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Is ISO 14001 a gateway to more advanced voluntary action? The case of green supply chain management

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ABSTRACT

Using Japanese facility-level data, we estimate the effects of ISO 14001 certification on the promotion of more advanced practices, namely green supply chain management (GSCM). Our results show that ISO 14001 promotes GSCM practices. Facilities with environmental management systems (EMS) certified to ISO 14001 are 40% more likely to assess their suppliers' environmental performance and 50% more likely to require that their suppliers undertake specific environmental practices. Further, government programs that encourage voluntary EMS adoption indirectly promote GSCM practices. These programs increase the probabilities that facilities will assess their suppliers' environmental performance and require suppliers to undertake specific environmental practices by 7% and 8%, respectively. Combined, these findings suggest that there may be significant but previously unnoticed spillover effects of ISO 14001 and government promotion of voluntary action.

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1. Introduction

An increasing number of governments have started to promote voluntary actions by private corporations to achieve their environmental goals. The popularity of this approach stems from the fact that voluntary actions often are more acceptable to the private sector than prescriptive mandates or economic instruments like pollution taxes and emissions trading. Moreover, government-encouraged voluntary approaches can be less costly than traditional command-and-control systems, which generally impose a significant administrative burden on regulators for monitoring and enforcement.

Partly because of governments' promotion, voluntary actions are becoming more common among industrial facilities. One of the more widely used voluntary actions involves an environmental management system (EMS). Industrial facilities that adopt EMS systematically develop an environmental policy, evaluate their internal processes that affect the environment, create objectives and targets, monitor progress, and undergo management review. In particular, ISO 14001, the EMS standard designed by the International Organization for Standardization (ISO), has received growing attention. By December 2008, more than 982,800 facilities worldwide had been certified to the standard [15].

Because of the popularity of ISO 14001, researchers have begun to examine the factors that motivate facilities to adopt ISO 14001 and its effect on their environmental performance. These studies have found that the adoption of ISO 14001 is influenced by facility size, export ratio, debt ratio, stakeholders' environmental preferences and pressures, and facilities'

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financial flexibility [22,23]. They also have found that greater regulatory pressure leads to early uptake of ISO 14001 [7,18,24,25].

In terms of the effectiveness of ISO 14001 adoption, the research findings are equivocal. On the one hand, some studies show that ISO 14001 certification can reduce an industrial facility's environmental impacts [2,20,24] and improve its compliance with environmental regulations [25]. On the other hand, some studies find little evidence that ISO 14001 improves facilities' environmental performance [3,9,18].¹

A commonality among previous studies that assess the effectiveness of ISO 14001 is that they measure environmental performance only for the facility that adopts the EMS standard. But even if an adopter of ISO 14001 does not directly improve its environmental performance, its adoption might affect the environmental actions of other organizations. For example, ISO 14001-certified facilities may be more likely to implement green supply chain management (GSCM) practices and thus assess suppliers' environmental performance when making their purchasing decisions. It is also possible that certified facilities may be more likely to attempt to green their supply chain by requiring that their suppliers undertake particular environmental measures [8]. However, examining the complex nature of these potential spillover effects of ISO 14001 has been largely overlooked in the literature. Additionally, although previous studies [2] show that government-promoted voluntary approaches can help reduce facilities' environmental impacts, they have not considered how ISO 14001 and other programs may indirectly encourage GSCM.

To our knowledge, this is the first paper to examine the multifaceted relationship between facilities' ISO 14001 certification and GSCM practices. In particular, using Japanese facility-level data from a survey conducted by the Organisation for Economic Co-operation and Development (OECD), we estimate the effects of ISO 14001 certification on the promotion of GSCM practices. Further, we assess the extent to which government-sponsored assistance programs that encourage facilities to adopt ISO 14001 also influence them to adopt GSCM practices.

We find the effects of ISO 14001 on GSCM practices to be quite large. Facilities with ISO 14001 are about 40% more likely to assess their suppliers' environmental performance than facilities without ISO 14001 and 50% more likely to require that their suppliers undertake specific environmental practices. We also show that policies that encourage facilities to adopt EMS are indirectly related to the implementation of GSCM practices. Specifically, the availability of government-sponsored programs that encourage facilities to use EMS make it 7% more likely that facilities will also assess their suppliers' environmental performance and make it 8% more likely that facilities will also require their suppliers to undertake specific environmental practices.

The fact that ISO 14001 promotes GSCM practices suggests the possibility of ISO 14001's positive externality: If a facility assesses its suppliers' environmental performance and requires them to undertake environmental measures, suppliers may subsequently improve their environmental performance. If so, ISO 14001-certified facilities play a role in reducing environmental impacts *outside* their production process. Additionally, government programs that promote the use of a voluntary EMS may encourage broader environmental improvements within private business. Our results therefore suggest that the effectiveness of ISO 14001 and the benefit from government-promoted voluntary actions may be far greater than previously considered.

2. ISO 14001 and green supply chain management

2.1. ISO 14001

Environmental management systems generally consist of internal policies, assessments, plans, and implementation actions [5] that affect facilities and their effects on the natural environment. ISO 14001 is an internationally recognized EMS standard that was developed by the International Organization for Standardization, a nongovernmental organization. What differentiates ISO 14001 environmental management from noncertified systems is that ISO 14001 requires external third-party verification to ensure that facilities conform to the ISO standard.² A certified facility must first commit to reducing its environmental impacts over time. Then it must demonstrate that its EMS meets ISO's five basic components: conformance to the facility's environmental policy, environmental planning (referred to in brief as "Plan"), plan implementation and operation ("Do"), periodic monitoring ("Check"), corrective action ("Act"), and management review, which generally occurs on an annual basis. Once certified, a facility must follow this cycle of Plan–Do–Check–Act over time to maintain its registration [2].

By virtue of undergoing certification, ISO 14001-registered facilities are more likely to formalize their commitment to achieving environmental performance goals [28]. Additionally, these facilities are more likely to embed environmental practices deep within their operational frameworks so that protecting the natural environment becomes an integral element of their operational strategies. For these reasons, ISO 14001 is hypothesized to help facilities reduce their environmental impacts, and this hypothesis has been examined in many studies, as mentioned earlier.

¹ One reason for such mixed findings may be related to the methodological complexity of determining the success of facilities' voluntary environmental efforts [9,17,21].

² ISO 14000 series consists of 23 standards constituting the ISO 14000 "family." One such standard is ISO 14001. This standard requires certification, whereas the others do not. In some instances an organization may claim its EMS conforms to ISO 14001, but does not obtain certification. The focus of this paper is on actual certification.

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