Inovação e Sustentabilidade: Imperativos na Gestão da Cadeia de Suprimentos?

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ENEGEP 2014, Curitibe-PR
7 de Outubro de 2014

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Agenda

- Introdução
- A importância da Sustentabilidade e da Inovação para a Gestão das Operações
- Motivações para adoção
- A importância das Cadeias de Suprimento
- Casos de negócios
- Considerações Finais e Lições

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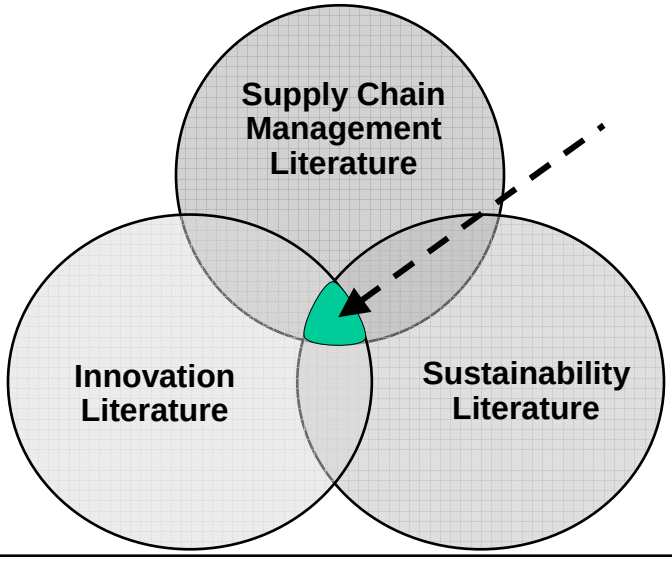
Areas of Research



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What is innovation?

- **Innovation** is the process and outcome of creating something new, which is also of **value**.
- Innovation involves the **whole process** from opportunity identification to commercialization (going through idea, invention, development, prototyping, production, marketing and sales) (Schumpeter, 1934).
- Today competition and changing environments require supply chains to **quickly adapt** themselves and promote new **business models**.

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Sustainable Development

Growth that meets economic, social, and environmental needs without compromising the future of any one of them.

WORLD RESOURCES INSTITUTE

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A Vision for Sustainable Development

"TRIPLE BOTTOM-LINE"

John Elkington (1997)

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How Important Is The Triple Bottom-Line?

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The Triple Bottom-Line

Sixty Percent of the Fortune 500 companies within the next few years will expand their strategic goals to reflect Triple Bottom-Line issues

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The Triple Bottom-Line

A survey by consulting firm Arthur D. Little:

83% of global business leaders believe they can generate significant business value by implementing sustainable development strategy and operations.

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The Triple Bottom-Line

***The Economist* magazine cites environmental issues as one of the most important of this century.**

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What Motivates Organizations to consider the Triple Bottom-Line?

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PROCTOR & GAMBLE

"People are going to want, and be able, to find out about the citizenship of a brand, whether it is doing the right things socially, economically and environmentally."

Mike Clasper

President of Business Development

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UNILEVER

"Corporate social responsibility is a modern business decision. Not because it is a nice thing to do or because people are forcing us to do it... because it is good for our business"

Niall Fitzerald
Former CEO

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EDF ENERGY

"Doing the right thing on climate change saves money, retains customers, creates new market opportunity and takes you beyond just compliance. It reduces your risk exposure and reduces risk to shareholders."

Jonathan Foot
Chief Environmental Officer

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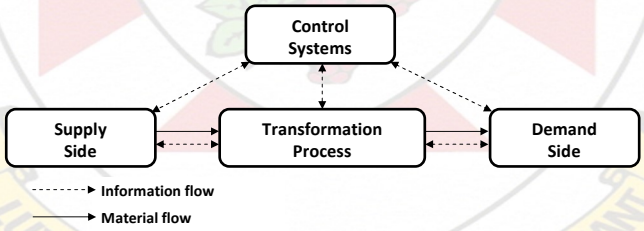
Why innovation?

- Sustainable organizations and SC can only be successfully implemented through innovation because the sustainability concept requires supply chains to **change in their essence**.
- Innovation allows SC to **create value** by incorporating the ecological and social dimensions in their **business practices**, without losing competitiveness.
- Innovations are then **central to the process of SC change** in regards to sustainability.

SC Complexity

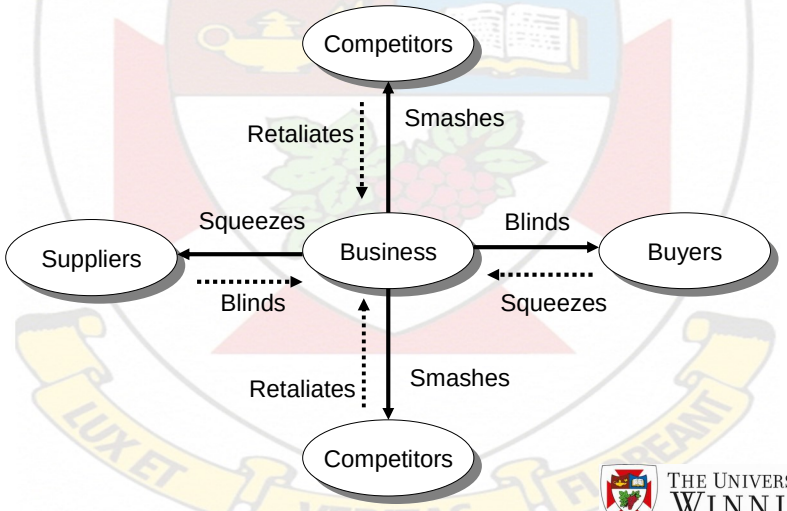
Managing SC involves high levels of Complexity & Uncertainty

Sources of Uncertainty	Examples
Supply Side	Quantity supplied, quality supplied, lead time
Transformation Process	Quantity produced, quality produced, production time
Demand Side	Quantity delivered, product specifications, distribution lead time
Control Systems	Information availability, accuracy

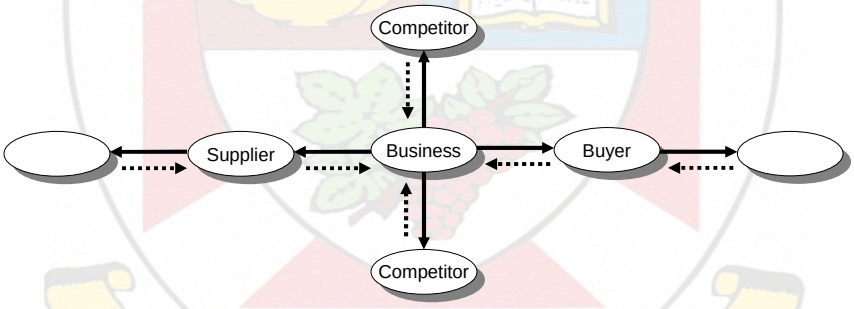


Source: van der Vorst & Beulens (2002); Mason-Jones & Towill (1998)

Organization's game



Supply Chain's game



And Sustainable Supply Chains?

Sustainable Supply Chains

- Involve additional dimensions of complexity and uncertainty - 'triple bottom line' (Elkington, 1998; WCED, 1987):
  - Economic dimension
  - Environmental dimension
  - Social dimension

Sustainable SCM as a Complexity Challenge

- Complexity: situation with large # of interacting parameters; difficult to infer properties of the entire system
- Because of complexity, managers are limited in what they can know (*bounded rationality)* – should seek *satisfactory* solutions
- Systems can present different levels of complexity (Knight, 1921; Simon, 1962; 1969):
  - Under simple systems, improving one parameter is enough for reaching higher performance
  - Under complex systems, improving one parameter will affect the performance of others. Key elements/interactions may be difficult to identify and resolve = **ambiguity**.

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Sustainable SCs

• **Sustainable supply chains** (e.g. Seuring & Muller, 2008)

• Economic goals can be compatible with environmental and social goals in sustainable supply chains (Pagell and Wu, 2009)

• There are strong evidences that sustainable practices lead to commercial success and should not be seen by supply chains as a moral obligation (Zailani et al, 2012).

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Casos de negócios

- Apple
- Toyota
- British Petroleum
- Petrobras

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Apple - the suicide factory in China

• Foxconn (Apple's supplier in China) has had a horrible history of suicides at its factories. A suicide wave in 2010 saw 18 workers throw themselves from the tops of the company's buildings, with 14 deaths.

•Employees and universities reported Foxxcom as a "labour camp" - "The assembly line ran very fast and after just one morning we all had blisters and the skin on our hand was black. The factory was also really choked with dust and no one could bear it," an employee said.

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Toyota – the hide and seek game

•mechanical sticking of the accelerator pedal causing unintended acceleration causing several crashes, injuries and deaths

•CTS Corporation, the American manufacturer of the electronic accelerator pedals that Toyota claims are at fault

•Recalls for approximately 7.8 million vehicles and an economic impact of more then $4.5 billion

•Toyota paid a US$1.2 billion criminal penalty, in which the Justice Department concluded that Toyota had intentionally hid information about safety defects from the public and had made deceptive statements to protect its brand image.

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BP – who is responsible?

2010 Deepwater Horizon Accident

- 11 deaths
- 5 million barrels over 5 months
- $ 37 billion

Investigation found that BP's, Halliburton's, and Transocean's cost saving strategies helped to trigger the explosion and ensuing leakage. The report stated that "whether purposeful or not, many of the decisions the companies made increased the risk of the accident clearly saved those companies significant time (and money).

ENERGY BP FORTUNE

BP: 'An accident waiting to happen'

Petrobras

Oh…it's not my responsibility

- According to Petrobras former CEO Gabrielli de Azevedo (2009), Petrobras' operations had been hindered by poor environmental performance of its SC in the past.
  - For example, in 2000 the company was responsible for major oil spills, and in 2001 it lost a modern floating platform (P-36) after numerous explosions, killing 11 employees
- Pressuring suppliers (exclusive approach); big SC changes (certifications ISO 9000; 14000)
- Offshore deep and ultra-deep water developments and operation **(Is that really sustainable?)**
- These events, along with public backlash, contributed towards Petrobras' shift in its environmental and social stances.

The Shift

- As early as 1975, Petrobras had engaged in various efforts to destroy Proálcool (Hira and Oliveira, 2009)
- Later on, they start supporting and getting involved in the Proálcool
- Petrobras becomes an "energy company" instead of an oil company in 2002 (Ferreira, 2009)
- Creation of the Biodiesel Program in 2005 by the Gov't
- In 2008 Petrobras launched the subsidiary "Petrobras Biofuels"
- Petrobras started investing in biofuel production in 2009 (bought 43,58% da Total Agroindústria Canavieira)
- The company is now seen as a model for CSR within the oil and gas industry (Noria, 2008), and is an industry leader in sustainable development - according to SD indicators like DJSI

SC 1 – Oil & Gas

- Petrobras discovered offshore oilfields in CamposBasin, Rio de Janeiro (1974)
- Leader in deep and ultra-deep well technology; rare example of an innovative national oil company (Silvestre & Dalcol, 2009)
- 5th largest publicly traded oil & gas company (listed on SP, Madrid and NYSE)
- Latin America's largest, most profitable firm
- One of the most innovative oil companies (Silvestre, 2014)
- Supply chain offers few opportunities for small firms and poor people without extensive long-term training:
  - Increased participation could erode attributes such as reputation and financial success (Hall et al. 2012)

SC 2 – Ethanol

- Originated with ProAlcool Program:
  - Response to 1970's oil crises
  - Initially subsidized
  - Petrobras initially opposed
- Brazilian sugarcane ethanol is more efficient than US/EU crops
- Now: Stable supply
- There is widely available distribution infrastructure (100% of gas stations)
- Automotive sector offers 'flex fuel' cars (ethanol/gasoline/natural gas)

Please see Hall et al. (2012) for a complete discussion

SC 2 – Ethanol

- In the beginning, subsidies favored large-scale farmers & concentration of mill owners
- Like previous generations of agricultural modernization (e.g. 'Green Revolution', use of foreign crops, transgenics), increased economic efficiency was achieved
- Small farmers ended up selling their lands and migrating to urban areas – *favelization*
- While an economic success, ethanol has been scrutinized for poor working conditions, not providing opportunities for small farmers and mills

Please see Hall et al. (2012) for a complete discussion

SC 3 – Biodiesel

- Gov't responded with Bio-diesel Program (2003), with Ministry of Mines and Energy, Petrobras, Brazilian Development Bank, and others.
- Aims to address part of the economic, environmental and social problems in the country by promoting a renewable energy SC.
- Economically, it is very important: 80% of the cargo transportation in Brazil uses diesel (trucks and watercrafts)
- The social component of the Program involves providing opportunities for poor farmers as supply chain members (Social Fuel Stamp – social label scheme) – Hall et al. (2012)
- Castor beans vs. soybeans (Matos & Silvestre, 2013)

SC 3 – Biodiesel

- Mechanisms that drive the participation of poor farmers (castor beans) are:
- Tax incentives (Social Fuel Stamp)
- Training, capacity building and financing
- Market stimulation (there is a mandatory bio-diesel content - initially 2%; 2009 = 4%)

- Entrepreneurial opportunities (poor take-up).
- In practice, difficult problems to solve:
- Distrust between poor farmers and refineries (it takes time to build trust)
- Poor farmers lack basic business knowledge (coops may be the solution)
- Tough competition from large-scale soybeans bio-diesel SC

Challenges – Petrobras

Biodiesel from Castor

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Challenges	Implications	Potential Solutions
Refinery owners don't want to deal with hundreds of poor small farmers	Refinery owners are likely to buy from concentrated seller to ensure stable supplies and reduce transaction costs	Adopt cooperatives as a strategy to increase scale and reduce transaction costs
Concentrated soybean producers offer a better option (financially)	Soybeans lack environmental and social benefits	Consider soybeans as a complementary crop for biodiesel development instead of a competing crop
Activists and media criticize refineries for exploiting Gov.'s poor monitoring system	Reduces Program legitimacy (Program at risk)	Implement more efficient monitoring and control mechanisms for the Program
Poor farmers want Petrobras to pay higher prices for their harvest, but don't want to honor contracts	It becomes difficult to commercially engage with these stakeholders	Adopt cooperatives as a strategy to commercially organize poor farmers; Shift from single to multiple objectives
Poor farmers lack education, don't trust industry and Government due to prior experience	Inability to see the long-term implications of their actions	Build relationships with stakeholders such as entrepreneurship support agencies to provide basic business training to poor farmers

Please see Matos & Silvestre (2013) for a complete discussion

Discussion

- ***Sustainable supply chain management*** is a continuous process whereby **capabilities**, **integration**, **collaboration** and **coordination** provide SC members the ability to respond to changing econ., env. & social concerns from different stakeholders
- Shaped by financial, social, environmental parameters, supply chains emerge, evolve, and create new problems that need to be addressed later – evolutionary approach (Nelson & Winter, 1982)
- Focal companies play a leadership role; trust is the base for the development of relationships among stakeholders (Vachon & Klassen, 2006; Lamming, 1993)
- Knowledge flows among supply chain members and other stakeholders are crucial (Carter & Rogers, 2008). There is a much increased need for **cooperation** among partnering companies in sustainable supply chain management (Seuring & Muller, 2008)

Takeaways…

- We cannot understand competition without considering SC approaches (individual companies are not relevant) – Silvestre (2014)
- We cannot improve SC performance without discussing sustainability
- SC performance can only be improved through innovation in order to truly integrate the environmental and social dimensions into business models, without losing market competitiveness (Silvestre, 2014)
- Innovation process is complex (Simon, 1969), involve risks (Knight, 1921) and is context-dependent (Langford et al, 2006)
- Innovations do not happen as a result of activities of one single organization in isolation, but they are often an outcome of SC interactions

More takeaways…

- Some supply chains, like oil & gas, have a propensity to be socially exclusive - attempts at reversing this may cause more harm than good
- Some supply chains, like ethanol and bio-diesel, have a propensity to be less socially exclusive, but still have strong tendencies to economize at the expense of weaker stakeholders.
- Firms operating in exclusive supply chains may be able to find satisfactory sustainable solutions by investing in other supply chains (it's a difficult task, but it may provide long-term benefits and opportunities for innovative solutions).
- Sustainable Supply Chains are opportunities, not costs

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