

Innovation and Public Policies

What we know, what we don't know

The innovator perspective

A Primer on
Roger Miller et Marcel Côté
Innovation Reinvented
Six Games that Drive Economic Growth
University of Toronto Press
April 2012

CSLS Seminar on Living Standards
Rideau Club, March 12th, 16h00
Ottawa, ON





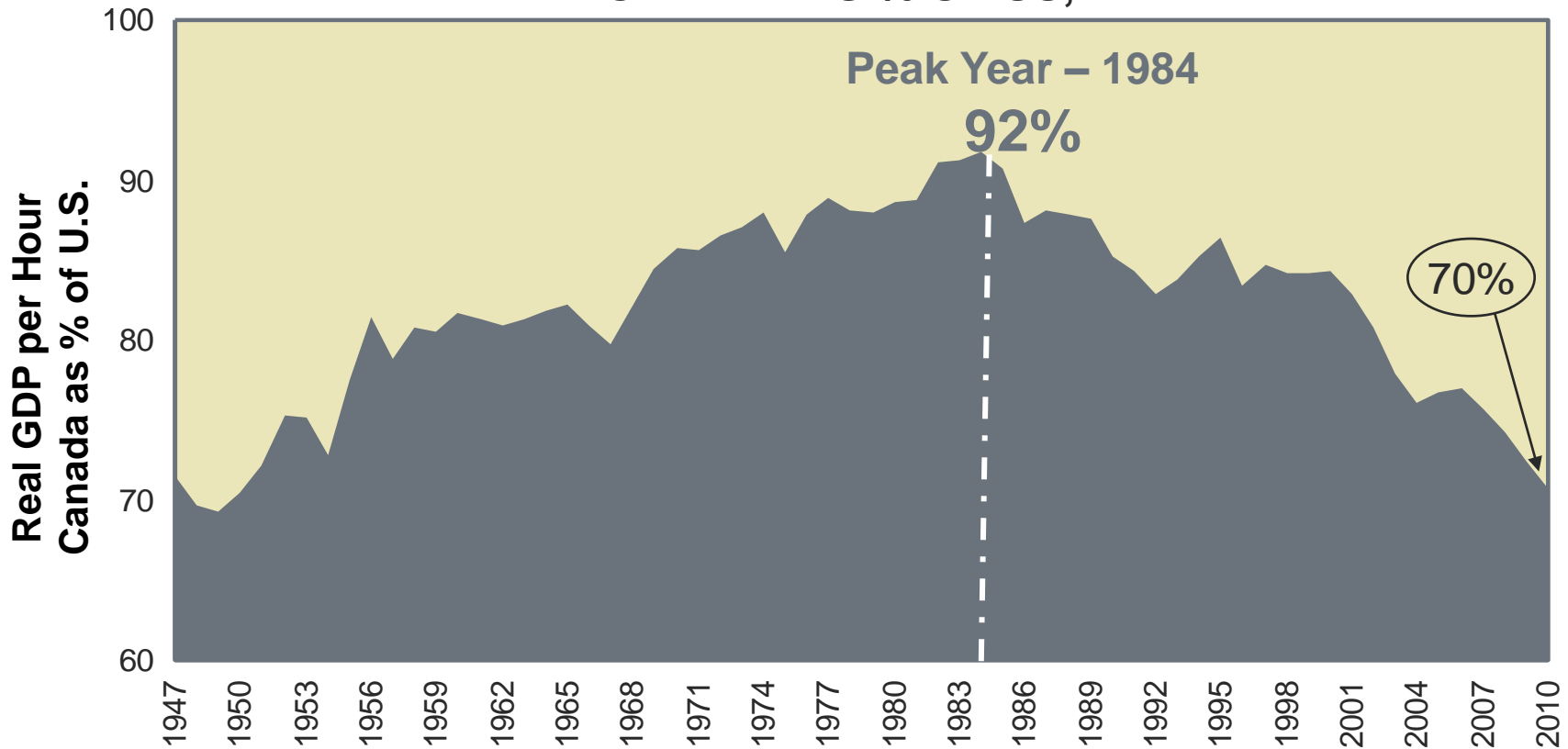
Innovation

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[Amazon Book search: 49 000 entries]

There is still a lot to learn

GDP PER HOUR WORKED, BUSINESS SECTOR,
CANADA AS % OF US,



What explain Canada's poor multifactor productivity growth?

The mystery of innovation...

The implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, work place or external relations*

From insulin and iPad ...

... to Gillette's five blade razor

The classical explanation....

Research ➔ **Development** ➔ **New product** ➔ **Growth**

...does not work well

* Oslo Manual 2003

Innovation

Some frequent misunderstandings

- 1- Innovation \neq invention
- 2- Marketing is usually more important than R&D
- 3- Incremental innovations $>$ radical innovations
- 4- Sometimes, it is rapid; sometimes, it crawls
- 5- There is no universal recipe

Understanding the process of innovation is a major challenge of contemporary economics

Our contribution

The MINE project

Managing Innovation in the New Economy

- A research project directed by Dr Roger Miller

A global survey of ~1000 innovative organizations

- Followed by 50 case studies

What innovation strategies are you pursuing? Why?

The statistical analysis yielded powerful insights

Looking at innovation...

.... from the perspective of the innovators

The statistical analysis

Identifying the games

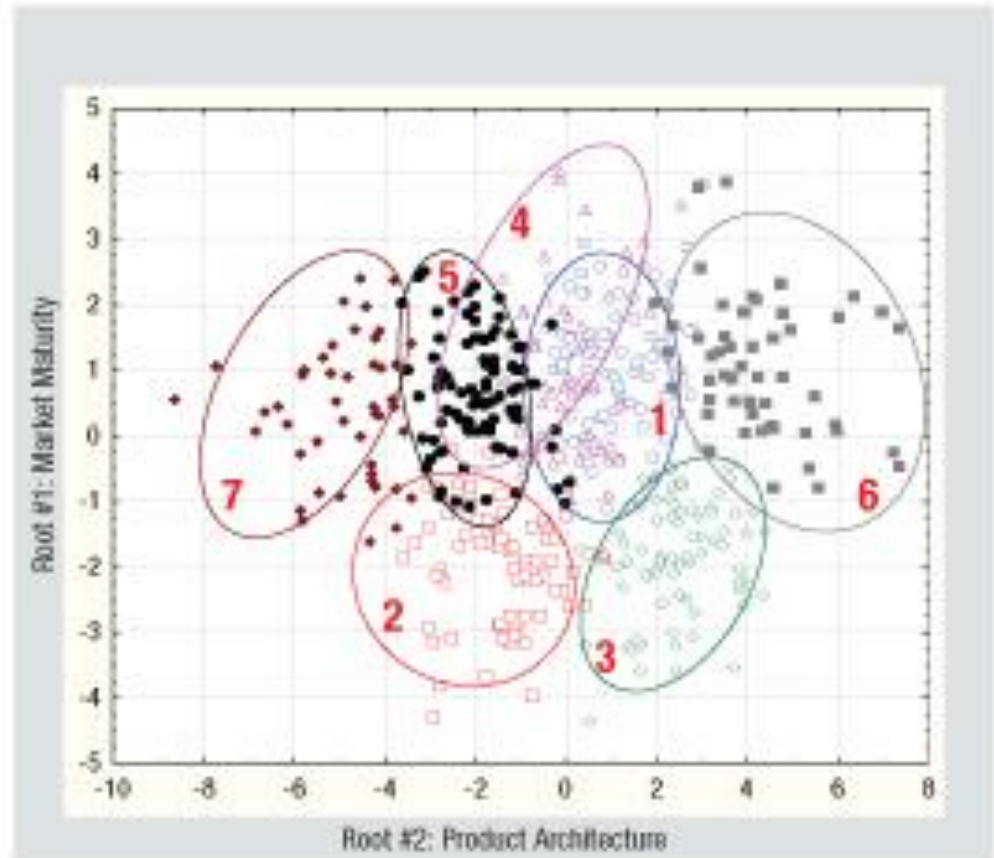
Principal components → cluster analysis → canonical analysis

Two dominant roots

1. Market maturity
 - Emerging and mature
2. Product architecture
 - Stand-alone, open systems, closed systems
 - Noise due in part to the questionnaire design

Provided insights on the structure of innovation

- An input for the case studies



Understanding the results

2 variables explain their innovation strategies

I – The maturity of the market

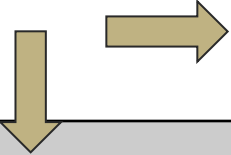
- 1- Emerging markets: developing customer bases
- 2- Mature markets : the customer bases are experienced

II- The architecture of the product

- 1- Stand-alone products: Lipitor, Nespresso, a gold mine
- 2- Open systems: iPhone, Wal-Mart
- 3- Close systems: TGV, Dreamliner, automated warehouse

$2 \times 3 = 6$ « *games* » of innovation

The six games of innovation

	<i>Stand alone products</i>	<i>Open systems (Platforms)</i>	<i>Closed Systems</i>
 <i>Innovations in <u>emerging markets</u></i>	- 1 - Eureka!	- 2 - Battle of Architecture	- 3 - System Breakthrough
<i>Innovations in <u>mature markets</u></i>	- 4 - New and Improved	- 5 - Mass Customization	- 6 - Pushing the Envelope

6 environments ➔ 6 patterns of innovation

Each game looks at innovation differently

Each one has its own set of rules and characteristics

- Particularly, the required competencies and the key success factors a

Very different footprints in the economy

- Emerging market games: 10% of GDP, 33% of growth
- Mature market games: 90% of the economy, 67% of growth

In all games, innovation takes many forms

- Bearing on the product, the processes, or the business model
- Incremental (90%+) or disruptive, open or proprietary,

Market-creating innovations: rare and often unnoticed

- Altair (PC, 1975), Intershop (Web shopping, 1994), SixDegrees (1996)

A battle of architecture

The smart phone market game



1997: The « invention »: RIM combines e-mail et pager

1997 -2002: Emulations, mostly by start-ups

1999: The first Blackberry, with a scroll wheel on the side

2002: RIM adds a phone function, a breakthrough that allowed texting

2003 – 2007: Most majors mobile players enter the market

- A major push in the consumer segment: Nokia, Samsung, Motorola, etc.

2007: The iPhone broadens the market: a must-have tool

2009: Google launches the Android platform, which is now market leader

A continuous flow of improved products
Relative technological homogeneity
Competition is mostly on design and marketing
Patents started to play a role only in 2011

Eureka!

Emerging market for a stand alone product



Post-it Notes, Viagra, Cirque du soleil, Snowmobile 1960 -1980

A 10 to 20 year adventure while the customer base expand to saturation

- It starts with an invention, followed by a lot of emulation

Significant evolution of the product as it improves

- Initially, the number of competitors explodes as entry is relatively easy
- Then the market gets crowded and consolidated around a few players

Four challenges

1. Marketing, branding, distribution: ➔ enlarging customer base
2. Smart R&D : Staying ahead of the product evolution
3. Design, agility, image
4. Managing growth

Great companies comes out of the adventure



Emerging open platforms

Battle of architectures

Smartphones, Facebook, Google, Amazon

Competition between rapidly progressing platforms

- Customer needs are satisfied by applications on the platform
- Most applications tend to be supplied by third parties

Significant network effects: the more the merrier

- Rapid concentration as the market grows
- The best offering, not the best platform usually win

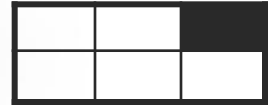
Four challenges

1. Attracting a minimum number of users: pricing and promotion policies
2. Coalition building: attracting third party developers to enhance the offering
3. Platform evolution and brand management
4. Managing growth

Rapid concentration: Top 4 smartphone platforms: 95% of the market



Closed systems Breakthroughs



SAP, Microsoft, Oracle at their onset, Boeing 787, Challenger

The game starts with a customer facing a major bottleneck

- Has deep pockets, is eager to address it
- Create a duet by partnering with a technical expert

A complex high risk multi-year endeavour

The four challenges of Breakthrough Games

1. Holding the duet together
2. A very complex technological solution
3. Project management: delays, budget overrun, tensions
4. Allowing the experts to commercialize the breakthrough



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We never through that this could be done...

When a market matures

New and Improved



Tide, most consumer products, basic materials, etc.

A game played in 40% of the economy

Relative stability of the demand and of the customer bases

- Competition is about taking customers away from competitors

Continuous improvement of products, processes and business models

- Sporadic although rare disruptions in processes and business models

Four challenges

1. Selecting innovation as a competitive edge (only~50% do!)
2. Incorporate innovation in management processes
3. Change management: continuous improvements
4. Develop and properly manage its ecosystem



Concentrated markets: 3 to 5 relevant competitors (+ their ecosystems)

Open platform in mature markets

Mass customization



Wal Mart, retail chains, car manufacturers, airlines



Mass market platforms aggregating the contribution of numerous players

- Allowing the customization of the offering by the customer

At the core, a strong brand and systems binding suppliers

- Customers can personalize their offering



ZARA

Four challenges

1. Managing the brand: its meaning to a broad segment of customers
2. Defining the offering
3. Managing the evolution of the systems
4. Managing the relations with suppliers



Global platforms, concentrated markets and large ecosystems

Closed systems, mature markets, Pushing the envelope



The Millau's Viaduc, tallest skyscraper, innovative computer system

The innovation can be traced back to an ambitious customer

- Who wants to develop an edge by pushing the envelope
- Assemble a team of experts to address it



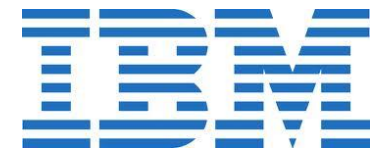
Going beyond the existing, facing issues for the first time

Four challenges

1. Project management: on schedule, on budget
2. Assembling the right team of experts
3. Getting stakeholders to sign on
4. Change management by those affected by the projects



Large infrastructure projects: aiming for the top



Best Business practices

Five principles to win at innovation games

1. Capitalize on innovation to compete
 - Not a foregone decision in mature markets
2. Know which games are being played in our markets
 - What are the required competencies? Do we have them?
 - A critical issue when playing more than one game
 - Different cultures and practices must coexist within the same company
3. The sources of most innovation ideas: customers and users
 - Beware of researchers in their lab (too far from the market)
4. Open innovation is generally vastly superior (GE, P&G, etc.)
 - The best ideas are not necessarily originated in-house
5. Being the leader or a smart follower: a strategic choice

Each game has its own winning strategies

Eureka: Marketing, product management, nimbleness, M&A

Btle of Archit'ure: “buying” early customers, managing third parties

- Initial financing is critical to survive profitless market breakthroughs

Breakthrough: a strong partnership, money and management

New and Improved: building a culture of innovation

- Getting enthralled with a five blade razor and with 5% annual improvements !

Mass Customization: brand and network management

- Spreading and evolving without aggrieving customers and key suppliers

Pushing the envelope: ambition, project management, experts

Growth comes mostly from mature markets

Emerging markets represents less than 10% of GDP

- ICT-Producing industries: 4.2%; life science: <1%; Internet industries: ~4%
- But their growth rate is five time that of mature markets

But account for about one third of innovation induced growth

	Est'ed share of GDP	Estimated share of GDP Growth*			
		<i>Stand alone products</i>	<i>Open systems (Platforms)</i>	<i>Closed Systems</i>	<i>Total</i>
<u>Emerging markets</u>	10%	Eureka! 15%	Battle of Architecture 15%	System Breakthrough 5%	35%
<u>Mature markets</u>	90%	New and Improved 30%	Mass Customization 20%	Pushing the Envelope 15%	65%

* The estimate assumes that capital, labor and technological progress contribute equal share to GDP growth

The innovators' perspective

Four challenges to mainstream public policies

1. Innovation is very different from knowledge development
 - It is a business opportunity, whereas knowledge rests in the global commons
2. R&D is seldom the most critical factor behind an innovation
 - Critical : Product design and management, distribution and marketing
 - Subsidizing R&D basically reduces the costs of a secondary factor
 - One exception: projects that triggers system breakthroughs
3. Most innovations are improvements in products and processes
 - Moreover, innovations are highly specific to their business settings
 - Only sporadically are new products launched, triggering emerging markets
4. Stimulating innovation requires impacting business strategies
 - Inducing business to rely more on innovation to compete: a complex task

BERD is a weak lever of innovation

An input among many, in a process driven by product management

- Emerging markets: marketing and price support/distribution matter more
- Mature markets: culture and change management are more critical
- Why subsidize R&D and not other more powerful levers?

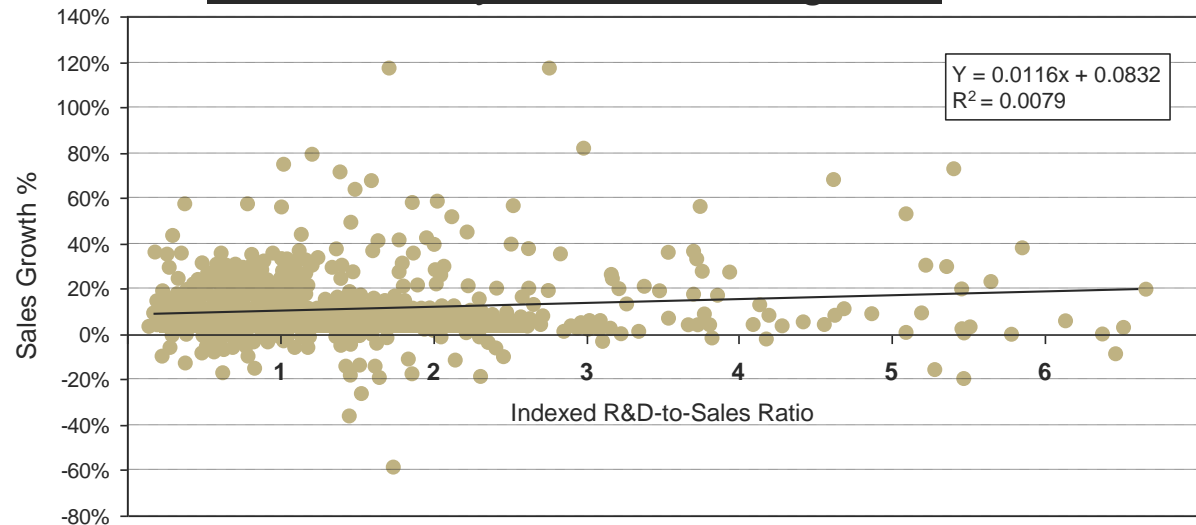
No correlation between

R&D / sales

versus

- Sales growth
- Enterprise profitability (gross, operating, and net)
- Market cap growth
- Total shareholder return.

R&D intensity versus Sales growth



Booz & Co 2005 survey of the world's top 1000 R&D spenders, 1999 to 2004

Shooting from many angles, responding to lobbies

Canadian Public Policies on innovation

1. Supporting industrial R&D: ~ \$5 B (80% in tax credit)
 - Tax credits inefficiency well documented by the Jenkins report
 - ~ \$1 B in project financing: IRAP, sector specific grants, soft loans
 - Classic industrial support programs in a few sectors (low cost financing)
 2. Supporting non commercial research: ~ \$5 B
 - Federal and Provincial efforts: universities, intra-muros, NRC
 - Oriented toward knowledge development rather than innovation
 3. Supporting entrepreneurship: VC, incubators, clusters, etc.
 - Knowledge transfers, university business collaboration, etc.
 - No significant impact in emerging markets except in Waterloo
 4. Other policies: IP, procurement, training, promoting S&T, etc.
- Life Sciences combine them all : meagre industrial successes

Clearly still in a deep fog

Revising Canadian innovation policies

Various assessment and proposals over the past five years

- CCA (Nicholson), Jenkins, Conference Board, K. Lynch, Canada 2020, etc.
- The consensus: current performance is mediocre, on most indicators
- The culprit is « business strategy », but the why is not understood
- M&E and IT shortfalls, Financial sector, Provinces, etc. can't explain the 70%!
- Baldwin & Gu (2010): MFP is the issue, and not capital intensity or labor

No strong consensus on strategic directions

- Better use of Federal support for R&D, specially tax credits
- Emphasizing more the knowledge base economy: S&T, entrepreneurs, etc.
- More international competition, remove internal barriers, leadership, etc.
- Strengthening support for “pull” approaches

Still a strong bias toward R&D as a key innovation lever

Lessons from the “Game” Framework

What to do: some modest proposals

The 25% productivity gap is mostly in mature sectors

- Most are not S&T intensive and most are in services
- What policies will encourage innovation-based competitive strategies?
- No magic bullet: most likely a cultural issue and a geographical consequence

Emerging markets: investing in ambition and in marketing

- Building winners that stay in the game: a Canadian ownership policy ?
- Creating richer milieux for fast growth firms, start-up and ecosystems

Universities: priority to technically-oriented top-notch graduates

- Developing talent, not research, is their main contribution to innovation

Demonstration projects and industrial challenges

- Replacing dumb tax credits by challenge grants
- Recognize the limit of « let the market decides » philosophy for innovation

Reversing the trend

Areas to explore further

S&T knowledge generation: we are good! Stop worrying!

- Per capita, we are most likely #1 in the world

Our low BERD: understanding the weak demand (unrelated to cost)

Mid to large “Business” generation: why are we so mediocre ?

- Mining is the only area where we excel globally: where else?

Our mature economy: can it strive to be more productive?

- Quite profitable with current strategies: what would bring them to change?
- To investigate: geography, resources orientation, foreign ownership

Emerging sectors: why do we drop out of most races

- What happened to the Ottawa technology cluster?
- Where are the Canadian champions at the finish line?

What to remember?

The take out from today

Analysing innovation from the perspective of the innovators

Six different games (or patterns), defined on two dimensions

- I- Emerging (rapidly expanding) markets and mature markets
- II- Architecture: stand alone, open systems and closed systems
 - Different skills, different KSF, different approaches to innovation

Canada has a major productivity issue in its mature sectors

- Businesses are not competing on innovation: we do not know why

Canadians are not performing in emerging market races

- Spotty participation dropping out easily
- Why wasn't Bombardier sold in 1980 (snowmobile emerging market)

We are quite good at S&T: R&D is not the problem!