

The First Globelics Conference



***COMPETENCE BUILDING ON TECHNOLOGY
REGULATION:***

Monsanto's experience on GMOs

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Research Field



- The role of technology regulation in the pace and direction of technical progress.
- Technology regulation as an important institution of SI, creating specific and complementary capabilities in S&T.

Precedent Studies



- 1960's – Increasing on institutions of technology regulation in Developed countries.
- 70's – 90's – Empirical studies identifying direct and indirect impacts of regulation in the technological trajectories in industry branches (Gellman, 1974; Rothwell, 1980, 1992).

Precedent Studies



- RESULTS: effects of technological regulation
- Not the process.

CONTENTS



- NEOSCHUMPETERIAN APPROACH OVER REGULATION ON TECHNOLOGY
- MONSANTO'S CAPACITY FACING REGULATION OF TECHNOLOGY
 - a) Monsanto's diversification strategy
 - b) The Pharmaceutical Co. G.D. Searle
 - c) Monsanto's development of biotech

Neoschumpeterian Approach

- Recognizes the importance of the institutional environment of the firm, without a more accurate discussion.
- Freeman (1987) The institutional dimension is highlighted in the NSI approach.

Neoschumpeterian Approach

- Nelson (1995) Little research studying has been carried out concerning the linkages between regulatory laws and industrial structure.

Neoschumpeterian Approach

- Nelson & Winter (1982) Effects of the *Clean Air Act* in California (60's, 70's) on technological development (automobile; energy); and on institutional level (EPA).

Neoschumpeterian Approach

■ Henderson, Orsenigo & Pisano (1999)

Patent system – positive stimulus

Regulatory System – negative stimulus

■ Pharmaceutical Innovation Process:

50's - \$ 2 million ; 3 years

60's - \$ 20 milion; 7 years

80's - \$ 150 million; 20 years

Neoschumpeterian Approach

- Coombs, Saviotti & Walsh (1987)
Economics and Technological Change
- Technological Innovation – Conflict of Interests.
- Not just a mere legal battle but a tug of war concerning the access to information and knowledge.

Neoschumpeterian Approach

- Braithwaite & Drahos (2001)
Global Business Regulation
- Lobby of MNEs; economic and military coercion by dominant nations (USA; United Kingdom)
- Codex Alimentarius (FAO/WHO) sponsored by US food industry

Neoschumpeterian Approach

- Codex Alimentarius (FAO/WHO)
sponsored by US food industry
- 90's – 140 working commissions
- 445 – food industry representatives
- 8 public interest representatives
- Main representatives: Nestle; Coca Cola;
Unilever; Monsanto

Neoschumpeterian Approach

- Teece (1986) Complementary Assets
- Capability of firm to deal with and participate of the technology regulation process.

INNOVATION & CONFLICT



“All innovations have costs and benefits; but some innovations provide benefits to one group of people and costs to a different group.” (Coombs; Saviotti e Walsh, *Economics and Technological Change*, 1987)

INNOVATION & CONFLICT



- Groups with different interests are likely to conflict, and the outcome may be resolved on the basis of the power of the groups concerned, rather than abstract justice. The development of conflicting interests also influences the status of scientific and technical knowledge. ."
- (Coombs; Saviotti e Walsh, 1987)

Neoschumpeterian Approach

- Teece (1986) Complementary Assets to innovation.
- Capability of firm to deal with and participate of the technology regulation process.

Monsanto's Diversification



- 6 Agrochemical Companies control 85% of the world GMO seed production.
- Monsanto's leadership developing a soybean plant resistant to glyphosate (Roundup Ready).

Monsanto's Diversification



Monsanto's Strategic Decisions:

1. How to maintain the value of its main asset (Roundup) by inducing farmers to increase the use of its herbicide, when environmental rules are becoming more strict?
2. How to keep farmers' fidelity to the brand name, in order to reduce the effects of competition after the patent validity expires?

Monsanto's Diversification

- 1960's - 70's: recruiting scientists and interacting with the academy and public research institutions.
- 1980's: development of GMO resistant to Roundup.
- 1990's: authorization of GMOs traded by the company; shareholder of seed companies all over the world.

The Pharmaceutical Co.

G. D. SEARLE



- 1970's - Medium Co. family firm.
- Searle's credibility crisis towards FDA.
- Hiring a professional CEO - Donald Rumsfeld:
 - Director of the Office of Economic Opportunity
 - Director of the Cost of Living Council
 - NATO ambassador
 - White House Chief Staff
 - Secretary of Defence
- Hiring lawyers - experts on lobby and regulatory affairs (John Robson; Robert Shapiro).

Monsanto's Development of Biotechnology



- Long term x Short Term Strategy
- Shapiro launched a short term and aggressive campaign for authorizing and diffusing GMOs

FIGURE 1 – Mobility of scientists and executive between regulating bodies and bio-tech corporations in the USA

Linda J. Fisher – former administrative assistant of the EPA, now Vice President of Public and Governmental Business for Monsanto.

Michael Friedman – former member of the FDA Commission, now Vice President of Clinical Affairs at Searle, pharmaceutical division of Monsanto.

Marcia Hale – former assistant to President of USA and Director of Inter-government affairs, now director of International Government Affairs at Monsanto.

Mickey Kantor – former secretary of US commerce and former US commerce representative, now member of the Board at Monsanto.

William Ruckelshaus – former EPA administrative director, now member of the Board at Monsanto.

Lidia Watrud – former researcher of microbe biotechnology at Monsanto, now at the Environmental Laboratory of the EPA.

L. Val Giddings – former bio-tech controller and biological safety negotiator at the USDA (*United States Department of Agriculture*), now vice president of the Bio-tech Industrial Organisation – BIO.

Source: THE EDMONDS INSTITUTE, <http://www.edmonds-institute.org/olddoor.html>

Monsanto's Development of Biotechnology



Global Area of GMOs:

1996: 1,7 million acres

2002: 58,7 million acres (62% soybean)

USA: 80% of GM soybean

Argentina: 99% of GM soybean

MONSANTO's Complementary Assets



Our regulatory organization is comprised of over 300 scientists and regulatory affairs experts located throughout the world to support our agricultural chemical biotechnology, seed and animal health products.

MONSANTO's Complementary Assets



(...) Our success in obtaining regulatory approvals for biotechnology-derived products has been clearly demonstrated. In the United States, we have obtained from the USDA more of the approvals that are necessary to permit the commercialization of our products since 1998 than all of our competitors combined.

MONSANTO's Complementary Assets



(...) We are actively involved in international regulatory organizations that promote the need for harmonized data requirements and the use of science-based, risk-based assessments in the regulatory decision-making process.

Source: Monsanto Annual Report (2001)

MONSANTO's Complementary Assets

- Capability of the firm - obtaining the support of federal authorities:
- Interaction of regulatory agencies
- Using the coercive power of the government aiming at eliminating technical trade barriers in foreign markets.

Conclusions



- The management of complementary assets - regulation of technology.
- The Monsanto's ability to exert influence on GMO regulation process in the USA.
- How new technologies are proposed and enforced to society.

Conclusions



- Innovation as a conflict of interests process.
- Beyond a resource allocation analysis.
- Innovation as a co-evolutionary process (economic, social, political, environmental and legal variables)

Conclusions



- Issues for further investigation:
 - a) bigger complexity in the relations between agents (firm, state, universities/research institutes), S&T knowledge is used to arbitrate its own results.
 - b) social actors and institutions such as NGOs should be included in the analysis of NSI.