Exploring the Development of Corporate Environmental Management

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Abstract

There are pressures from public sector and the civil society to include environmental variables in management of corporate practices. Companies can provide different approaches to deal with environmental problems and different evolutionary stages. This article aims to identify the differences of these stages and their development in brazilian companies.

Keywords: corporateenvironmental management; environmental strategy; management and operation practices.

Introduction

Companies can match demands for mitigation of environmental impacts in their production systems in different ways. The literature on the subject describes three stages, the first being reactive in nature (restricted toattend pollution control legislation), the second, more advanced, seeking to prevent pollution instead of treating it after it have been generated, and the third of proactive nature, with changes in the organizational structure of the company, as well as in the relationship with suppliers and consumers from the Supply Chain. Returning to the literature, as organizations evolve in the field of environmental management, they optimize operational and management practices that compose innovation and sustainability. The main purpose of this paper is to investigate how the development of these practices influences the evolution of environmental management. The paper is organized in three sections. The first presents the evolution of the corporate environmental management and its relationship with operational and management practices. The second section discusses the paths of evolution in corporate environmental management. The third is the conclusion, showing the importance of researches seeking to find out prescriptive models to create sustainable supply chains.

Conceptual Definitions

This section presents the evolution of the corporate environmental management and its relationship with operational and management practices.

Evolution of Corporate Environmental Management: Operational and Management Practices.

Sustainable development has been part of the national and international public agenda for over 20 years. The World Commission on Environment and Development issued a document entitled Our Common Future, also known as Brundtland Report (1987) according to which sustainable development should meet present needs without putting in risk the possibility of future generations to meet their own.

The report marks a new concept of development, concerning meeting social needs now and in the future, which denotes the perception of the importance of environmental conservation and the impacts of corporate activity "beyond the walls of factories " as a social issue, and not mere externality. Industrial production is one of the most important causes of high environmental impacts, creating damages to society, fauna and vegetation. Because of that, there have been pressures from the public sector and the civil society to include environmental variables in the management of corporate practices. Thus, now the companies have a fundamental role in the development of environmental strategies.

According to Bansal and Roth (2000) environmental strategies consist in a group of practices and initiatives to mitigate the firm´s impact in the environment. The development of corporate environmental management requires changes in operating structures, creating new practices of environmental management.

Researches classify the development of environmental strategies in three stages: reactive, preventive and proactive. (Hunt and Auster 1990,Hart 1995,Shrivastava 1995,Russo andFouts 1997,Aragon Correa 1998,Sharma and Vredenburg 1998,Klassen and Whybark 1999,Barbieri 2004,Jabbour and Almada Santos 2006,Walls et al. 2011).

The reactive environmental management intends to meet the environmental legislation and often uses the so-called end of pipe technology to give treatment to pollution generated by industrial production. End of pipe technologies treat pollutants at its output in the end of the process. As the name implies, the reactive stage, the company is restricted to meet existing legislation, e.g., reducing emissions and solid waste generation.

When the environmental management is treated from the standpoint of control, it is merely seen as acosts generator item. This has implications for the organizational setup of the company, and environmental issues are not addressed in an integrated way between its various sectors. At this stage, the environmental dimension is considered a limiting factor to production performance (Maimon 1994, Corazza 2003, Barbieri 2004, Jabbour and Almada Santos 2006).

The second stage is an intermediary one searching a preventive pollution control rather than retrospective treatment. Thus, the environmental issue is treated preventively, with concerns about the use of raw materials and the selection of suppliers. The question is administered within the scope of the manufacturing area, but can involve other areas. However, the environmental variable does not pervade all administrative aspects. At this stage, the environmental activities are based on performance objectives of the company, particularly the prevention of pollution. However, the environmental performance of the company still does not constitute a strategic factor, and prevention goals are set up without the active participation of the environmental area.

Finally, in the third stage, proactive environmental management goes beyond environmental compliance and emphasizes pollution prevention, with investments for innovation of products and processes, incorporation of environmental issues in the planning, corporate values, managerial and business strategies of the company, as well as the involvement of stakeholders, with improvements in relationships with suppliers and customers in the supply chain (Hunt and Auster 1990, Hart 1995, Shrivastava 1995, Russo and Fouts 1997, Aragon Correa 1998, Sharma and Vredenburg 1998, Klassen and Whybark 1999, Barbieri 2004, Jabbour and Almada Santos 2006, Walls et al. 2011).

The environmental issue acquires a proactive dimension when it is aligned with the overall strategy of the organization. Porter and Kramer (2006) state that the lack of success on the experience of certain companies with respect to environmental management initiatives is directly linked to the fact that there was no association between the overall business strategy and environmental management. For this alignment to happen changes are needed in the configuration and organizational structure, with the involvement of executives from various areas of the company.

Nidumolu et al. (2009) state that environmental friendly products reduce costs as well as optimize the use of resources. They argue sustainability is the key driver for innovation, forcing companies to transform the way they create and develop products, technologies and processes.

Beyond Proactive Strategies to Green Supply Chain

Seuring and Müller (2008) state that the development of corporate environmental management initiatives is the result of pressure from the government, civil society and stakeholders. In this sense, companies tend to influence their suppliers to adopt sustainable practices, and these practices acquire a systemic perspective, the Supply Chain.

Barbieri and Cajazeira (2009: 2), say "seeing the production chain and not just what is going on inside the company is the basis for the establishment of good corporate management and operation practices committed to sustainable development." Thus the most important innovation for environmental friendly production practices is to develop a Sustainable Supply Chain (Zhu et al. 2008,Barbieriand Cajazeira 2009, Sarkis2012, Walls et al. 2011, Amini and Bienstock2014), which can be briefly summarized as an operating closed circuit that integrates green products and processes (Hart 1995,Barbieri 2004,Walls et al 2011,Sarkis 2012,Amini and Bienstock, 2014).

A Green Supply Chain adds environmental issues to the usual performance criteria: cost, quality, reliability and flexibility (Ageron et al. 2012). Srivastava (2007) and Seuring and Müller (2008) define that Supply Chain includes information systems and technology, transportation, warehousing and logistics. When purchasing practices, manufacturing, research and development and distribution are aimed to minimizing environmental impacts, they feature a Green Supply Chain (Srivastava 2007,Seuringand Müller 2008). This results in a relationship between innovation and sustainability, with investments in product management and design for environment (Barbieri 2004,Zhu et al. 2008,Amini and Bienstock 2014).

Barbieri (2004), Amini and Bienstock (2014), state that the strategic nature of environmental management is linked to aspects of integration and communication within and outside the organization, with the development of a relationship based on sharing information and resources with members of the supply chain, seeking to optimize the efforts for environmental management.

Sharma and Vredenburg (1998) also point out the importance of the interaction with the external environment of the company. Because of the relationship with stakeholders, companies develop high order learning, an organizational competence which arises from the need to respond to the demands of the external environment, with the development of new knowledge. As a result, there can be changes in production systems, which now constitute closed and circular flows (rather than linear processes), use of renewable energies, search for sustainable use of raw materials, instead of searching only efficiency.
Walls et al. (2011)follow the same logic and declare that a network consists in the interaction between organizations andis a reflection of the suppliers and buyers engagement, development product stewardship efforts or material exchange (so called industrial symbiosis).

Sarkis (2012) says that Sustainable Supply Chains are developed concurrently with other practices and management models. Therefore, the relationship between Environmental Systems, Life Cycle Analysis, Ecodesignand Industrial Symbiosis is very narrow.

Companies that adopt environmental management systems are also evolving their supply chains because they are instituting procedures used to influence the environmental practices of its suppliers, including them to reduce their environmental impact.

Using Life Cycle Analysis (LCA) it is possible to make a list of the impacts of the product or the process from "cradle to grave", making an inventory of material flow in the product system, with an assessment of the environmental impact according to this inventory. This makes possible to redesign products and processes, improving aspects such as material selection and suppliers, recyclability or reducing energy consumption (Barbieriand Cajazeira 2009).

Ecodesign (Krikke et al. 2004) includes design for disassembly, design for recycling and reuse. (vanHoek 1999). Considering Closed Loop Supply Chain, Ecodesign is fundamental to reduce the impact of the product life cycle in the environment. It is worth mentioning that the reduction of this impact does not occur in the facility level, but requires coordination between the different members in the chain. As Nidumolu et al. (2009:5) say, it requires “management knowhow to balance supplies of raw materials and manufacture of products.”

Industrial Symbiosis includes processes orientation to improve the use of resources, through an interdependent flow of materials, processes and energy use. Briefly, industrial symbiosis consists in using waste, products and by-products from one company to feed power toanother company, forming an industrial park that shares resources, promoting substantial gains in productivity and minimizing impacts on the environment (Graedeland Allenby 1995,Barbieri 2004,Genget al. 2009).

Table 1 summarizes the relationship between the stages of development of corporate environmental strategies and operational and management practices.

Table 1: stages of development of corporate environmental strategies and operational and management practices

Evolution

STRATEGIES/ STAGES	PRACTICES	AUTHORS
Proactive	- Development of Green Supply Chain: - Production systems in closed, circular flows; - Development of new products and processes with integration of members of the supply chain; - Transfers of information and resources among the chain members; - Developing products that seek to minimize the environmental impact; - Use of tools such as Life Cycle Analysis; - Organizational learning as a response to the demands of the external environment; - Development of integration skills Supply Chain.	Maimon (1994) Hart (1995) Sharma e Vredenburg (1998) Klassen and Whybark (1999) Corazza (2003) Barbieri (2004) Côte et al. (2008) Zhu et al. (2008) Nidumolu et al. (2009) Seuring and Miller (2008) Walls et al. (2011); Sarkis (2012) Amini andBienstock (2014)
Preventive	- Search for efficiencyin the use of resources; - Early development of operational efficiency with reduction of leftovers, reuse and recycling of materials; - It's the beginning the selection of suppliers, the concern about the use of raw materials.	Hart (1995) Maimon (1994) Corazza (2003) Barbieri (2004) Jabbour and Almada Santos (2006) Nidumolu et al. (2009)
Reactive	- Companies are restricted to obey the laws; - Use of technology end of pipe; - Treatment of waste and process emissions after they have been generated. - Lack of investment in new technologies; - Environmental variable is seen as a limiting factor to performance.	Maimon (1994) Klassen e Whybark, 1999 Corazza (2003) Barbieri (2004) Jabbour e Almada Santos (2006)

Paths of Evolution of Corporate Environmental Management

Some authors suggest a continuum of corporate environmental evolution, e.g., (Hunt and Auster 1990, Hart 1995, Shrivastava 1995, Russo and Fouts 1997, Aragon Correa 1998, Sharma and Vredenburg 1998, Klassen and Whybark 1999, Barbieri 2004, Jabbour and Almada Santos 2006, Walls et al. 2011).

Recent research shows that the evolutionary process of environmental management in Brazil is not necessarily consecutive. Jabbour (2010) found that this process does not present the typical characteristics of the three phases (reactive, preventive and strategic) in a linear sequence in Brazil. The author shows that it is possible to find simultaneously aspects of reactive approaches

as well as strategic approaches in the same company, indicating the need for further research on the subject.

Gavronski et al. (2013:32) point out that researches on taxonomies have helped to find similarities between different firms. On the other hand, few studies intended to figure out the paths followed by operation managers of manufacturing firms in emerging countries (as Brazil) to "adopt diverse strategies of environmental management, with diverseoperational and management practices and results".

Considering the search for proactive strategies one may ask: how do strategies and practices influence (positively or negatively) the development of environmental management? What is the specificity of each practice in a particular company that allows to promote proactive strategies?

Conclusion

AragonCorrea and López(2007) state that proactive environmental strategies and practices are urgent (Aragon Correa and López 2007: 375). On the other hand, the authors' research shows "many managers and stakeholders are now finding that some proactive approaches may perpetuate or even increase environmental problems, while others have no clear payoffs". (Aragon Correa and López 2007: 375).

Pagelland Wu (2009) and Jabbour (2010) state there are still research gaps regarding the development of prescriptive models of how to create sustainable supply chains.

Recent research reports the emerging need to analyze the development of environmental management (Aragon Correa and López 2007,Walls et al. 2011,Aminiand Bienstock 2014). Amini and Bienstock (2014) emphasize the current importance of academic sustainability research to empirically validate the framework.

Considering these issues, this paperproposes a frameworkto identify what practices have been developed, relating them to the three strategies provided by literature, allowing a view of the evolution of corporate environmental management in Brazil.

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