INNOVATION and KNOWLEDGE CREATION
How are these concepts related?

SILVIO POPADIUK

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Innovation and knowledge creation: how are these concepts related?

SILVIO POPADIUK

- Statistician - 1974
- PhD in Business Administration – Universidade de Sao Paulo – Brazil – 1996
- Professor at Faculty of Economic Sciences and Business (FCECA) - Universidade Presbiteriana Mackenzie (1896) – Sao Paulo – Brazil since 1993

- 11 Faculties – 1145 professors - assistants
- 28,000 students
- FCECA: 203 Professors – assistants

- Main interest areas
  - Knowledge management
  - Marketing research
  - Research Methods
  - Strategy

- WHY AM I AT FIS?

Brazil: 8,500,000 Km2
Population: 175,000,000
Sao Paulo State: 30,000,000
Sao Paulo City: 10,600,000
Number of cars: 5,300,000
**RESEARCH QUESTION**

<table>
<thead>
<tr>
<th>Knowledge Creation (SECI model) (Nonaka &amp; Takeushi, 2001)</th>
<th>Type of Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Radical</td>
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<tr>
<td></td>
<td>Incremental</td>
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<tr>
<td>Socialization</td>
<td></td>
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<tr>
<td>Externalization</td>
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<td>Combination</td>
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<td>Internalization</td>
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Brazil size
■ GENERAL FRAMEWORK

Three streams: Strategy – Innovation - Knowledge

Firms Seek PROFITS through:

= F(KNOWLEDGE)

■ DERIVATIVE OUTCOME

- Ontology theory - Taxonomy - Topic Maps

■ REFERENCES IN STRATEGY

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Iguacu Falls (Brazil – Argentina – Paraguai)
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Salisbury, Mark, 2001
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First Stream: STRATEGIC VIEW

The starting point: Consumer’s NEEDS

Company creation

But

There are three actors in the market

MACRO ENVIRONMENT

Consumer

Company

Competitor

SO

How to study Competition?

Three approaches:
1. Industrial organization
2. Chamberlinian competition
3. Schumpeterian competition

(Barney, Jay B. 1986)
1. INDUSTRIAL ORGANIZATION
Focus: External environment
Main idea: Porter’s five forces
Main authors
• Bain, 1956; 1968; Mason, 1939
• Porter, 1980; Caves & Porter, 1977

2. CHAMBERLINIAN COMPETITION
Focus: Internal environment
Main idea: Resources and capabilities
Main authors:
• Chamberlain, 1933; Robinson, 1933
• Kotler, 1976; Learned et al. 1969

3. SCHUMPETERIAN COMPETITION
Focus: Dynamic of the environment
Main idea: No stability - No predictability
Creative destruction INNOVATION
Main authors:
2. Lippman & Rumelt, 1980; Barney, 1985

Source: Barney, Jay B. 1986

Brasilia Catedral
How to be more competitive?
What explains different performances?
• External and internal determinants

FROM INTERNAL DETERMINANTS

Knowledge-based perspective where firms are seen as repository of knowledge resources and capabilities that includes:

- Expertise
- Experience of individuals
- Routines and processes
- Knowledge of customers needs and supplier strength. So...
Innovation and knowledge creation: how are these concepts related?

**PLUS** KNOWLEDGE CAPABILITIES

**SUSTAINABLE COMPETITIVE ADVANTAGE**

**MORE PROFITS**

**SO...**

PROFIT is the **MAIN** drive for COMPETITION

But

PROFIT is REVENUES - COST

and REVENUES

Depends on: PRICE and QUANTITY

But

\[
\text{PRICE} = f(\text{PRODUCT ATTRIBUTES} \text{ and } \text{QUANTITY})
\]

\[
\text{COST} = f(\text{PRODUCT ATTRIBUTES} \text{ and } \text{QUANTITY})
\]

Source: Afuah, 1998)
WHAT DOES IT IMPLY?

Products should be developed such as allow the best profits. In this case, **INNOVATION** becomes the key word. The main idea involved with innovation is **KNOWLEDGE**. That is, the knowledge should be incorporated in the product such as can stimulate the customers to buy them. (Afuah, 1998)

How can we classify this knowledge whose aim is the generation of profits? **THREE APPROACHES**

- Knowledge in TECHNOLOGY
- Knowledge in MARKET
- Knowledge to ADMINISTRATION
## INNOVATION and NEW KNOWLEDGE

<table>
<thead>
<tr>
<th>NEW</th>
<th>Approach of Innovation</th>
<th>Focus of Innovation</th>
<th>TYPE OF INNOVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Technology</td>
<td>Products</td>
<td>Radical</td>
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<tr>
<td></td>
<td></td>
<td>Processes</td>
<td>Incremental</td>
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<tr>
<td></td>
<td></td>
<td>Services</td>
<td></td>
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<tr>
<td>KNOWLEDGE</td>
<td>Market</td>
<td>Product</td>
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<td></td>
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<td>Price</td>
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<td>Place</td>
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<td>Promotion</td>
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<tr>
<td>Administration</td>
<td>Competences</td>
<td>Strategy</td>
<td>Rio de Janeiro – Cristo Redentor</td>
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<td>Structure</td>
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<td></td>
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<td>People</td>
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<td></td>
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<td>Systems</td>
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</tbody>
</table>

Source: Framework based on AFUAH, Allan, 1998
DEFINITION OF INNOVATION

“Innovation is the use of new knowledge to offer a new product or service that customers want. It is invention + commercialization” (AFUAH, Allan; 1998)

New knowledge can be technological or market related.

To be an innovation, an idea must be converted into a product or service that customers want.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Knowledge of components, linkages between components, methods, processes, and techniques that go into a product or service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>Is the knowledge of distribution channels, product applications, and customers expectations, preferences, needs, wants</td>
</tr>
<tr>
<td>Administrative</td>
<td>Pertains to organization structure and administrative processes and may or may not affect technical innovation</td>
</tr>
</tbody>
</table>

Pantanal - MS
# Innovation and Knowledge Creation: How Are These Concepts Related?

<table>
<thead>
<tr>
<th>TYPE OF INNOVATION</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product and/or Service</td>
<td>Are new products or services introduced to meet an external and market need</td>
</tr>
<tr>
<td>Process</td>
<td>Are new elements introduced into an organization’s production or service operations – input materials, task specifications, work and information flow mechanisms, and equipment used to produce a product or render a service</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE OF INNOVATION</th>
<th>Characteristics</th>
</tr>
</thead>
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<tr>
<td>Radical</td>
<td>The technological knowledge required to exploit it is very different from existing knowledge, rendering existing knowledge obsolete. Such innovations are said to be competence destroying</td>
</tr>
<tr>
<td>Incremental</td>
<td>The knowledge required to offer a product builds on existing knowledge. It is, according to Tushman and Anderson (1997), competence enhancing</td>
</tr>
</tbody>
</table>

Source: AFUAH, Allan, 1998
Innovation and knowledge creation: how are these concepts related?

**RADICAL**

**Product**
- Vacuum tube > Transistor
- Piston > Turbojet
- Block ice > Mechanical refrigeration
- Gas lamps > Incandescent/fluorescent bulbs
- Cloth diapers > Disposables
- Dos > Windows 3.x > Windows XP – NT
- Analog > Digital

**Process**
- Draw glass > Float glass
- Natural gems > Synthetic gems
- Rotary kiln > Edison kiln

**Service**
- Federal Express one-day delivery service

**INCREMENTAL (Architectural)**
- Cannon’s small copier
- Sony’s Portable Radio
- Microsoft’s Office Suite
- Honda’s Motorcycles

Source: Tushman & Anderson, 1997
**KNOWLEDGE - Definitions**

- "Knowledge is defined in the knowledge management literature in several ways. Characteristics of knowledge relevant to business organizations include facts, opinions, ideas, theories, principles, and models, experience, values, contextual information, expert insight and intuition. In the knowledge management community, knowledge is categorized into two broad areas: explicit and tacit." (MITRI, Michel, 2003)

- "Knowledge is a justified personal belief that increases an individual’s capacity to take effective action" (ALAVI & LEIDNER, 1999)

**Relationship between subject and object**

![Diagram showing the relationship between subject and object](source: HESSEN, Johannes, 2000)

The more accurate the image of the object, the greater the knowledge.

Sao Paulo – Italia Building - Downtown
- **TACIT KNOWLEDGE**
  - The implicit knowledge used by organizational members to perform their work and to make sense of their world. Tacit knowledge is hard to verbalize because it is expressed through action-based skills and cannot be reduced to rules and recipes

- **EXPLICIT KNOWLEDGE**
  - Knowledge that has been codified formally using a system of symbols, and can therefore be easily communicated or diffused. It may be object-based or rule-based

- **CULTURAL KNOWLEDGE**
  - The shared assumptions and beliefs about an organization’s goals, capabilities, customers, and competitors. These beliefs are used to assign value and significance to new information and knowledge

- SOURCE: CHOO, Chun Wei; on site, July 6, 2004
WHAT IS KNOWLEDGE MANAGEMENT?

“Knowledge management is a framework for designing an organization’s goals, structures, and processes so that the organization can uses what it knows to learn and to create value for its customers and community.” (CHOO, Chun Wei, on site, 2004)

“Almost all the definition include reference to a common set of activities with respect to knowledge. These include: acquisition, structuring, storage, management, development, dissemination, and use. KM is closely associated with the concept of the “learning organization”, in which mental models, shared vision, team learning, systems thinking and personal mastery are central themes”

(MITRI, Michael, 2003)

HOW TO CREATE VALUE?
Microsoft Word Commands Known
1. To know 450 commands
2. To improve individual creativity aiming to reach individual potential
3. To Join potentials to reach collective potential of using MS Word

BUT, how could the whole be greater than the sum of the parts?

- Enabling conditions
- Explore tacit knowledge
- Intention
- Commitment
- Leadership
- Systems
- Structure
How to be INNOVATIVE? – The answer: Knowledge creation

<table>
<thead>
<tr>
<th>KNOWLEDGE</th>
<th>To TACIT</th>
<th>To EXPLICIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>From TACIT</td>
<td>Socialization</td>
<td>Externalization</td>
</tr>
<tr>
<td></td>
<td>Sharing ideas, feelings, experiences</td>
<td>Metaphors, models, concepts</td>
</tr>
<tr>
<td>From EXPLICIT</td>
<td>Internalization</td>
<td>Combination</td>
</tr>
<tr>
<td></td>
<td>Learning by doing</td>
<td>Joining new information</td>
</tr>
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Source: Nonaka & Takeushi, 1995
RESEARCH QUESTION
- Do the degree of knowledge creation differ when comparing incremental and radical product innovation?

HYPOTHESIS
- H$_{01}$: The degree of socialization is higher in radical product innovation than in incremental product innovation
- H$_{02}$: The degree of internalization is higher in radical product innovation than in incremental product innovation
- H$_{03}$: The degree of combination is higher in radical product innovation than in incremental product innovation
- H$_{04}$: The degree of externalization is higher in radical product innovation than in incremental product innovation
- H$_{05}$: The correlation among socialization, internalization, externalization, and combination within radical product innovation is higher than the correlation among socialization, internalization, externalization, and combination within incremental product innovation

VARIABLES: Knowledge creation and innovation
SAMPLE POSSIBILITIES

1. One company, many projects
   - Select some projects or all projects and apply the questionnaire
   - A) Leaders x leaders
   - B) Leaders x members of the same team
   - C) Member team x member team
   - D) Teams x teams

2. Many companies, one or more projects by company
   - A) Leaders x leaders
   - B) Leaders x member of the same team
   - C) Member team x member team
   - D) Companies x Companies
   - E) Project x Project
SUPPOSITION: One company or different companies

1. Leaders of radical projects versus leaders of incremental projects
2. Leader of each project versus members of the same project
3. A member of each team compared with other members same team
4. Members of radical projects compared with member of incremental projects

The same reasoning apply for internalization, combination, and externalization

H₀₁: socialization (radical project) > socialization (incremental project)
SUMMARY OF HYPOTHESES TO BE EVALUATED

Two or more project being evaluated

<table>
<thead>
<tr>
<th></th>
<th>Leader of radical project</th>
<th>Leader of incremental project</th>
<th>Member of the same team</th>
<th>Multiple Teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leader of radical project</td>
<td>AMONG</td>
<td>BETWEEN</td>
<td>BETWEEN</td>
<td>BETWEEN</td>
</tr>
<tr>
<td>Leader of incremental project</td>
<td>AMONG</td>
<td>BETWEEN</td>
<td>BETWEEN</td>
<td>BETWEEN</td>
</tr>
<tr>
<td>Member of the same team</td>
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<td></td>
<td>AMONG</td>
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ACKNOWLEDGMENTS

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- Paulette Rothbauer

- Thea Miller
- Susan Brown
- Joseph Cox
- Ab Gehani
- Tony Lemmens

Brasilia – in the evening
Vera Lucia

Ariana        Camila      Juliana

The best combination
Between tacit and explicit
No theory needed! Only a deep interaction
Innovation and knowledge creation: how are these concepts related?
Be welcome when visiting Brazil

THANK YOU!