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ISO 14001 certification in Brazil: motivations and benefits

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Abstract

Why do firms seek the ISO 14001 certification? This study presents a survey with 63 Brazilian companies from the chemical, mechanical and electronic industries. A Structural Equations Model (SEM) analyzed the relations between motivations and benefits related to the certification. An exploratory factor analysis identified four sources of motivation: reaction to pressures from the external stakeholders; proaction in expectation of future business concerns; legal concerns; and internal influences. Four dimensions characterized the benefits of an ISO 14001 certification: operational changes; financial impacts; relationship with business stakeholders (customers, competitors, suppliers); and relationship with societal stakeholders (government, society and NGOs). The motivations appear in two levels. Internal and legal motivations are the first level (antecedents), while reactive and proactive motivations are second level (consequents). Internal motivations explain reactive and proactive motivations and production benefits. Legal motivations explain proactive motivations, financial benefits, and benefits in relationships with societal stakeholders.

Keywords: Sustainability; Environmental management systems; ISO 14001; Brazil

1. Introduction

In 1996, the International Organization for Standardization introduced the ISO 14000 series of global standards of voluntary procedures that companies should adopt in their environmental management systems (EMS). The initial reaction to these standards was lukewarm at best: In 1999, three years since its inception, the number of sites ISO 14001 certified was about 10,000 worldwide. However, by 2002 there were over 46,000 and by 2005 there were more than 88,000 certified sites around the world; that is almost 100% growth in 3 years.[1] Most of the certifications have occurred in developed countries. After a slow start, the number of certifications in emerging nations is increasing at a pace greater than 100% per year, and already accounts for more than 20% of all certifications today.

The motivation for this rapid growth in ISO 14001 certification is not clear. Morrow and Rondinelli [1] observed that German energy and gas firms implemented EMS in order to improve regulatory compliance, develop environmental documentation of their processes and to increase efficiency. Andrews et al. [2,3] identified the North American companies' environmental behavior based on six dimensions: Environmental Performance, Regulatory Compliance, Economic Performance (costs and benefits), Implementation of Pollution Prevention, Interested Party Involvement, and Environmental Condition Indicators.

Some anecdotal evidence shows that regulatory compliance is a less pressing issue in emerging nations than it is in most developed nations. However, some corporations in emerging markets have realized that it could be to their advantage to maintain higher standards of environmental compliance to enjoy better business opportunities. This can be observed in Brazil, the fourth-ranked emerging economy according to

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[1] Source: http://www.ecology.or.jp/isoworld/english/analy14k.htm

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the number of certified environmental management systems in 2002. The number of certifications tripled in that year, which motivated this survey. Our study was designed to identify the main drivers and the consequences of ISO 14001 certification, as perceived by Brazilian companies. Ammenberg and Sundin [4] produced a similar study analyzing ISO 14001 adoption in an industrialized economy. However, studies proposing causal connections between motivations and benefits of the EMS certification are rare. Thus, this study helps to fill this void by analyzing the relationship between corporate motivations and the effects and benefits associated with ISO 14001 implementation in companies in Brazil.

In the following sections, we discuss the related literature grouped in three main subjects: Strategies of Environmental Operations, Environmental Capabilities and ISO 14000-Based EMS.

1.1. Strategies of environmental operations

Klassen and Whybark [5] proposed a typology of three operation management approaches that companies have been using to address environmental impacts: pollution prevention, environmental management systems and pollution control. In this context, the mission of operations is to translate the respective operational approach into eco-efficient capabilities. Klassen and Whybark [5,6] called these capabilities the *environmental operations technologies*. They developed a taxonomy of three managerial orientations that affect the corporate environmental policies: obedience, opportunism and leadership. These frameworks are neither mutually exclusive nor redundant. One classifies these policies focusing on the technologies adopted and the other classifies them based on the motivation of the firms, but both can be analyzed empirically.

- *Pollution controls* are the structural investments made to deal with process emissions after they have been generated. They do not always reduce the amount of pollutants that are released or discarded by the site, but they reduce the risk associated with them [5]. Using quality management as a reference, pollution control is the equivalent to adopting end-product inspection as the basis for the quality management system: defects are not avoided, but they are not released to the market either. Likewise, the use of pollution controls does not improve the process and it does not eliminate pollution, but it may prevent the pollution from affecting the surrounding environment. Pollution controls are often costly and bring no direct benefits to the operation.
- *Pollution prevention* requires structural investments that involve changing the operation, improving the environmental performance of the final product and throughout the production process. This combination may generate significant economic benefits for the company by finding and eliminating or reducing the sources of environmental impact, which may be related to avoidable process losses and energy and material's inefficiencies.
- *Environmental management systems* (*EMS*) are infrastructural investments made in a collection of operational procedures designed to reduce the generation of wastes; to prevent the generation of waste caused by accidents; and to safely and effectively manage non-conforming amounts of waste. EMS may include the formalization of operating processes, cross-functional coordination, involvement of stakeholders, monitoring, internal and external disclosure of results, training, certification, and other activities related to the environmental impact of the organization [5]. The International Organization for Standardization (ISO) first introduced ISO 14001 in 1996, and the current version of the standard was updated in 2004.

Hart [7] indicated that pollution prevention is the environmental equivalent to total quality management (TQM). Both types of program are designed to eliminate losses and wastes in the whole process: total quality management strives to reduce material losses associated with poor production, pollution prevention includes redesigning the products and processes to reduce the generation of waste and to reduce risks from the entire life cycle of the production and products. Pollution prevention programs associate pollution with losses in the form of excessive materials and energy consumed in the process. Hence, the resources and capabilities that a firm develops in the introduction of a quality management system such as TQM might be useful and supportive in the adoption of a pollution prevention program.

Angell and Klassen [8] suggest that there are two environmental strategy perspectives: *external constraint* and *operational component*. Firms that treat the environment as an external constraint will make environmental decisions independently of the operational decisions. Since decisions made separately are locally optimized, it is unlikely that they are also globally optimal. In fact, we believe that environmental decisions that are made without considering their impact in the operations will generally be more costly, since only by chance may they bring operational benefits. Firms that treat the environment as an operational component recognize them as legitimate operational factors that must be integrated in all operational decisions. In this case, opportunities for process improvement and cost reduction may be uncovered when the firm adopts environmentally friendly process changes. Angell and Klassen [8] indicated that sustainable operations decisions might be structured in the same fashion as the manufacturing decision categories of Wheelwright [9] and Wheelwright and Hayes [10]. The operational decision-making model is sufficiently robust to incorporate the new sustainability concerns into the manufacturing strategy framework. The environmental concerns affect all areas of operations management, reinforcing the coherence of the operational component perspective.

St. John et al. [11] proposed environmental responsibility and natural resource limitations as some of the main drivers of change in today's manufacturing strategy. Many authors have conjectured that it is possible to combine environmental