



## Modelling the impact of ISO 14001 on environmental performance: A comparative approach

Olivier Boiral<sup>a,\*</sup>, Jean-François Henri<sup>b,1</sup>

<sup>a</sup> Faculté des sciences de l'administration, Pavillon Palasis-Prince, 2325, rue de la Terrasse, Local 1638, Université Laval, Québec City, QC G1V 0A6, Canada

<sup>b</sup> Faculté des sciences de l'administration, Pavillon Palasis-Prince, 2325, rue de la Terrasse, Local 4226, Université Laval, Québec City, QC G1V 0A6, Canada

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### ABSTRACT

Studies analyzing the effects of ISO 14001 certification and determinants of environmental performance tend to be based on a traditional and instrumental model of efficiency. Using structural equation modelling developed through a survey of 303 organizations, this paper compares the validity of this instrumental model with two alternatives models: the legitimacy-based model and the hybrid model. The findings question the efficiency of ISO 14001 and show that the traditional model does not explain the environmental performance of the surveyed organizations. Study results show that the legitimacy-based model, which questions the efficiency of ISO 14001 certification, is more pertinent in explaining the environmental performance but leads to a rather critical view of management practices. The development of a hybrid model based on the principal hypotheses of the legitimacy-based model, but integrating certain managerial and operational practices distinct from ISO 14001 certification, results in a less critical and more pertinent view of the determinants of environmental performance. Study results suggest that this hybrid model provides the best data fit.

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### 1. Introduction

Since its introduction in 1996, the ISO 14001 standard has become a reference model in the field of environmental management. With more than 250,000 certified organizations in the world in 2010, this standard seems to be garnering the same success as the referential ISO 9000 standard already adopted by over 1,100,000 organizations (International Organization for Standardization, 2011). Contrary to the Eco-Management and Audit Scheme (EMAS), which is primarily used in Europe, the ISO 14001 standard has been implemented in a growing number of countries, including China, where nearly 70,000 organizations were certified in 2010 (International Organization for Standardization, 2011). However, despite institutional pressure in favour of ISO 14001 certification and its rapid growth, the efficiency of this standard remains controversial, and studies of the issue have led to contradictory results (Boiral, 2007; Jiang and Bansal, 2003; King et al., 2005; Welch et al., 2003).

This research is based on an empirical study of 303 organizations and the evaluation of three theoretical models. Its purpose is

to analyze the extent to which ISO 14001 certification and the implementation of various management practices might explain the environmental performance of organizations. Three models involving different meanings and paradigms related to ISO 14001 effectiveness are discussed and compared: (i) an instrumental model, (ii) a legitimacy-based model, and (iii) a hybrid model.

The first model explored is based on a traditional and instrumental view of relationships between ISO 14001 certification, management practices and environmental performance. The second model explored is based on an appraisal of this traditional and instrumental approach. In this model, ISO 14001 certification and management practices represent first and foremost a means of responding to external pressure that is devoid of any real impact on environmental performance. The development of a third model based on the results of the previous two models is intended to provide an alternative between the functionalist character of the classical model and the rather radical approach of the critical model.

Exploring and validating different models that might explain the meaning of ISO 14001 for managers and its connection with practices expected to improve environmental performance also sheds light on several problems related to certification.

First, the ISO 14001 standard is not based on any predefined performance objective, but on a range of practices whose efficiency remains to be clearly demonstrated (Boiral, 2007; Jiang and Bansal, 2003). The development and validation of explanatory models

\* Corresponding author. Tel.: +1 (418) 656 2131x4776.

E-mail addresses: [olivier.boiral@fsa.ulaval.ca](mailto:olivier.boiral@fsa.ulaval.ca), [Olivier.Boiral@mng.ulaval.ca](mailto:Olivier.Boiral@mng.ulaval.ca) (O. Boiral), [jean-francois.henri@fsa.ulaval.ca](mailto:jean-francois.henri@fsa.ulaval.ca) (J.-F. Henri).

<sup>1</sup> Tel.: +1 (418) 656 2131x7737.

makes it possible to evaluate the efficiency of these practices from different theoretical perspectives. Secondly, studies on the determinants of environmental performance rarely make connections with specific practices inherent to the ISO 14001 system, and tend to consider this standard from a monolithic standpoint. Modelling different configurations of the relationships between environmental management practices and improved performance in this field contributes to analyzing the extent to which the determinants of these performances correspond to ISO 14001 system prescriptions. Thirdly, organizations can ostensibly adopt the standard in order to make a point of meeting certification process requirements and complying with external pressures, but without implementing the means or internal measures needed to truly improve their environmental performance (Boiral, 2007; Christmann and Taylor, 2006). In such case, alternatives legitimacy-based and hybrid models questioning the use of the standard as a tool to improve internal practices and environmental performance might prove pertinent in understanding the meaning of certification inside organizations.

Because they are based, for the most part, on an instrumental model, studies on the impact of ISO 14001 can hardly verify the pertinence of alternatives approaches with regard to the determinants of environmental performance and the symbolic role of certification. This study will explore the pertinence of these alternatives approaches in relation to the dominant instrumental and traditional model.

## 2. ISO 14001 and environmental performance: A controversial relationship

Studies on the impacts of ISO management standards on performance are generally based on an instrumental cause-and-effect model in which certification alone is expected to explain organizational efficiency. Although most of these studies are based on an optimistic view of ISO management systems efficiency, the results of empirical studies regarding this question are often contradictory. Thus, in the case of the ISO 9000 standard, many studies have emphasized the benefits of the standard in terms of improved quality, customer satisfaction and production management (Bhuiyan and Alam, 2005; Naveh and Marcus, 2005; Standards Council of Canada, 2000). On the other hand other studies, fewer in number, have questioned these benefits and consider that the standard has little or no impact on the improvement of performance (Acharya and Ray, 2000; Boiral, 2003; Heras et al., 2002; Wilson et al., 2003). The same kind of debate is repeated in the evaluation of the impacts of the ISO 14001 standard on improvements in environmental performance. While most studies tend to highlight the positive nature of these impacts and the fact that ISO 14001 certification improves environmental performance (Goh Eng et al., 2006; Melnyk et al., 2003; Potoski and Prakash, 2005; Pun and Hui, 2001; Standards Council of Canada, 2000), other studies question these benefits (Barla, 2007; Boiral, 2007; Christmann and Taylor, 2006; King et al., 2005; Welch et al., 2003).

Several reasons explain the controversy surrounding the efficiency of the ISO 14001 standard. First, this controversy may be explained by the ambivalence towards the purpose and rationale behind this management system. The ISO 14001 standard is both an internal management tool and a means of publicizing the environmental commitment of organizations (Boiral, 1998; Christmann and Taylor, 2002; Jiang and Bansal, 2003). Depending on the position adopted, the standard might be considered to be a means of improving environmental performance or a means of responding to institutional pressures. For the standard designers, the implementation of ISO 14001 must contribute to integrating environmental concerns into daily management activities and committing the organization to a thought process of continuous improvement

(International Organization for Standardization, 2004). However, if the aim of the organization is first and foremost to respond to the demands of customers or external pressure for certification, the improvement of environmental performance may not be a management priority. In this case, obtaining certification is the main objective, rather than a tool to improve practices.

Second, controversy over the impact of ISO 14001 certification may be explained by the vagueness of the standard on this subject. Although the standard claims that implementation will improve environmental performance, it does not propose requirements or specific criteria on the subject (Boiral and Sala, 1998; Fryxell and Szeto, 2002; Goh Eng et al., 2006). It is up to organizations to establish their own objectives and criteria to measure environmental performance. The standard is limited to proposing management practices to guide organizations in the implementation of a management system that will encourage a process of continuous improvement. Thus, implementation of the standard does not automatically result in improved environmental performance; rather, it serves to establish means that should theoretically contribute to improved environmental performance (Boiral and Sala, 1998; Goh Eng et al., 2006). Too often, studies on the impact of the standard seek to establish a direct connection between certification and certain performance indicators without considering the rationale behind certification and the existence of intermediate variables that might explain the performance.

Lastly, the lack of consensus on the definition of organizational performance criteria, particularly with regard to environmental issues, is creating growing controversy over the efficiency of the ISO 14001 system. Generally speaking, the use of relevant criteria for measuring environmental performance is a critical issue in environmental management systems (Boiral, 2007; Henri and Journeault, 2008; Jiang and Bansal, 2003). Nevertheless, criteria for measuring organizational performance are plentiful but restrictive, often leading to contradictory results (Cameron, 1986; Henri, 2004; Herman and Renz, 2004). Difficulties measuring the efficiency of ISO 14001 are even greater, given the existence of a multitude of contaminants and environmental issues that could be considered (Jiang and Bansal, 2003; Lober, 1996). Although the ISO 14031 standard proposes general guidelines for measuring and monitoring environmental performance (Henri and Journeault, 2008), it does not offer a clear indication of the type of indicators to be used by organizations. The use of raw materials, water and energy, waste management, atmospheric emissions or external relations are but some of the many issues that could be covered by various indicators. Thus, the choice of indicators is based in part on individual values and preferences (Zammuto, 1984; Zellars and Fiorito, 1999). These individual values can lead to very different results in the evaluation of environmental performance. Therefore, we aim to avoid a too restrictive view of the standard's impacts by expanding the evaluation criteria used to assess the efficiency of ISO 14001.

More specifically, building on the work of organizational theorists who have examined the concept of effectiveness since the 1950s, different models of effectiveness have been used to define environmental performance, including the goal model, the system model, the strategic-constituencies model and the competing-values model. Based on these models, environmental performance is divided into two main dimensions, namely results versus process and internal versus external (Ilinitch et al., 1998; Lober, 1996).

The *results dimension* is assessed in terms of the accomplishment of outcomes (Etzioni, 1960); in a goal model, the focus is on the ends: achievement of financial and environmental outcomes. Hence, environmental impacts generated in the conduct of business and the financial consequences of environmental practices refer to this dimension. The *process dimension* of environmental performance refers to the system model. Without neglecting the importance of

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