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ISO 14001 certification in manufacturing firms: a tool for those in need or an indication of greenness?

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ABSTRACT

Adoption of environmental management systems constitutes one of the most important elements of corporate sustainability in recent years. The purpose of this study is to contribute knowledge as to which firms are most likely to adopt an environmental management system, those which are in greatest need of effective approaches or those which are already environmental frontrunners. A comparison between the improvement in environmental performance over a six-year period prior to ISO 14001 certification and the corresponding improvement in firms choosing not to adopt a system was performed. Environmental data was analyzed by using *t*-tests for six different areas: air emissions, water emissions, resource use, energy use, waste and overall environmental performance. In none of these environmental areas have we been able to find any statistically significant differences between certified and non-certified firms at 95% confidence level regarding the change in environmental performance prior to ISO 14001-certification or the corresponding period in non-certified firms. Our results indicate that it is equally likely that firms showing less or no improvement choose to implement and certify an environmental management system as it is for firms showing more improvement to do so.

1. Introduction

Adoption of environmental management systems (EMS) constitutes one of the most important elements of corporate sustainability in recent years. To simplify: an EMS is a set of management processes and procedures that allows organizations to analyze, control and reduce the environmental impact of their operations and services to save costs, improve efficiency and oversight and to streamline regulatory compliance (Pawar and Risetto, 2001). Many of the implemented systems are based on the international standard ISO 14001 and certification to this standard follows a similar path to the development of the ISO 9000-series focusing on quality management. During the period from 1996, when it first became possible to certify to ISO 14001, until now, about 220 000 organizations worldwide have chosen to certify their EMS (ISO, 2011). The commercial success of ISO 14001 has led to extensive research focusing on different phenomena and issues connected to the adoption of EMSs based on the standard (Nawrocka and Parker, 2009).

In this paper we will look more closely into one of those issues, market signaling. This area has been addressed before but is has not drawn as much attention as many other phenomenon associated with ISO 14001 certification. Evidence is lacking regarding which firms, from an environmental performance perspective, are more likely to adopt and certify an EMS. Is ISO 14001 certification a way to show customers, public authorities and other stakeholders that the firm already is at the forefront concerning environmental issues? Or is it possibly the poor environmental performers that really are in strong need of effective approaches and tools that are more likely to adopt ISO 14001? In this study, we make an attempt to contribute to the answer to those research questions by comparing the change in environmental performance prior to certification in ISO 14001-certified firms and in non-adopting firms. The study is based on environmental data drawn from manufacturing firms in Sweden.

Following this introduction, a literature review covering different aspects of EMS adoption and ISO 14001-certification is presented in Section 2. In Section 3, the most relevant theory is presented leading to hypothesis formulation. Section 4 outlines the data set and the statistical methods used in the study. Results are presented in Section 5 followed by the last section where the results are discussed and conclusions are drawn.

2. Literature review

The phenomenon of EMS adoption and ISO 14001-certification has been studied by scholars around the world from a number of

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different perspectives. Often the studies are mainly focusing on contributing with knowledge within the corporate environmental and sustainability field of research, not using findings to further develop more general management theory. However, there are some exceptions. King et al. (2005) have studied ISO 14001 as an example of a private and decentralized institution, Potoski and Prakash (2005) have applied the theory of cartels and clubs to ISO 14001 as an example of a voluntary environmental program, King and Toffel (2009) have studied certified EMSs in the light of self-regulatory institutions, and several studies have addressed the issue of information asymmetries in markets, market signaling and the role of ISO 14001 certification (King et al., 2005; King and Toffel, 2009; Toffel, 2006). There has also been some interest in using EMS adoption and certification as a case for studying strategic decision making in firms (Bansal and Roth, 2000; Darnall and Edwards, 2006; Delmas and Toffel, 2008; Sharma and Henriques, 2005).

Even though some scholars have used the corporate environmental management field as their empirical setting because of its richness and complexity (Delmas and Toffel, 2008), most scholars tend to stay within the environmental context. This body of research, that has become rather mature during the last decade, can mainly be divided into two major research areas. Many of these studies are focusing either on the organizational characteristics of the firms that adopt voluntary environmental approaches and the motives for adoption (the situation before adoption) or studies are concentrating on the usefulness and possible benefits of the approaches (the situation after adoption).

The effects and benefits of EMSs and ISO 14001 has been a popular area ever since the introduction of the standard (Zobel, 2010), but since we in this paper will be concentrating on the period before certification we will be brief regarding this issue. Some of these studies argue that the systems lead to real improvements (e.g. Arimura et al., 2008; Iraldo et al., 2009; Potoski and Prakash, 2005; Russo, 2009), while others are more pessimistic regarding the influence of the EMSs (e.g. Barla, 2007; Ghisellini and Thurston, 2005; Hertin et al., 2008; Melnyk et al., 2003). In other words, research in this area has not been able to find a conclusive answer to the question as to whether EMSs are useful for improving corporate environmental performance.

In the literature, we can find some important findings concerning which types of firms that take the step to implement an EMS and choose to certify. Just after the introduction of ISO 14001, Chapple et al. (2001) found in UK manufacturing firms that the larger more powerful firms are less likely to certify to ISO 14001. The results also indicate that firms in less concentrated industries are more likely to become certified. Further, the data also suggested that it is the smaller firms and the very large firms that have gained ISO certification and that it is the middle of the range firms that are slower on the uptake. In a more recent study, Takahashi and Nakamura (2010) studied Japanese manufacturing firms and found that firms are more likely to seek ISO 14001 certification when their operations involve low degrees of complexity. In addition, they found support for the hypothesis that firms facing more uncertainty in their operations, and hence more risk, are more likely to seek certification.

Overall, it seems that firms in general appear to consider a broad range of motives in the decision to adopt and certify an EMS (Hamschmidt and Dyllick, 2001; Heras-Saizarbitoria et al., 2011; Chan and Li, 2001). For example, Fryxell et al. (2004) found in a sample of 128 facilities that the main drivers for ISO 14001 certification were to ensure regulatory compliance, to enhance the firm's reputation and to improve environmental performance. Similar findings are presented in a study of certified firms within the chemical, mechanical and electronics industry in Brazil where four dominating sources of motivations were identified: pressures from external stakeholders, proaction in expectation of future business concerns, legal concerns and internal influences (Gavronski et al., 2008). A slightly different situation was found among Swedish firms, for whom it seemed to be most important to use certification to demonstrate their commitment to environmental protection. However, a number of other motives such as customer pressure, relations with communities and authorities and environmental improvements were also identified as somewhat important (Poksinska et al., 2003). The studies mentioned here and other published findings mainly suggest that there are two main theoretical approaches to this issue (Heras-Saizarbitoria et al., 2011). One perspective suggests that voluntary environmental initiatives are adopted due to external pressures and that this pressure make firms behave in a homogenous manner. For example, it has often been found that firms certify to ISO 14001 in anticipation of or in response to customer demand (Boiral, 2007; Delmas and Terlaak, 2001; Jiang and Bansal, 2003; King et al., 2005). The alternative perspective explains the sources of motivations from an internal perspective, for example an improvement in the environmental behavior of the firm, internal strategy and organizational capacities (Heras-Saizarbitoria et al., 2011).

3. Theory and hypothesis development

The empirical literature concerning motives for an EMS in accordance to ISO 14001 does not give us a clear answer as to which are the main motives for adoption. However, it is fairly clear that sources of motivations of an external nature dominate among most studies (Heras-Saizarbitoria et al., 2011). As we mentioned before, customer expectations and demands seem to be an important factor to consider, as well as a wish among firms to please other stakeholders and develop the external image of the firm (Hamschmidt and Dyllick, 2001; Poksinska et al., 2003; Schylander and Martinuzzi, 2007). In addition, pressure from public authorities commonly also contributes to the decision to certify (Del Brío et al., 2002; Shin, 2005; Uchida and Ferraro, 2007).

It seems that firms adopt and certify an EMS foremost because their stakeholders expect them to do that or even demand them to do it. A number of large international corporations, including several in automotive industry, are using ISO 14001 certification as an indicator of superior environmental practices (Christmann and Taylor, 2006; Toffel, 2006). But if ISO 14001 certification should be treated as a legitimate indicator for superior environmental performance, it first has to be established that ISO 14001 foremost attract firms that already before certification exhibit superior performance. This is due to the fact that ISO 14001 certification does not measure the actual environmental performance of an organization (Krut and Gleckman, 1998). Certification merely implies that the organization meet regulatory mandates and has an EMS in place that has the potential to help the organization toward better environmental performance (Rondinelli and Vastag, 2000; Summers Raines, 2002). Goals and priorities within the EMS context are self-chosen, and there is no minimum standard beyond compliance with applicable law (Stenzel, 2000).

In the literature we can find a number of studies arguing that adopters of ISO 14001-based EMSs already are superior performers, and that certification is a way to signal to customers, public authorities and other stakeholders that they are environmentally proactive firms (Johnstone and Labonne, 2009; King et al., 2005; King and Toffel, 2009; Toffel, 2006). These studies all use the same signaling model originally formulated by Spence (1973).

The key assumption in this model, using terms from the context in this paper, is that adoption is cheaper for firms with already superior environmental practices since they can fairly easy adopt additional practices in order to adopt and certify an ISO 14001-