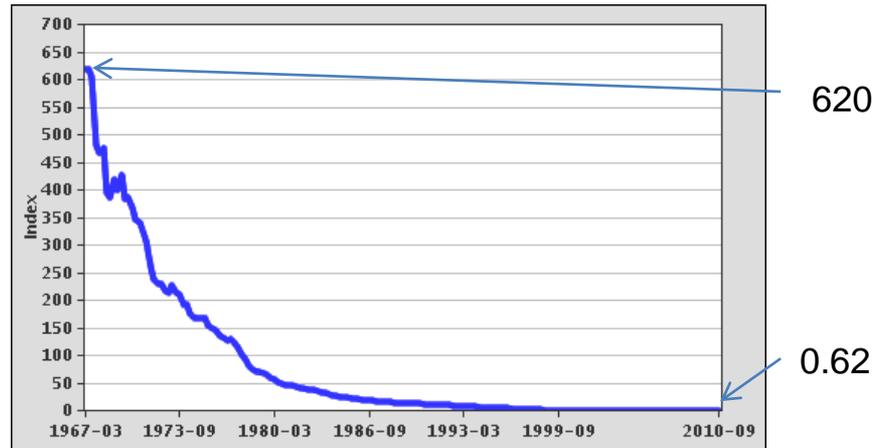
this diagram does not include financial innovation, managerial innovation



So what makes innovation a fountain of youth for the resource sector? Same way as in any sector... other than medical treatment

Computer costs are 1/1000 today of what they were in 1970, what does that allow all industries to do?

Technical change and innovation have solved cost pressures, raised productivity and alleviated scarcity/shortages



BEA Price Index: Computers / Peripherals  
<http://www.frbsf.org/csip/data/charts/chart28.cfm>

# So what makes innovation a fountain of youth for the resource sector?

- **Innovation converts a resource into a large reserve**

- resource

- = total amount of a material that exists.

- discovered and undiscovered, economically recoverable or not economically recoverable

- Reserves

- = Economically recoverable portion of the resource given existing technologies and prevailing prices.

- **Innovation creates abundance**

- Transportation

- Overcome distance

- Production extraction

- Lower costs increase profits at any given price
- Lower quality resource, harder to access resource

- Forward processing

- Increase value-added, higher profit per unit of extraction
- New products

- Business innovation/logistics/supply chain/new markets

- **Eco-environmental innovation**

- Lower environmental and social cost

- **Regulation, legal, property rights, policy**

- “social license” addressed

# So why does the resource sector get no respect?

## The “Verizon Math” Problem:



- **Small rates applied to large volumes confuse and overwhelm people**
  - Prefer a one in 1000 shot at a 40:1 ROI on \$1 million
    - Expected Profit: 39,000
  - to a relatively certain 1.001:1 ROI on \$10 billion
    - Expected Profit: \$10 million

verizonmath.blogspot.com

$\$.002 \neq .002\text{¢}$

$\$.002 = .2\text{¢}$

$\$.0002 = .02\text{¢}$

$\$.00002 = .002\text{¢}$

Can you hear me now?

$.002\text{¢}/\text{kb} \times 35,893 \text{ kb}$

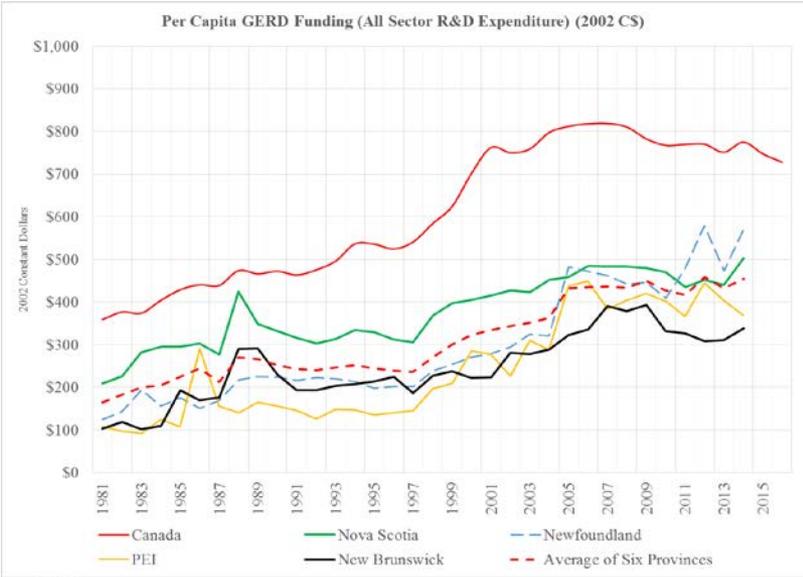
$= 71.786\text{¢} = \$0.72$

Thanks for listening

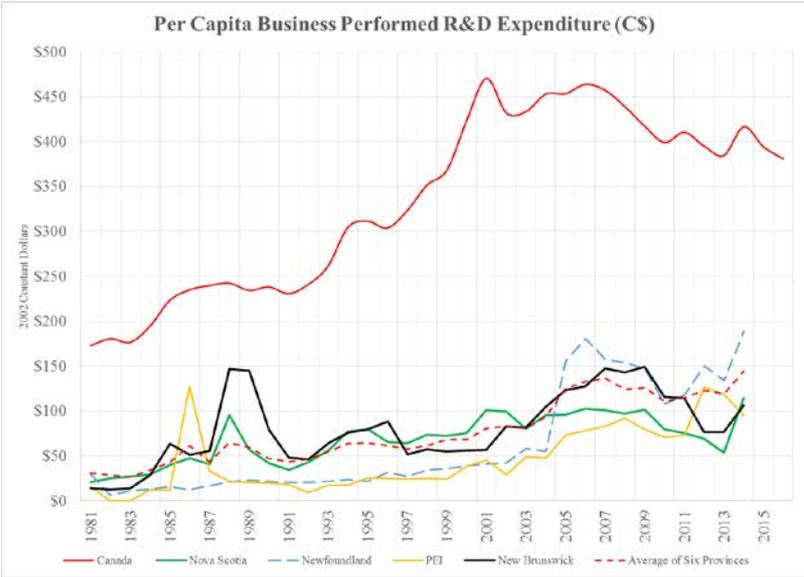
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# Atlantic provinces have low BERD per capita

## GERD

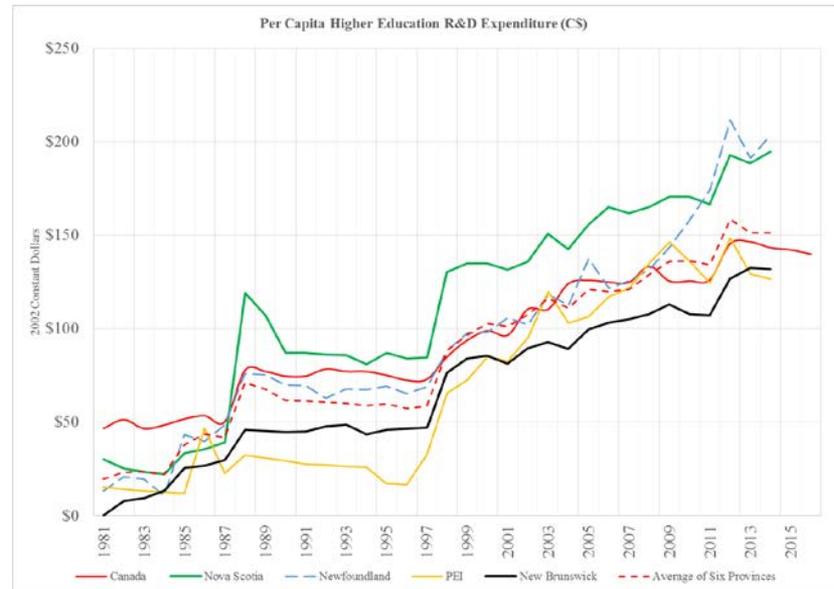
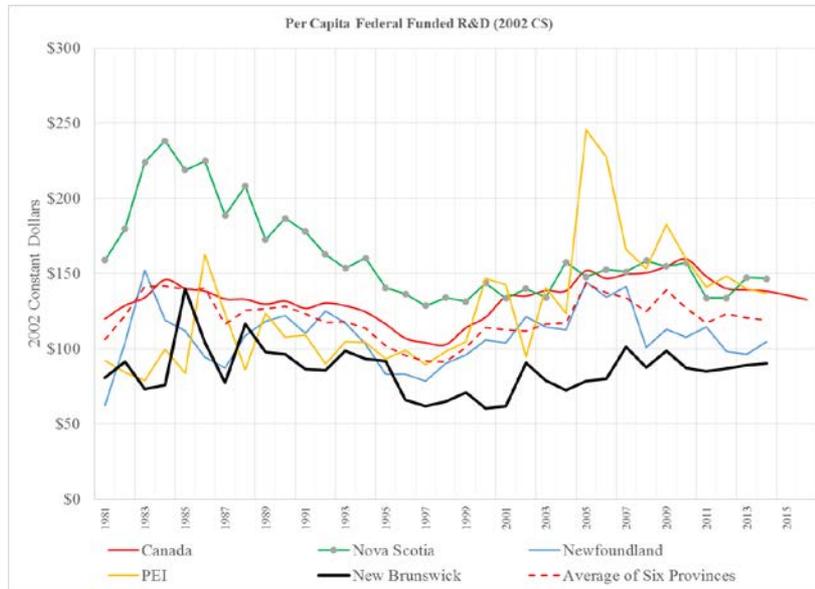


## BERD



# A different look: Federal and HERD Funded RandD per capita

R&D by source of funding rather than where its performed



# What could NB Universities do for the province with an extra \$100 million per year in RandD funding? (Performed)

This is Higher Ed expenditures attributed to R&D

20% of this gap may be due to the lack of a medical school in NB

Some due to lower representation of research intensive faculties in overall operations in NB than NS

