

## **The diffusion of environmental management standards in Europe and in the United States: An institutional perspective**

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**Abstract.** ISO 14001, released in 1996, provides the basic framework for the establishment of an Environmental Management System (EMS) that can be audited and certified. ISO is not only an acronym for the International Organization for Standardization, but is also a term that refers to its Greek meaning: 'equal.' The main rationale for the creation of ISO 14001 was that its worldwide acceptance should facilitate international trade by harmonizing otherwise diffuse environmental management standards and by providing an internationally accepted blueprint for sustainable development, pollution prevention, and compliance assurance.

However, the implementation of ISO 14001 varies significantly across the globe. A significant number of firms have adopted ISO 14001 in Western Europe and Asia. In December 1999, 52% of the 14,106 ISO 14001 certified facilities were located in Western Europe and 36% in Asia. On the contrary, very few American companies have adopted this voluntary standard. U.S. certified facilities accounted for only 4.5% of the total of ISO 14001 certified facilities in the world in December 1999.

The U.S. institutional environment seems acting as a deterrent to ISO 14000 adoption as U.S. companies are fearful of the certification process which lays their performance open to public scrutiny. The opposite is true in Europe, where governments have encouraged the adoption of environmental management standards by setting up a trusted certification system and providing technical assistance to potential adopters.

This paper offers a conceptual framework to analyze this variation in adoption rates. It is proposed that the regulatory, normative and cognitive aspects of a country's institutional environment greatly impact the costs and potential benefits of ISO 14001 adoption and therefore explain the differences in adoption across countries. The analysis is supported by data collected from a phone questionnaire to 140 firms in Europe and a questionnaire mailed to 152 firms in the U.S.

### **Introduction**

ISO 14001, released in 1996, is an Environmental Management System (EMS) that is certified by a third party. The development of ISO 14001 as an international standard for EMS is a clear consequence of globalization. The main rationale for the creation of ISO 14001 was that its worldwide acceptance

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Table 1. ISO 14001 certified facilities worldwide.

Region	Country	Certified facilities	% total
<i>Europe</i>		7365	52.2
	U.K.	1492	10.6
	Austria	156	1.1
	Denmark	430	3.0
	Finland	470	3.3
	France	462	3.3
	Germany	962	6.8
	Ireland	115	0.8
	Italy	243	1.7
	The Netherlands	403	2.9
	Spain	573	4.1
	Sweden	851	6.0
	Switzerland	543	3.8
	Other	665	4.7
<i>Asia-Pacific</i>		5120	36.3
	Japan	3015	21.4
	Korea	309	2.2
	Taiwan	216	1.5
	Australia	708	5.0
	Other	872	6.2
<i>North America</i>		975	6.9
	Canada	276	2.0
	U.S.A.	636	4.5
	Mexico	63	0.4
<i>Latin America</i>		309	2.2
<i>Africa/West Africa</i>		337	2.4
<i>Total</i>		14106	100.0

Source: International Standard Organization, December 1999.

should expedite international trade by harmonizing otherwise diffuse environmental management standards and by providing an internationally accepted blueprint for sustainable development, pollution prevention, and compliance assurance.

ISO 14001 is an example of harmonized procedural standards where all nations should eventually adopt similar environmental management systems and procedures. However the level of diffusion of ISO 14001 differs across countries. A significant number of firms have adopted ISO 14001 in Western Europe and Asia. In December 1999, 52% of the 14,106 ISO 14001 certified facilities were located in Europe and 36% in Asia. On the contrary, American companies seem less eager to adopt this voluntary standard. The 636 U.S. certified facilities accounted for only 4.5% of the total ISO 14001 certified facilities in the world in 1999 (Table 1).

What are the factors that explain the variation in patterns of adoption across the world? Are there institutional factors that facilitate the early adoption of ISO 14001 and its subsequent diffusion in a specific national context? To date, not much has been written describing either the impediments or drivers associated with the implementation of ISO 14001 as the standard has been adopted recently. This paper further discusses these very important issues and offers a conceptual framework to analyze the variations in adoption patterns. It is proposed that the regulatory, normative and cognitive aspects of the institutional environment greatly affect the costs and potential benefits of ISO 14001 adoption, and therefore explain the differences in adoption across countries.

An Environmental Management System (EMS) is one of the tools an organization can use to implement an environmental policy. It consists of 'a number of interrelated elements that function together to help a company manage, measure, and improve the environmental aspects of its operations' (Welford, 1996). However, if each company designs its own system to meet its own particular needs, one can see that the resulting systems might differ widely among firms making it difficult to compare their results. To cope with this problem, industry associations have developed codes of practices and some countries have adopted national EMSs.<sup>1</sup> Nonetheless, without a common international standard, companies would be forced to deal with dozens of separate and potentially incompatible EMSs for every country where they conduct business. This could potentially increase their costs and impose trade barriers. This was the rationale at the origin of the European Environmental Management Standard EMAS and the international EMS standard ISO 14000 series.

The ISO 14000 series environmental management systems standards were introduced on the coattails of the success of ISO 9000, which is a series of quality management system standards. The total number of ISO 9000 certifications worldwide passed 340,000 in 1999, and is growing at a rate of at least 50,000 to 60,000 per year.<sup>2</sup> ISO 9000 has become a 'business standard': companies often find that ISO 9000 has become a 'qualifying criterion' in the global market, and therefore seek certification regardless of whether they expect to achieve or believe in the need for improvements in quality (Struebing, 1996).

Will the ISO 14000 series follow the same path? Will this search for ISO (equality) be successful? The response to these questions may be negative if specific institutional factors hamper the global diffusion of such a standard. These factors may play a more important role for environmental standards than for total quality management standards, since environmental issues are heavily regulated. Specifically, firms might identify regulatory violations during the implementation of the environmental certification. The adoption of the standard may thus be associated with high transaction costs if regulatory agencies or other stakeholders were to use such information against firms. Furthermore if stakeholders including regulatory agencies, customers and investors do not believe that ISO 14001 has the potential to improve environmental performance, it is unlikely that they will require firms to adopt the standard. ISO 14001 is voluntary but not free. It is proposed that firms will

invest in ISO 14001 if they perceive that the benefits of certification will outweigh its costs.

Both the field of neo institutional economics and neo institutional sociology emphasize the impact of the institutional environment on organizational change. The institutional economics approach highlights the differences in the efficiency of governance structures according to the institutional environment in which they are implemented. Institutional sociology devotes a considerable amount of attention to understanding how practices travel from one organization to another, and from one social setting to another (Arias and Guillen, 1998). The institutional approach proposes that the adoption of organizational practices is impacted by regulative, normative, and cognitive aspects of the institutional environment (Scott, 1995). Building on these research streams, this paper identifies the specific mechanisms through which the institutional environment impacts the potential costs and revenues of ISO 14001 and therefore its attractiveness.

The cases of Europe and the United States illustrate the institutional framework, which is developed in this paper. European companies benefited from a very favorable institutional environment towards ISO 14001. There was a strong regulatory commitment to ease the diffusion of European environmental management standards. European governments have encouraged the adoption of environmental management standards by setting up a trusted certification system and providing technical assistance to potential adopters. On the contrary, U.S. firms faced an unfavorable institutional environment with a lack of regulatory commitment to environmental management standards. U.S. companies are fearful of the certification process which lays their performance open to public scrutiny. This analysis is supported by primary data collected from surveys and questionnaires administered to firms based in Europe and in the U.S.

This paper is organized as follows. The first part describes the principles underlying ISO 14001. The second part proposes a conceptual framework explaining the impact of institutional factors on the costs and revenues of ISO 14001 adoption. The third part of the paper presents the case of the development of ISO 14001 in Europe. The fourth part describes the diffusion of ISO 14001 in the United States. A discussion of the results and concluding remarks follows.

## **Part I. ISO 14001 an explanation**

On the heels of ISO 9000's success,<sup>3</sup> the International Standard Organization (ISO)<sup>4</sup> responded to the demands to address the field of environmental law and pollution that were expressed at the occasion of the Rio Agreement (1993)<sup>5</sup> and the GATT Uruguay Round Ministerial Decision on Trade and the Environment (1994).<sup>6</sup> The ISO responded by establishing the Strategic Advisory Group on the Environment (SAGE) to determine whether an international environmental management standard could 'promote a common approach to environ-

mental management, enhance an organization's ability to attain and measure improvements in environmental performance, and facilitate trade and remove trade barriers' (Tibor and Feldman, 1996). SAGE assessed the need for an international EMS standard that would encourage responsible environmental management without violating GATT. As a result, Technical Committee 207 (TC 207) was formed in 1993 to develop the ISO 14000 Series.

In September 1996, ISO issued the first edition of the ISO 14000 Series, a set of guidelines for developing systems and practices in six environmental sectors. The Series was divided into six sections, each containing one or more standards. These include: ISO standards 14001 and 14004 (Environmental Management Systems); ISO standards 14010 to 14012 (Environmental Auditing); ISO standards 14020 to 14025 (Environmental Labeling); ISO standard 14031 (Environmental Performance Evaluation); ISO standards 14040 to 14043 (Life Cycle Assessment); ISO standard 14060 (Environmental Aspects in Product Standards).

The first and only edition that was published in 1996 focused on the EMS standard ISO 14001 and the Environmental Auditing standards (ISO 14010–14012).<sup>7</sup> ISO 14001 is the only certifiable standard in the ISO 14000 Series. All other standards in the Series describe supporting functions, which serve to maximize the effectiveness of the ISO 14001 EMS. However, the implementation of these supporting standards is not required for ISO 14001 certification.

There are five requirements of ISO 14001: (i) formation of a corporate environmental policy and commitment to an EMS, (ii) development of a plan for implementation, (iii) implementation and operation of the EMS, (iv) monitoring and possible corrective action, and (v) top management review and continual improvement (Glovert Ritzert, 2000). To acquire ISO 14001 certification, an organization will have to undertake an initial audit and complete five surveillance visits during the three-year validity of the certificate (Adams, 1999). The costs of certification can vary widely, depending on the size of the company, the nature of its operation, and the environmental system already in place. Estimates range from less than \$50,000 for small firms to greater than \$200,000 for bigger firms.<sup>8</sup> These estimations concern the certification process only and do not take into account the cost of organizational changes that firms may have to carry out to attain the ISO 14001 standard.

Potential benefits include improved efficiency in production and waste management through the auditing process, a reduced risk of costly environmental accidents, a lower corporate liability exposure, and improved access and competitiveness in the marketplace (Fielding, 1998; Klaver and Jonker, 1998; Adams, 1999).

The following section is dedicated to the conceptual approach. I posit that firms will adopt the standard ISO 14001 only if its potential benefits offset its costs. I have developed a conceptual model to analyze how the institutional environment impacts these costs and revenues. This framework illuminates the adoption of organizational designs by viewing organizations as efficiency seeking under regulatory, cognitive and institutional constraints.

## **Part II. Institutional factors, transaction costs and demand**

Organizational scholars and economists have long argued that national environments can significantly affect many aspects of organizations, especially through the distinct institutional, legal, political and cultural features of a country. North suggests that a country's institutional endowment is characterized by the legislative and executive institutions, judicial institutions, administrative capabilities, informal norms, and the character of the contending social interests (North, 1990). Scott demonstrates that the behavior of organizations and their interaction is governed by regulative, normative, and cognitive aspects (Scott, 1995).

Empirical research shows that differences in the institutional environment within the boundaries of nation-states influence the ease of transfer of management practices across borders (Kostova, 1999; Cole, 1985, 1989; Gooderman et al., 1999; Casper and Hancke, 1999; Guler, Guillen and MacPherson, 2000), and compares the differences in transaction costs linked to different institutional environments (Levy and Spiller, 1994; Bergara, Henisz, and Spiller, 1998; Delas and Heiman, 2001). However, none of these studies attempt to identify the specific mechanisms through which the institutional environment impacts the potential costs as well as the demand for organizational practices. Following Roberts and Greenwood, I propose a framework where efficiency seeking organizations may be biased in favor of current designs and those that are legitimized within their institutional context (Roberts and Greenwood, 1997).

### *Regulatory aspect of the institutional environment*

Regulatory systems, as well as intellectual property regimes, tort laws, and antitrust laws, constitute the regulatory aspect of the institutional environment. They influence the set of organization structures that are possible within that context and the agents' ability to efficiently contract with other agents.<sup>9</sup> In the case of ISO 14001, a transaction is undertaken between a firm and the certification organization. This transaction should result in the firm eventually being granted ISO 14001 certification. The regulatory side of the institutional environment, in the form of environmental regulations, may potentially have an important impact on the costs of this transaction since non-compliance with environmental regulations might be revealed during the acquisition of ISO 14001 certification. Indeed, the legal issue that many companies struggle with, and in some cases could prevent them from considering the implementation of ISO 14001, is the potential discovery of regulatory violations that firms had not yet identified or resolved. ISO 14001 may inadvertently lead to the discovery of non-compliance with applicable environmental regulations. While compliance with environmental laws and regulations should theoretically be considered a benefit of implementing ISO 14001, the identification of violations during the implementation phase or during self- or third party audits can lead to potential

liabilities. The violated regulations may involve strict liability (intent or negligence need not be shown) and/or the duty to disclose violations (Wilson, 1998). Regulatory agencies, which enforce environmental regulation, could potentially use ISO 14001 to take legal actions against non-complying firms (Orts and Murray, 1997).

Additionally, ISO 14001 requires companies to document the details of environmental aspects of their operations that are not related to regulatory compliance in order to track the effectiveness of the system. This may also cause a potential risk of legal liability. Audits conducted under ISO 14001 check these documents and may point out weaknesses in the company's handling of environmental matters such as records of system failures and minor spills. These findings, while they may not be governed by any regulations, might still be used in legal proceedings as incriminating evidence. Thus, if a company adopts an EMS with a written policy statement on environmental matters, which specified targets and objectives, it may also be defining a standard under which it may be held accountable (Mostek, 1998).

In conclusion, information disclosed during the process of ISO 14001 certification may lead to legal liability and subsequent transaction costs. In a context where there is uncertainty concerning regulatory behavior toward firms seeking ISO 14001 certification, firms may be reluctant to acquire a certification that could lead to high transaction costs.

#### *Normative and cognitive aspects of the institutional environment*

The normative pillar of the institutional environment refers to sets of expectations, within particular organizational contexts, of what constitutes appropriate and legitimate behavior (Scott, 1995). In other words, Scott's normative pillar is grounded in the 'logic of appropriateness' (March, 1981); that is, what is expected of organizations. Much of the writing on normative constraints emphasizes how the normative expectations assume a taken-for-granted form; the ways of organizing become unquestioned, and alternatives become unthinkable (Zucker, 1983). The cognitive aspects of the institutional environment refer to the cultural elements that govern choice often without receiving conscious thought (DiMaggio and Powell, 1983; Hoffman and Ventresca, 1999; Zucker, 1983).

The normative and cognitive elements of the institutional environment have an important impact on the diffusion of organizational practice as they can limit the set of potential envisioned organizational alternatives. An otherwise attractive organizational alternative may be dismissed out of hand, because it is not perceived as appropriate within a particular institutional context.

Normative and cognitive elements of the institutional environment are more likely to play a role in firms' decision to adopt organizational practices under conditions of uncertainty, i.e. when the benefits from an organizational practice are poorly understood, and the efficiency benefits of adoption are not clear

(DiMaggio and Powell, 1983). March and Simon (1958) recognized that decision makers operate under cognitive constraints and tend to conduct more-or-less limited searches among available alternatives to obtain satisfying solutions. When information is not available or when searching for information is too costly, organizations will rely on their routines and will adopt what is conceived as appropriate.

ISO 14001 may represent such a case, as its potential benefits may be quite unclear for first adopters as well as stakeholders who care about environmental performance. Indeed, the standard can be regarded as a process standard rather than a product standard. There is no product label linked to ISO 14001 that could inform customers how a product has been produced with environmental sensitivity.<sup>10</sup> This discussion is complicated by the fact that consumers might not identify or understand the advantages of ISO 14001, as the standard does not provide any real measure of environmental performance. The standard does not establish absolute requirements for environmental performance other than a commitment to compliance with applicable regulations, and it does not identify environmental performance as a factor in the actual certification process.<sup>11</sup>

Due to this lack of definition of precise environmental variables for monitoring purposes, the resulting data may not provide companies with accurate information they can use to make comparative judgments about environmental performance issues. Additionally, in a context where there is little available information on how to reach the ISO 14001 standard and get certification, it is probable that firms will have to incur higher costs to access this information than in a context where the information is readily available. For potential adopters there is, therefore, uncertainty on the potential efficiency gains linked to the reduction of pollution. In such a context, firms may form their opinion by observing who is adopting the standard and how the adopters are evaluated by regulatory agencies. In brief, because there is little tangible information available about the performance of ISO 14001, the normative and cognitive aspects of the environment may therefore play an important role in the demand for ISO 14001.

In a cultural context where there is little trust between 'polluters,' regulators, environmental non-profit organizations, and investors, it is unlikely that these stakeholders will endorse a standard that does not provide tangible measures of environmental performance. On the contrary, in a context where process is as important as performance, and where the relations between stakeholders are marked by trust, the ISO 14001 standard may find a favorable ground to grow.

In conclusion, the regulatory aspect of the institutional environment impacts the potential transaction costs of acquiring ISO 14001 in the form of litigation costs and search costs. The normative and cognitive aspects of the environment may be an important driver of the demand for ISO 14001 as the impact of ISO 14001 on environmental performance is difficult to measure.

### *Coercive mechanisms*

Institutional theory explains how pressures originating from the state or from powerful organizations impact the three pillars of the institutional environment and are the most direct mechanism of institutional diffusion (DiMaggio and Powell, 1983). Coercive isomorphism refers to the homogeneity pressures stemming from political influence and the need to achieve legitimacy within a context. Research has documented that nation-states, especially if they have an active strategy to accelerate economic growth, are key to the diffusion of new practices borrowed from other countries (Arias and Guillen, 1998). As such, the cross-national diffusion of innovation is highly dependent on the coercive role of the state in each country. States may provide incentives (or implement sanctions) for organizational transformation. In addition, as consumers of goods and services, states may exert coercive pressures by asking suppliers and contractors to conform to certain procedures and standards. The state's role in imposing the adoption of a practice has been reported in many organizational studies (Tolber and Zucker, 1983; Kelley and Arora, 1996).

### *The role of the government*

Governments can play an important role to help offset some of the costs of adoption and to impact the cognitive and normative aspects of the institutional environment. Governments can adopt two different attitudes to deal with the potential incompatibility between the regulatory environment and ISO 14001. They can decide to facilitate the adoption of ISO 14001 by providing some flexibility to the existing regulatory system. Alternatively they can choose to strictly enforce existing rules that may cause high transaction costs to ISO 14001 certified companies. Uncertainty surrounding government commitment to ISO 14001 predictably increases industry transaction costs of acquiring ISO 14001 via potential legal costs.

The government can also promote the adoption of ISO 14001 by threatening to issue a mandatory environmental management standard (that may be more stringent than ISO 14001) if firms are not voluntarily adopting ISO 14001 in its present form. Firms would then compare the costs of adopting ISO 14001 to the costs of complying with a more stringent regulation.

Both of these actions impact the normative and cognitive institutional environment as firms and stakeholders will get a clear signal of endorsement or ignorance of the standard. In addition, there are two other sets of actions that a government can use to transform the normative and cognitive environment linked to ISO 14001. The first one is to inform firms of the existence of ISO 14001 by providing technical assistance to potential adopters and also to certification organizations. These actions increase the scope of possible alternatives that firms will consider. Indeed, firms must bear search and information costs in order to acquire ISO 14001 certification. They require specific information about how to develop an environmental management system for their own operation. Environmental agencies can offset these costs by provid-

ing concrete advice – technical assistance – to firms seeking to establish environmental management systems. The environmental agency can also facilitate the development of the certification system by subsidizing the development of certification organizations.

The second set of actions that government can take is to promote ISO 14001 by enhancing the reputation of first adopters. Mimetic isomorphism refers to the fact that practices diffuse when organizations copy others located in their own social system. Institutional research has also argued that organizations are more likely to imitate the behavior of other organizations they perceive to be more successful and legitimate (DiMaggio and Powell, 1983).

These actions may have an impact on the demand of ISO 14001; i.e. stakeholders believe in the benefits of ISO 14001 which have been demonstrated by the government and therefore require it. The standard becomes a legitimate organizational structure as the government endorses it.

In conclusion, government commitment to ISO 14001 can take the following forms: allowing compatibility between the standard and existing regulation, issuing a credible threat of a more stringent regulation; providing technical assistance and facilitating the development of the certification system and promoting first adopters. The government by committing to the standard can change the regulative, normative and cognitive aspects of the institutional environment. In so doing, it can reduce the costs of ISO 14001 certification and increase its perceived benefits.

#### *The role of industry*

In addition to the government, firms are a second influential type of organization that may cause coercive isomorphism. For example, multinationals are widely recognized as key agents in the diffusion of practices across national borders, through transmission of organizational techniques to subsidiaries and to other organizations in the host country (Arias and Guillen, 1998). The way the industry is organized within an institutional context may also affect the rate of diffusion of the standard. If the industry is dominated by a few big players, it is probable that if these players adopt ISO 14001 and require their suppliers to adopt ISO 14001, this will have a greater impact on the demand of ISO 14001 than if the industry is more fragmented.

Institutional research has also argued that organizations are more likely to imitate the behavior of other organizations that are tied to them through networks (Zucker, 1987). The importance of networks among potential adopters has been reported by many studies. Industries that are strongly relying on trade associations, for example, may get the information faster. In such an industry, the information and search allocated to ISO 14001 certification will be less than in an industry which is less organized and fragmented.

In conclusion, since ISO 14001 is a voluntary standard, firms will implement ISO 14001 if they believe that the potential transaction costs of acquiring certification will be offset by the perceived benefits the certification will ultimately provide to them. The framework is presented in Figure 1. The Institu-

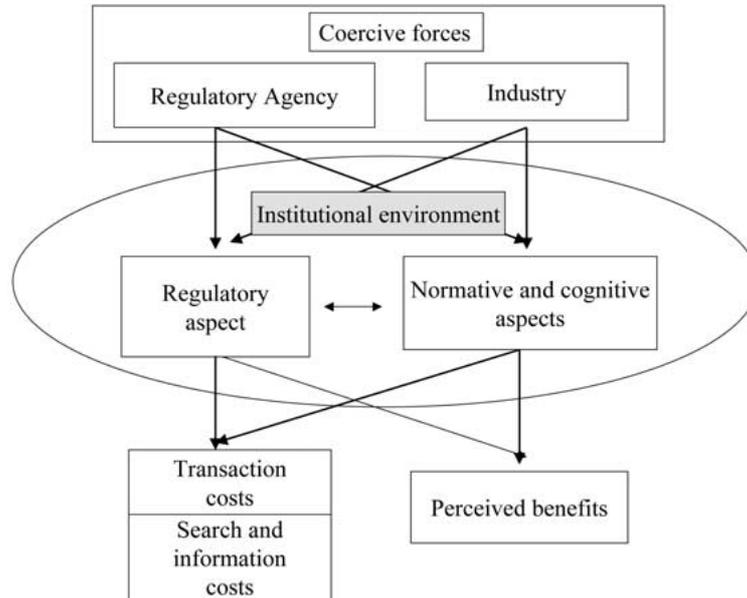


Fig. 1. Institutional mechanisms, costs and demand for ISO 14001.

tional Environment defined by its regulatory, normative and cognitive aspects, impacts both the cost of acquiring certification as well as the perceived benefits from certification. Governments can act as a coercive force to transform the institutional landscape and act as a coercive force to favor the adoption of ISO 14001. Multinationals may also initiate the diffusion of ISO 14001 through mimetic mechanisms.

The following two sections describe the impact of the institutional environment on the diffusion of ISO 14001 in Europe and in the United States.

### Part III. The development of ISO 14001 in Europe

In Europe, ISO 14001 could grow on the ground of existing EMSs. The British BS 7750 and the European EMAS were the first EMSs implemented in the world. This would provide Europe with some experience in EMS standardization to build on when ISO 14001 was put into place. Furthermore, EMAS, the European standard developed by the European Commission benefited from strong support by European authorities that promoted this diffusion into European firms. These two elements, experience with EMSs and regulatory promotion of the standard, favored the development of ISO 14001 in Europe by limiting the information and transaction cost associated with the adoption of the standard and creating the perception among stakeholders that ISO 14001 was a legitimate environmental management standard.

In the course of the assessment of the implementation of EMAS in 1997, a survey was conducted with competent bodies (responsible for the accreditation of EMAS sites), accreditation bodies (responsible for the accreditation of EMAS verifiers), Accreditation Environmental Verifiers (AEV) (responsible for verifying sites and recommending accreditation to competent bodies), and EMAS registered sites in the 15 Member States. Fourteen representatives of Member State Competent bodies of Ministries were interviewed (see the questions in Table 6 in the appendix).<sup>12</sup> One hundred forty registered EMAS sites in 12 Member States (11.6%) were interviewed by phone.<sup>13</sup> The registered sites interviewed were distributed across three years: 9% for 1995, 44% for 1996, 47% for 1997. The questions used in this paper are listed in Table 6 of the appendix.

Although EMAS continues to differ from ISO 14001 in its depth and demands with regard to commitment, transparency and environmental performance, the structure of the environmental management system is to be analogous to the structure detailed in ISO 14001.<sup>14</sup> Already in 1997, of the 140 EMAS certified sites that were part of the survey, 47% were also ISO 14001 certified. Only 15% of registered sites of small sized enterprises were not certified ISO 14001.<sup>15, 16</sup> Since there is a high correlation between EMAS and ISO 14001 certification it is valuable to use the results of the survey of EMAS certified facilities to understand the behavior of ISO 14001 certified facilities in Europe.

This section builds upon the results of the survey. First, I will explain the coercive role of the European Commission and its strong commitment to promote the standard. Second, I will show how the European experience with EMAS and BS 7750 facilitated the ISO 14001 certification process. Then, I will discuss the cost to obtain certification, the perceived benefits from information disclosure, and the demand for certification.

### *The threat of a mandatory EMS*

It is in the U.K. that the world's first environmental standard – BS 7750 – was published in March 1992. The standard was subjected to a 2-year pilot implementation program involving almost 500 participants, including 230 implementing organizations, and was modified on the basis of the feedback obtained from the program. The modified standard was published in January 1994.

At the same time that British Standard Institute (BSI) began work on BS 7750, the European Commission was setting up its proposal for an eco-audit scheme: the Environmental Management and Audit Scheme (EMAS). EMAS was adopted by the Council of Ministers on June 29, 1993 (Council Regulation 1836/93).<sup>17</sup> Because EMAS is a regulation, rather than a directive, it immediately binds all EU Member States.<sup>18</sup>

The European Commission originally intended to pursue mandatory participation but business lobbying successfully prevented this. The European Commission did, however, retain the right to adopt compulsory registration in the

future, adding power to the legislative impetus towards environmental audit (Ashford, 1994). At first the European Commission also required an annual auditing, which changed to a less stringent requirement, that the audit be executed at intervals no longer than three years.

The EMAS regulation requires that the European Commission reviews the progress of the EMAS no more than five years after adoption. The evaluation of EMAS was planned for 1999. There was a potential threat for firms that the European Commission would decide to transform EMAS into a mandatory environmental management scheme, hence a legitimate institution.

The perceived threat of EMAS becoming a mandatory scheme was also intensified by the choice of 'competent certification bodies' that would be linked to Member States environmental ministries. For example, in France there is a close link between the inspection authority (regulator) and the competent body, that could lead to concern over possible increased control of industrial sites. This in turn has raised the issue of the voluntary nature of EMAS. Therefore, in France EMAS could be perceived as a first step to a mandatory standard.

The important difference between EMAS and BS 7750 is that the later does not have the formers' commitment to publish audit findings regarding environmental performance, a disclosure with which companies are often uncomfortable. It has been suggested that BS 7750 would serve to introduce companies to the EMS techniques, allowing them to cut their teeth on the less publicly scrutinized standards of BS 7750 before moving on to EMAS. The similarity between the two schemes should therefore encourage companies to set up an environmental management system and assess their progress before taking the key step to publication of performance (Gilbert, 1994).

The early availability of competing national environmental management standards such as BS 7750 (which were withdrawn and replaced by ISO 14001 in countries such as the U.K.), when the EMAS scheme was launched April 1995, is one factor contributing to the current success of ISO 14001.

In brief, the European Commission acted as a coercive force threatening to issue a mandatory environmental management scheme with environmental performance measures. In addition, as discussed below, firms with EMSs were granted some regulatory flexibility to EMSs' certified companies.

#### *Regulatory flexibility*

In some Member States regulatory flexibility was granted to EMAS certified firms. Within Germany, a political decision was made to try and keep the competent body for the scheme (i.e. the accreditation certification organization), as close as possible to business. The result was that rather than having one centralized competent body, Germany has 44 Chambers of Industry and Commerce and 21 Chambers of Skilled Craftsman designated as EMAS competent bodies. German authorities have begun to ease administrative enforce-

ment requirements on EMAS certified sites. This policy has a further positive effect in that it frees control resources and enables the authorities to concentrate efforts on non-EMAS certified sites. Additionally, in the heavily regulated German *länder* of Bavaria many industrial sites sought EMAS registration after it was indicated that regulatory compliance procedures would be eased for EMAS registered sites, although this in fact has yet to happen (OECD, 1998).

In conclusion, in Europe, EMAS was granted a high credibility by the European Commission and regulatory flexibility in some Member States. Under the threat of a potential mandatory EMAS, EMSs would gain legitimacy and ISO 14001 could be used as a way to learn how to become EMAS certified.

#### *Reduction of search and information costs*

According to interviews of EMAS competent bodies conducted in 1997, there have been several measures to inform companies of the requirements of EMAS. Conferences, seminars, brochures, and guidelines were the methods most frequently used by Member States to inform companies of the content of Regulation No. 1836/93. Six Member States could quantify the financial budget allocated to promote the participation of small and medium companies. From 1995 to 1997 the amount was of ECU 35.1 million.<sup>19, 20</sup>

The European Commission also favored the development of certification bodies or 'verifiers' and also of the initiation of a market for consulting companies. These elements facilitated the ease of the adoption of EMAS and subsequently ISO 14001 for European firms. Indeed, consulting firms knowing the commitment of the European Commission to promote the standard could invest in consulting services to help firms adopt the standard. This would then reduce firms' costs to get certification as they could rely on a market of consulting firms. In 1997, 254 verifiers have been accredited in 10 Member States, of which 72 (231%) are organizations (as opposed to individuals). Out of the 72 verifying organizations, 57 (79%) are also certifiers for ISO 14001. The majority (92%) of the 66 registered sites certified ISO 14001 had their ISO 14001 certification undertaken by the same organization that undertook their site's verification.<sup>21</sup>

#### *Information disclosure to stakeholders*

EMAS has more obligations than ISO 14001. It requires firms to provide an 'Environmental Statement' that can be disclosed to the public. The environmental statement is then widely distributed. The majority of all registered sites (88%) distribute between 100 and 499 copies of their environmental statement. This figure increases to 94% for large sized enterprises. Forty-five percent of all registered sites have had specific requests for more than 100 copies of their environmental statement. Therefore unlike ISO 14001, EMAS encompasses a

public document on the environmental performance of the firm. Firms can use this as a tool to promote their environmental management to stakeholder.

Indeed, all registered sites viewed customers (60%) and the local community to the site (44%) as the main audiences for their sites environmental statement.<sup>22</sup> Sixty percent of all registered sites viewed the environmental statement as a useful communication tool with their stakeholders.

There is, therefore, a difference between ISO 14001 and EMAS in terms of measurement and diffusion of environmental performance. The availability of environmental information, in the European context, is seen positively. Firms can use the Environmental Statement to communicate with stakeholders on their environmental policy.

#### *Demand for ISO 14001*

The survey of EMAS certified facilities provides an interesting response on how firms perceive the advantages of EMAS. The top three benefits cited by all registered sites were 'cost savings' (31%), 'better image' (29%) and 'improved employee moral' (26%). 'Competitive advantage' would just be important for 11% of certified facilities behind 'assured regulatory compliance.' More than the efficiency rationale, certified facilities in Europe seem to respond to a legitimacy concern by establishing good relations with their stakeholders rather than responding to market pressure. Indeed, results concerning the market rewards linked to EMAS certification from the survey are not clear. Only forty-one percent that the market has rewarded them for achieving EMAS registration.<sup>23</sup>

In conclusion, European firms responded to a regulatory pressure that favored the development of an Environmental Management Standard. European regulatory institutions, through a strong commitment to the standard reduced the potential costs linked to environmental management standard certification. Furthermore, they introduced the EMAS certification system which favored the development of third party certification organizations and consulting companies that were later used for ISO 14001 certification. This reduced the search and information costs for European firms. Since ISO 14001 is bridged to EMAS and is easier to implement for firms, it might have been perceived as a way to get prepared for a potential 'mandatory' environmental management standard that could be required by the European Commission. In addition, EMAS with its 'environmental statement' provided a clear and positive signal to stakeholders concerning firms' commitment to improvements in environmental performance. This would reinforce the legitimacy of environmental management standards, and render the benefits of adoption more tangible.

Industry in Europe tends to rely greatly on trade associations. This provides European firms with a high degree of self-organization and a considerably potential for collective action (Dyson, 1992; Streeck, 1983; Mojuye, 2000; de Graeff, 1994). The trade associations are the channel to which firms can gain

access to information on how to get certified and the benefits of certification. Furthermore, ISO 14001 with its international dimension also provides economies of scale and potential competitive advantage for international companies. For European firms, trading with other countries may be more important than for U.S. firms because of the limitation of the size of their own market. They may, therefore, be more inclined to adopt a standard that will facilitate their access to other European markets.

The case of the United States differs strongly from the European one, as there was no previous Environmental Management Standard in place previous to ISO 14001. The U.S. is characterized by a very sophisticated command and control system of regulations in which ISO 14001 has difficulty finding a place. Furthermore, the adversarial culture between the industry and the regulatory agency does not favor the development of a standard with such an intangible performance outcome.

#### **Part IV. Firms' incentives to obtain certification in the U.S.**

Within the United States many ISO 14001 certification decisions were made by non-U.S. firms. Thirty-one percent of certified firms had their headquarters outside the United States. Of the foreign multinationals that had certified their facilities, the largest percentages were from Japan (19.2%) and the European Union (9.6%) (Bansal, 1999). This raises the question of whether there are specific characteristics of the U.S. environment that deter U.S. firms from seeking certification.

To evaluate the drivers and barriers to the implementation of ISO 14001 in the United States, a questionnaire was mailed to U.S. certified companies. Of the 152 corporate questionnaires mailed, a total of 55 responses were received by February 15, 1999. The responses represent 36% of those surveyed, as well as over 30% of the 200 U.S. ISO 14001 certified firms identified in the Globus International Database as of November 1998.<sup>24</sup>

The geographical location of respondents closely mirrors the distribution of certified firms in the country, as indicated. The distribution of responding firms by industry is also close to the actual distribution of ISO 14001 U.S. certified firms (Table 2). Seventy-eight of the certified facilities in the sample belonged to large companies with annual sales greater than \$500 M.

The questionnaire asked managers to state the importance of several factors that led to their decision to become ISO 14001 certified. Three of the questions from the survey were selected for analysis in this paper. The first question relates to the incentives for a firm to adopt ISO 14001. The second question relates to the level of involvement of stakeholders in assisting firms to design their ISO 14001 EMS. The last question pertains to the constraints associated with the implementation of ISO 14001 certification.

Table 2. Distribution of firms by industry in the U.S. sample.

Industry	Percent
Chemicals	9.1
Electric gas service	5.5
Electronics	18.2
Engineering	7.3
Indus machinery	7.3
Instrument and related	7.3
Metal mining	1.8
Metal products	3.6
Miscellaneous manufacturing	1.8
Paper	1.8
Primary metal industry	7.3
Printing and publish	1.8
Textile	3.6
Transport equipment	16.4
Non identified	7.3
Total	100.0

#### *ISO 14001 and the U.S. regulatory environment*

Concerning the regulatory framework either favoring or discouraging the adoption of ISO 14001, the variables considered in the survey were: 'greater permit flexibility,' 'revised approach to regulatory inspections,' 'fewer regulatory fines,' and 'decreased permit costs.' These variables were rated from not important (1) to very important (5). A high majority of firms did not consider these factors to be important incentives to their decision to become ISO 14001 certified. More than seventy-six percent (76%) of the firms in our sample considered 'greater permit flexibility' not to be a very important factor in their decision to apply for ISO 14001 certification. Likewise, seventy-seven percent (77%) of the firms said that 'revised approach to regulation inspections' was not very important; seventy-six percent (76%) said the same for 'greater permit flexibility'; seventy-three percent (73%) for 'fewer regulatory fines'; and eighty-five percent (85%) for 'decreased permit costs.' According to this survey, it seems clear that the institutional set-up does not provide any incentive for U.S. firms to adopt the standard. In fact, the institutional set-up seems to be more of a constraint that hampers firms from adopting the standard.

In contrast, the variables which represent regulatory constraints, 'uncertainty with regulatory agencies' utilization of EMS audit information, 'potential legal penalties from voluntary disclosure,' and 'lack of regulatory flexibility' were considered to be important by firms. The five-point scale ranged from 'not a constraint' (1) to 'a very serious constraint' (5). Sixty-two percent (62%) of surveyed firms considered 'uncertainty with regulatory agencies' utilization of EMS audit information' to be a constraint. Likewise, sixty percent (60%)

Table 3. Incentives to ISO certification.

	Not important to important (1–3) %	Quite important to very important (4–5) %
Improved management of environmental impacts	28	72
Public demonstration of environmental stewardship	34	66
Reduced pollution	38	62
Reduced environmental risk	38	62
Increased competitive advantage	38	62
Improved compliance with government regulations	45	55
Greater market share	46	54
Improved regulatory compliance	49	51
Increased international trade opportunities	49	51
Improved internal communication among managers	53	47
Access to new markets	57	43
Marketing/advertising opportunity	57	43
Communication with the community	60	40
Increased shareholder value	64	36
Customer requirement	68	32
Fewer regulatory fines	73	27
Greater permit flexibility	76	24
Revised approach to regulatory inspections	77	23
Decreased insurance costs	85	15
Decreased permit costs	85	15
Greater access to capital	87	13
Buyer requirement	90	10
Lender requirement	94	6

Valid N (list) 53 observations.

indicated the ‘potential legal penalties from voluntary disclosure,’ and sixty-nine percent (69%) for ‘lack of regulatory flexibility’ (Table 4).

#### *Costs of the adoption of ISO 14001 by firms in the U.S.*

The survey indicated that the design cost of ISO 14001 was less than \$100,000 for seventy-five percent (75%) of the firms.<sup>25</sup> Furthermore, the initial registration cost was less than \$50,000 for ninety-four percent (94%) of the firms. It is quite difficult to evaluate the full range of transaction costs of the certification process since the majority of the firms implemented the standard only recently. However, several variables can approximate these costs, namely ‘design cost,’ ‘certification cost,’ and ‘annual cost of maintaining an ISO 14001 EMS.’

The survey indicates that the ‘design costs of ISO 14001 EMS’ are a more important constraint than are the ‘registration costs’ and the ‘annual cost of maintaining an ISO 14001.’ Seventy-five percent (75%) of the firms in our sample considered that the ‘design costs of ISO 14001 EMS’ was a constraint.

Table 4. Constraints to the adoption of ISO 14001.

	Mild to serious constraint (1–4) %	Not a constraint (5) %
Lack of top management support	77	23
Design costs of ISO 14001 EMS	75	25
Lack of regulatory flexibility	69	31
Registration costs	33	
Lack of understanding of ISO requirements	67	33
Annual costs of maintaining an ISO 14001 EMS	67	33
Lack of time to implement a quality EMS	65	35
Uncertainty with regulatory agencies' utilization of EMS audit information	62	38
Potential legal penalties from voluntary disclosure	60	40
Lack of personnel to implement/manage EMS	58	42

Valid N (list) 52 observations.

This is compared to sixty-seven percent (67%) for the 'registration costs' and the 'annual costs of maintaining an ISO 14001 EMS.' A majority of firms, sixty-two percent (62%) considered the 'lack of time to implement a quality EMS' as a constraint for adopting ISO 14001, and fifty-eight percent (58%) felt the same about the 'lack of personnel to implement/manage EMS' (Table 4).

#### *Past experience in standardization and stakeholders' involvement*

Since many certification decisions are made by non-U.S. firms, mainly European and Asian firms, the home country of origin of the firm might have an influence on ISO 14001 certification. This is confirmed by the fact that U.S. firms generally do not benefit from the involvement of external stakeholders to help them design their EMS. The totality of surveyed firms say neither their 'distributors' nor 'community members' have been actively involved in the design of their EMS; ninety-eight percent (98%) said the same for their 'customers/clients'; ninety-six percent (96%) for their 'shareholders'; eighty-nine percent (89%) for their 'marketing/public relations'; eighty-three percent (83%) for the 'lawyers'; and ninety-three percent (93%) for their 'regulatory officials.'

On the contrary, most of the firms consider that individuals belonging to the company are substantially ('quite to very') involved in the design of the EMS: with forty-six percent (46%) for the involvement of 'corporate representatives'; fifty-seven percent (57%) for 'employees'; sixty-one percent (61%) for 'senior management'; and eighty-nine percent for 'environmental managers'. Thus, the survey suggests that U.S. firms are building on their own resources to put their ISO 14001 EMS in place, and do not rely on outside help (Table 5).

Table 5. Stakeholders' involvement in design of ISO 14001.

	Not involved to involved (1–3) %	Quite to very involved (4–5) %
Involvement of environmental managers	11	89
Involvement of senior management	39	61
Involvement of employees	43	57
Involvement of corporate representatives	54	46
Involvement of lawyers	83	17
Involvement of marketing/public relations	89	11
Involvement of regulatory officials	93	7
Involvement of shareholders	96	4
Involvement of customers/clients	98	2
Involvement of community members	100	0
Involvement of distributors	100	0

Valid N (list wise) 53 observations.

#### *ISO 14001 and environmental performance*

Do the firms in the sample consider that ISO 14001 certification will improve their environmental performance? Four variables were designed to represent environmental performance: 'improved regulatory compliance,' 'improved management of environmental impacts,' 'reduced environmental risk' and 'reduced pollution.' According to the survey, a modest majority of managers considered these variables to be at least 'quite important' in their decision to become ISO 14001 certified: fifty-one percent (51%) for 'improved regulatory compliance'; seventy-two percent (72%) for 'improved management of environmental impacts'; sixty-two percent (62%) for 'reduced environmental risk'; and sixty-two percent (62%) for 'reduced pollution.' These figures indicate that managers believe that the improvement of environmental performance is an important reason to seek certification.

However, it should be noted that the strongest reason to seek certification in the context of 'environmental performance' was 'improved management of environmental impacts' which accounted for seventy-two percent (72%). As mentioned earlier, one of the weaknesses of the standard is its lack of specific performance indicators and common metrics for tracking and comparing environmental performance. These results are therefore consistent with the main finding that ISO 14001 does not directly improve environmental performance but does influence the management of environmental impacts.

#### *Demand for ISO 14001*

It is clear from the survey that, in the U.S. at least, whether or not ISO 14001 is adopted is not related to stakeholders' requirements. A vast majority of firms

considered various stakeholders as non-important incentives in seeking certification: 'increased shareholder value' accounting for sixty-four percent (64%); 'customer requirement' accounting for sixty-eight percent (68%); 'buyer requirement' accounting for ninety percent (90%); and 'lender requirement' accounting for ninety-four percent (94%). Very few U.S. companies at present require that their suppliers be ISO 14001 certified. IBM is one of the few in this case, which might explain the high rate of certification in the electronics industry (Zuckerman, 1999).

According to the results, ISO 14001 certification is more often used as a public demonstration of environmental stewardship. The variable 'public demonstration of environmental stewardship' exhibits the highest mean (3.9). 'Communication with community' and 'marketing/advertising opportunity' both show a lower mean (3.2) (Table 3).

One of the main incentives to get ISO 14001 originates from the need to access markets where ISO 14001 is a requirement. The variables representing the potential to gain a competitive advantage from the adoption of ISO 14000 all exhibit a mean superior to 3: 'Increased international trade opportunities' (3.4), 'access to new markets' (3.2), 'increased competitive advantage' (3.6), and 'greater market share' (3.3) (Table 3). These results indicate that firms believe that there is a positive link between the adoption of ISO 14000 and the gain of business advantages.

In conclusion, the results show that in the U.S.: first, firms that get certified are mostly multinationals. This means that they probably benefited from an experience in dealing with management standards in their home country or that they feel that the standard could favor their entry in a market where EMSs are widely diffused. Second, firms believe that the U.S. regulatory set-up does not provide any incentive to adopt ISO 14001 and might even be a constraint to its implementation. Third, there is neither demand, nor involvement from U.S. stakeholders to push firms to adopt the standard. U.S. stakeholders are not contributing to the implementation of the standard at the firm level and are not requiring firms to obtain certification. Finally, managers do believe that the adoption of the ISO 14001 standard will improve the management of their environmental performance. However, since the standard is not valued by U.S. stakeholders, it is mainly used to demonstrate environmental stewardship to the public and to increase trade opportunities.

## **Part V. Discussion**

Surveys of firms, both in Europe and in the U.S., show that the institutional environment play an important role with the adoption of ISO 14001. In the European case it is a favorable role and in the case of the U.S. an unfavorable one.

*Which regulatory environment for ISO 14001?*

As discussed earlier, the transaction of acquiring ISO 14001 certification might be costly if there is uncertainty about regulatory commitment to the standard. Specific legal mechanisms may be implemented to cope with such a situation.

In the past ten years the Environmental Protection Agency (EPA) has moved haltingly from a strict command-and-control approach toward more open communication and flexible programs (McKiel, 1998). The EPA is proposing more innovative approaches and recognizes that industrial commitment and advancement in the area of pollution prevention could properly be considered when rendering decisions on prioritizing enforcement goals, defining what penalties will be sought for which action, and when negotiating settlements (Lally, 1998). However, the adversarial culture between the industry and the regulatory agency might take more time to change. As for the industry, the few regulatory changes that have been undertaken to allow the development of ISO 14001 may seem insufficient.

ISO 14001 stipulates that audit findings from internal or external audits be documented in a detailed written audit report. In the U.S. context, firms might fear that these audit reports would become the new 'smoking gun' of environmental litigation. A potential protection against self-incrimination through an EMS audit may take place with the emergence of a 'self-evaluation privilege.' With such a privilege, audit reports are not admissible in civil, criminal, or administrative court proceedings. In 1995 the EPA developed a document called 'Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations' which provides guidance to design a 'self-evaluation privilege' regulation.<sup>26</sup> However, by mid-1997, only 19 states had passed the self-evaluation privilege into law (Illenda and Calhoun, 1997). Since the privilege is still recent, it is not yet certain if it will be recognized in court. These results underline the importance as well as the complexity of the legal implications of ISO 14000.

The European context seems to provide a better ground than the U.S. for the development of EMS standards. Cultural elements in Europe such as a good quality relationship between regulatory agencies and industry have mitigated firms' fears of transaction costs linked to the adoption of the EMS certification. In the survey, firms viewed favorably the disclosure of environmental performance information to stakeholders. The quality of exchange that can be observed in Europe between industry and regulatory agencies does not exist in the U.S. This lack of cooperation between industry and regulatory agencies in the U.S. most likely accounts for the slow pace of adoption of ISO 14001.

*Normative and cognitive aspects of the institutional environment*

The European Commission is strongly committed to the development of EMAS acting as a coercive force, and in doing so has sent a clear signal to

stakeholders legitimizing environmental management standards. Furthermore, the cost of designing and implementing an EMS might be high in an environment where there is little experience to build on within the industry as well as few consulting companies. I described how the development of the certification system for EMAS in Europe provided such experience and eased ISO 14001 certification process. Experience with other standards such as the ISO 9000 Quality Management System can also be beneficial to reduce the costs of the adoption of ISO 14001. As I described, the majority of ISO 14001 certified firms are also ISO 9000 certified (Corbett and Kirsch, 2001). Again, European firms are well ahead of their American counterpart in terms of the adoption of ISO 9000 standard.<sup>27</sup>

Although commitment to improved environment performance and compliance with existing command and control regulations are prerequisites to ISO 14001 certification, the ISO 14001 standard does not provide any real measure of environmental performance. As I discussed, it is therefore difficult for stakeholders to assess the benefits of such a standard. Furthermore, since ISO 14001 is a process standard and is not linked to any eco-labeling standard, it does not send a clear signal to customers regarding a firm's environmental improvements. In the European case, the clear signals came from the European Commission, which endorsed the standard.

In the U.S., the situation is the opposite. As it is clear from the survey, stakeholders are not requiring ISO 14001 certification. The standard is still questioned and has not yet become 'the norm.' The resulting demand for the standard is therefore weak. The data indicate that firms are using the certification to increase trade opportunities rather than to respond to a demand within their own market. In conclusion, in the United States it is not clear whether the benefits gained from the adoption of the ISO 14001 standard can offset the potential associated transaction costs.

This paper has compared the diffusion of ISO 14001 in Europe and in the United States. It would be very interesting to compare these cases to the Asian context in which the diffusion of ISO 14001 seems quite rapid. As in Europe, Asian regulatory agencies have actively pushed the development of ISO 14001. Many Asian countries have government funded ISO 14001 support programs already in place and some of them are hoping that in the long run, an ISO 14000 system will assist them in monitoring industry (OECD, 1998).<sup>28</sup> In addition to regulatory agencies, local government administrations are also taking a number of measures to promote the use of ISO 14001 (Yano, 1998).

The United States is an interesting example because the question still remains whether obtaining ISO 14001 certification offers value to companies. The problem of the implementation of ISO 14001 might be even more critical in developing countries where the institutional environment to promote the standard might not be available. Further research should address the issue of the diffusion of ISO 14001 in a more comprehensive, and international manner.

## Part VI. Conclusion

Institutions take shape and thrive when they confer benefits greater than the transaction costs incurred in creating and sustaining them (DiMaggio and Powell, 1991). While pressures toward isomorphism may induce acceptance of the same practices all over the world, it is clear that the speed of this diffusion may vary depending on the institutional context and structural position of each country.

This paper has proposed an institutional perspective to analyze how a specific institutional context can impact the cost and the perceived benefits of implementing such an EMS standard at the firm level. Institutional theory emphasizes the importance of regulative, normative and cognitive factors that affect adoption decisions over and above the technical efficiency of the organizational practice. This is an interesting perspective to examine the case of ISO 14001, as it is a process standard with results difficult to identify. Uncertainty of regulatory behavior toward firms seeking ISO 14001 certification impacts the level of transaction costs between the firm and the certification body. Regulatory commitment to the standard, by for example providing of flexibility within the regulatory system, can offset these potential costs. Governments can act as a coercive force to influence the normative and regulative aspects of the institutional environment surrounding the standard by sending a clear signal of their endorsement of the standard and reducing information and search costs. Governments can play an important role by providing technical assistance and by enhancing the reputation of adopters. These actions may impact the demand for ISO 14001, as stakeholders will believe in the benefits of the ISO 14001, since the government has demonstrated them.

The institutional economics framework focuses on efficiency, whereas institutional sociology places particular emphasis on legitimation processes and the tendency for institutionalized organizational structures and procedures to be taken for granted regardless of their efficiency implications. Building on the theoretical work of Robert and Greenwood this article adds to the literature by using both of these research streams as a way of understanding organizational design adoption (Roberts and Greenwood, 1997). This framework analyzes the adoption of ISO 14001 by viewing organizations as efficiency seeking under institutional constraints.

The importance of institutional factors to the diffusion of ISO 14001 is linked to the incompleteness of the standard in dealing with the measurement of environmental performance. If the standard would clearly define a procedure for the assessment of environmental performance it would be possible for stakeholders to use ISO 14001 to compare firms' impact on environmental performance within a country and internationally. The benefits of the standard would therefore be unambiguous. Thus, we could predict that a standard that could clearly spell out environmental measures would diffuse better on an international scale, and that institutional factors would play a less important role in its adoption, since the adoption would be based mostly on comparing its tangibles benefits.

## Appendix

Table 6. Questions of the EMAS survey.

Question number	Question
G.4.a.	'What measures have been taken to inform companies of the requirements of EMAS?'
G.6.	'What financial budget (and over what time period) has been allocated to informing companies and the public?'
A.2.a.	'To date, approximately how many verifiers has your organization accredited?'
A.2.b.	'How many of these verifiers are organizations?'
A.2.c.	'How many of these accredited verifier organizations are also verifiers for ISO 14001?'
S.4.	'Was the certification undertaken by the same organization that undertook your site's verification?'
S.13.a.	'How many of your site's environmental statements have you distributed in total so far?'
S.14.a.	'What in your opinion are the 3 main audiences (or stakeholders) for your site's environmental statement?'
S.14.b.	'Which are the 3 main groups that have actually requested copies of your site's environmental statements?'
S.15.'	'In your opinion, has the site's environmental statement been a useful communication tool with the site/company stakeholders that you have mentioned?'
S.16.a.	'What are the 3 main benefits of EMAS implementation?'
S.16.b.	'In your opinion, do you feel that the market has rewarded your site for achieving registration to EMAS?' The results were 49% for 'no' and 9% for 'don't know'

## Notes

1. Examples of Industry Codes of Practice are the U.S. Chemical Management Association's Responsible Care Program; the Global Environmental Management Initiative (GEMI), the Environmental Self Assessment Program, and many others. Great Britain was the first country to develop a national EMS standard: British Standard 7750 in 1992.
2. For updated figures on the diffusion of ISO 9000 by country see ISO 9th cycle 1999.
3. The ISO originally focused on product technical standards. Then in 1979, the ISO decided to address quality management and assurance standards. As a result, ISO 9000 was published as a final standard in 1987. This system establishes standards for quality management in all areas of business and a process for registration or verification of compliance.
4. The International Organization for Standardization (ISO) was founded in 1946 to 'promot[e] standardization and related activities in order to facilitate international exchange of goods and services.' There are 111 member countries within the ISO and each country has 1 official representative. The United States' representative is the American National Standards Institute (ANSI).

5. The Global Environmental Initiative in Rio de Janeiro in 1992 was an essential step in the formation of ISO 14000 (Von-Zharen, 1996). Over one hundred of the countries attending the United Nations Conference on Environment and Development (UNCED) committed to improving international environmental management programs and petitioned the International Standardization Organization to adopt this cause.
6. The Uruguay Round Ministerial Decision on Trade and the Environment established a committee in 1994 under the World Trade Organization (WTO) to harmonize environmental and trade policy based on two key factors: (i) 'identifying trade and environmental policy linkages to promote sustainable development' and (ii) 'avoiding protectionist measures while promoting [the] environmental objective agreed to at the [UNCED]' (Hall and Tockman, 1995).
7. The other sections were published in draft and are still being revised by TC 207.
8. For small to medium-sized manufacturing facilities (100 to 300 employees), the cost of developing and auditing an EMS will generally range from \$20,000 to \$75,000 per facility. Implementation for larger, heavy industrial facilities within a multinational company (500 to 900 employees) can range from \$100,000 to \$200,000 (Watkins and Gutzwiller, 1999).
9. Examples of such studies include the impact of property rights systems on innovative strategies (Arrow, 1996; Merges and Nelson, 1994); the influence of antitrust regulation on cooperative strategies (Shapiro and Willig, 1991); and the effect of government's credible commitment on firm's behavior (Levy and Spiller, 1994; Weingast, 1995).
10. ISO 14001 is not linked to ISO 14020 to ISO 14025 which are the environmental labeling standards under discussion under the supervision of Technical Committee 207.
11. True to the well-known axiom 'you can't manage what you don't measure,' Section 4.5.1 of ISO 14001 requires an organization to have procedures to 'monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment' as part of the checking and corrective action portion of its EMS. Although ISO 14001 requires an organization to measure and track its environmental performance, there are no adopted or commonly accepted Environmental Performance Indicators. ISO 14031 (*Guidelines on Environmental Performance Evaluation*) contains over 100 examples of measures and indicators, but it does not propose a core set of metrics for comparison and benchmarking of performance, nor does it establish performance levels.
12. Certification Competent Bodies in Denmark, France, Ireland, Luxemburg, The Netherlands, Sweden, the U.K., Belgium and Spain. Ministries for the Environment in Austria, Finland, Greece, and Portugal were interviewed. Germany did not provide answers to these questions. The interviews were conducted during the time period 23/10/1997 to 5/11/1997.
13. Population data from EMAS Help Desk (31/12/97): 1211 EMAS sites in 12 Member States. Greece, Luxemburg and Portugal had no registered sites. Population size in Austria, Denmark, France, Finland, The Netherlands, Sweden and U.K. meant EMAS sites were randomly selected for a minimum representative sample of 10%. The interview time period was 2/2/1998 to 23/2/1998.
14. As a result of the European Commission 'Decisions on the recognition of ISO 14001 and certification procedures for use with the EMAS Regulation,' it is now possible for verifiers to avoid duplication of effort between certifiers and verifiers in the verification of an EMAS site and the validation of its environmental statement. As published in the Official Journal OJ L104 22 April 1997.
15. Of the 66 registered sites certified ISO 14001, over a third (38%) had achieved ISO 14001 after EMAS verification and 36% at the same time as EMAS verification.
16. Responses 26% before EMAS verification, 38% after EMAS verification and 36% at the same time as EMAS verification.
17. Art. 1(1), 1993 O.J. (L 168) 1, 2.
18. Directives and regulations are two methods of legislation in the European Union. Directives are most common in the Environmental area. By 1992, there were almost 200 environmental directives but only forty regulations. Once passed, a directive requires 'harmonization' of the various Member States through national legislation passed in accordance with the directive.

Various levels of harmonization are possible, since Directives are binding, but only as to the result to be achieved. They leave to the national authorities the choice of form and methods.

19. Approximately \$34 million.
20. Six respondents out of 14 representatives of Member State Competent Bodies of Ministries.
21. The 8% of sites which used different organizations for their site verification and their ISO 14001 certification were all of large sized enterprises.
22. The overwhelming majority (79%) of requests for environmental statements came from researchers and people in education/schools. Consultants (34%) are the second highest group requesting site environmental statements.
23. In your opinion, do you feel that the market has rewarded your site for achieving registration to EMAS? The results were 49% for 'no' and 9% for 'don't know.'
24. The population of certified firms was so small (180) that it was almost impossible to compare it to a representative sample of non-certified companies since they were so numerous (billions of firms).
25. Design cost means the cost of preparing the Environmental Management System before it is audited. It does not include the certification costs.
26.
  1. Penalties for violations could be completely waived under certain conditions, including discovery of the violations during an environmental audit, voluntary disclosure to the EPA within 10 days, and no serious harm or endangerment resulting from the violation.
  2. Up to a 75% reduction in penalties may be granted if all conditions of (1) are met, except 'discovery of the violations during an environmental audit.'
  3. Criminal prosecution for environmental crimes will not be recommended to the United States Department of Justice if all conditions of (1) are met and 'the violation does not involve: (i) a prevalent management philosophy or practice that concealed or condoned environmental violations: or (ii) high-level corporate officials' or managers' conscious involvement in, or willful blindness to, the violation.'
  4. Audit reports will not be routinely requested or used to initiate criminal or civil investigations.
27. In December 1999, Europe accounted for 190,248 ISO 9000 certified facilities, 55% of the 343,643 worldwide certified facilities. The United States with 33,054 certified facilities accounted for 10% of the total.
28. These countries include: Japan, China, South Korea, Taiwan, Hong Kong, Thailand, Malaysia, Singapore, Indonesia, Vietnam, and Sri Lanka.

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