

STAKEHOLDERS AND COMPETITIVE ADVANTAGE: THE CASE OF ISO 14001*

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This paper integrates a stakeholder perspective into the resource-based view of the firm, to analyze the mechanisms that link the adoption of the international Environmental Management Standard ISO 14001 to firms' competitive advantage. This paper shows that the perceived competitiveness impact of the standard depends mostly on the involvement of firms' external stakeholders (distributors, customers, community members, and regulatory agencies) in its design. ISO 14001 is a process standard, and it is difficult for stakeholders to get credible information on the effectiveness of the standard if they are not involved in its design. Stakeholders' involvement in a firm's ISO 14001 standard becomes a valuable organizational capability, which is difficult to imitate by competitors. The analysis is supported by primary data collected from a questionnaire mailed to 152 firms, resulting in 55 observations representing 30% of the total number of firms certified in the U.S. in August 1998.

(STAKEHOLDERS; COMPETITIVE ADVANTAGE; NATURAL ENVIRONMENT; RESOURCE-BASED VIEW; ORGANIZATIONAL CAPABILITY; STRUCTURAL EQUATION MODELING)

Introduction

Despite the importance of environmental management to manufacturing operations, research in the discipline of Operations Management has only just begun to address difficult questions related to the natural environment. Some attention has been given to environmental performance as a competitive dimension of operations (Angel and Klassen 1999 and papers in the current special issue of POM). However, the interactions between environmental management systems, operation management, and competitive advantage have not yet been studied. Other streams of the management literature, such as business strategy, have explored the link between environmental management and the firm's profitability. This research stressed market gains and cost savings resulting from environmental management without analyzing in detail the exact mechanisms that link operations management and performance (Porter and van der Linde 1995; Klassen and Laughlin 1996; Reinhardt 1998). I suggest that the relationship is more complex than a simple calculus equating higher costs with lower profits. If the sole driving force for a corporate environmental policy is minimizing tangible pollution costs, then any firm going beyond compliance would forfeit the profits it could gain

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from simply (and legally) continuing to externalize those costs. Instead of asking whether it pays to be green, we ought to be asking about the circumstances under which it might pay.

Building on the resource-based view of the firm (Peteraf 1993), Hart suggests that stakeholder integration should be seen as a capability arising from product stewardship, which requires the integration of perspectives of key external stakeholders such as environmental groups, community leaders, non-governmental organizations (NGOs), the media, and regulators into product design and development (Hart 1995). In the same vein, my argument highlights the role that environmental management, in relation to stakeholders, plays in capturing premium profits from environmental process improvements.

Some research in the literature of operations management has focused on quality management linked to environmental efforts to obtain a competitive advantage (McInerney and White 1995). However, little attention has been given to the involvement of stakeholders in operations management and how this involvement could impact the firm's competitive advantage.

This paper studies the case of the international Environmental Management Standard ISO 14001 in the United States to examine how stakeholders' involvement in a firm's operational management can become a valuable organizational capability. Formally adopted in 1996 by the International Organization for Standardization, ISO 14001 represents a new standard, and approach to improved environmental performance. Due to its backing by the International Organization for Standardization, it is expected that ISO 14001 certification will evolve into a set of globally accepted environmental management practices. ISO 14001 shares many common traits with its predecessor ISO 9000, which is the international standard for quality management. Like ISO 9000, ISO 14001 does not focus on outcomes, such as pollution, but focuses on processes. Also like its predecessor, ISO 14001 involves a possible audit by a third party. The ISO 14001 standard describes the basic elements of an effective Environmental Management System (EMS). These elements include creating an environmental policy, setting objectives and targets, implementing a program to achieve those objectives, monitoring and measuring its effectiveness, correcting problems, and reviewing the system to improve it and overall environmental performance (Tibor and Feldman 1996).

In addition to improving environmental performance, ISO 14001 is said to be able to provide economic benefits to certified companies, notably in terms of competitive advantage (Bansal 1999; Corbett and Kirsch 2000). Companies may experience direct financial benefits: a decrease in the cost of regulatory fines, as well as a decrease in environmental liabilities. By involving employees, ISO 14001 can lead to increased operational efficiencies. ISO 14001 can also indicate to external stakeholders such as customers, communities, the media, investment and insurance groups, and regulatory agencies that the company has a sound environmental management system in place.

However, many firms in the U.S. appear reluctant to adopt ISO 14001. In 1998, only 3.7% of the 7,887 ISO 14001-certified facilities were located in the U.S., far fewer than the 7% of U.S. ISO 9000-certified facilities in 1995, 2 years after the institution of ISO 9000. This suggests that U.S. firms either do not see how such a standard could provide more benefits than strict compliance with command and control regulation, or that they may even perceive risks in actual certification due to the potential release of confidential information during the audit procedure (Delmas 2000).

At present it is not clear how ISO 14001 certification can function as a credible signal to external stakeholders how a product has been produced with environmental sensitivity. Stakeholders may not identify or understand the advantages of ISO 14001 as the standard does not provide any real measure of environmental performance. Indeed environmental performance is a factor in the certification process, but there are no specific quantitative targets that must be met in order to achieve certification.

Our main argument is that external stakeholders have to be actively involved in the design of a firm's EMS to be able to "trust" its effectiveness and to put a value on it. In addition, their

involvement can also become an organizational capability, which is difficult to imitate by competitors. Focusing on the impact of ISO 14001 on the firm's competitive advantage rather than on the link between ISO 14001 and environmental performance per se, this paper advances our understanding of two theoretical trends: the resource-based view of the firm and the literature in environmental operations management (for research on the links between ISO 14001 and environmental performance see Fielding 1998 and Buchholz 1999).

The first part of this paper integrates a stakeholder perspective into the resource-based view of the firm to analyze the link between EMS and competitive advantage. The second part is dedicated to the data collection and data analysis of ISO-certified companies in the U.S. The third part discusses the results. Concluding remarks follow.

A Resource-Based View of Environmental Management Standards

The resource-based view (RBV) of the firm emphasizes the key role of management in adapting, integrating, and reconfiguring internal and external skills, resources, and functional competencies in changing environments (Barney 1991; Mahoney and Pandian 1992; Teece, Pisano, and Shuen 1997). As firms turn to outside parties for a variety of resources, they develop a network or portfolio of ties to specific partners. These relations are both a resource and a signal to markets, as well as to other potential partners, of the value of the firm's activities and its products.

The RBV starts with the assumption that the desired outcome of managerial effort within the firm should be directed toward obtaining a sustainable competitive advantage, and that this advantage can be gained if the firm possesses and deploys certain key resources in its product markets. From this perspective, these key resources can be defined as those that create value for customers (Williams 1992). How the transformation of an EMS satisfying the ISO 14001 standard into a valuable resource for firms might happen is explained below.

A resource only becomes a competitive advantage when it is applied to an industry and brought to a market (Barney 1986). In this context, the role of managers is to convert resources into something of value to their customers. However, this process is complex and involves two stages. First, resources must be effectively deployed in the marketplace to create value for customers. Second, this advantage resists erosion and is sustainable if the resources underlying those advantages are rare and difficult to duplicate (Barney 1991). These requirements pertain to the valuation of resources in general outside the environmental arena. However, each requirement acquires special importance and presents particular problems in the context of environmental management standards. Indeed, the resource-based view of the firm focuses on customers as the main driver of resource valuation. I posit that this view is too limited and present a broader perspective of resource valuation, which includes external stakeholders such as community members, regulatory agencies, and financial institutions.

EMS as an Organizational Capability

In the resource-based view, resources are classified as tangible, intangible, and personnel-based (Grant 1991). Intangible resources include reputation, technology, and human resources; the latter include culture, the training and expertise of employees, and their commitment and loyalty. As I describe below, ISO 14001 certification can be described as an intangible resource.

ISO 14001 provides the basic framework for the establishment of an EMS that can be audited and can lead to certification. ISO 14001 is a process, not performance, standard. In other words, ISO 14001 does not tell organizations what environmental performance they must achieve aside from compliance with environmental regulation. Instead, the standard describes a system that will help an organization to achieve its own objectives and targets.

Like ISO 9000, ISO 14001 can be seen as a way to increase the quality of management and can provide operational efficiencies that can lead firms to gain a competitive advantage. For

example, multinationals operate under multiple jurisdictions, each having a different set of environmental regulations. ISO 14001 provides the means for head office management to control their international environmental operations. Conforming to one standard, rather than multiple standards, could yield operating efficiencies.

Virtually by definition, an EMS must be closely integrated into a company's other management systems to function efficiently. In fact, a substantial number of ISO 14001's requirements relate to the structure of an organization, such as record-keeping procedures, management review processes, communication methods, definitions of responsibility, and Environmental Health and Safety policy and training programs. Integrating environmental management into traditional management structures could entail a significant amount of organizational restructuring. Alternatively, since the system is closely interconnected to traditional systems, these may already fulfill the predominant number of ISO 14001 requirements or at least facilitate any necessary modifications.

One characteristic of ISO 14001 is its potential to involve top-level management. The text of the standard specifies that "the organization's top management should define and document its environmental policy within the context of the environmental policy of any broader corporate body of which it is a part and with the endorsement of that body, if there is one" (ISO 14001 Annex A A.2. Environmental policy). Because it requires that top management define an overall environmental policy for their firm, the framers of ISO 14001 certification expected it to be viewed as a competitiveness issue, rather than a compliance issue (see paragraph 5 in the introduction of the standard ISO 14001: "environmental management encompasses a full range of issues including those with strategic and competitive implications.")

What distinguishes ISO 14001 as compared to EMSs in general is the requirement of an audit. Usually, this audit is performed by a third party. This requirement may provide support the efforts of environmental managers to involve all employees from the bottom to the top in the design and implementation of the standard. However, the level of involvement of all employees may vary from facility to facility.

In brief, ISO 14001 is a system standard that has the potential to cut across the functions of the organization and integrate environmental considerations with other corporate functions of the organization. However, this potential will be reached only if all employees including top management are involved in the design of ISO 14001. Under this approach, which involves the whole organization, cost efficiency, productivity, and environmental performance all become part of the same decision-making process. This coordination can lead to operational and managerial efficiencies and competitive advantage. The impact of the involvement of all employees in the design of ISO 14001 on the competitive advantage of a company can be formalized as follows.

PROPOSITION 1. The greater the involvement of employees in the design of ISO 14001, the greater the competitive advantage derived from certification.

Willingness to Pay and Credible Information

The involvement of the whole organization of the firm and its managers will certainly have a beneficial impact on the firm's environmental performance and efficiency. However, firms will not reap the full benefits of ISO 14001 if external stakeholders such as customers, investors, media, community members, and regulatory agencies do not value the standard positively. Indeed, if ISO 14001-certified firms want to pursue a differentiation strategy based on their environmental management system, they will need the support of these external stakeholders.

Some consumers may be willing to pay a price premium for products and services originating from companies that are pursuing efforts to reduce their pollution output. Investment and insurance groups, with the expanding nature of environmental risks and

liabilities, may require more thoughtful environmental analysis in the preparatory stages of a transaction. Companies with pollution prevention programs and EMSs like ISO 14001 should be far more attractive risks to insurance underwriters and should gain better rates. Banks and insurance companies could better account for the lower risks resulting from ISO 14001 certification through lower costs of capital and insurance premiums. Regulatory relief can be an important benefit of ISO 14001 (Begley 1996). Indeed, regulatory agencies might perform less intensive and less intrusive monitoring of ISO 14001–certified firms. Examples of such regulatory flexibility have been shown in Japan and Germany (OECD 1998). However, would these stakeholders value ISO 14001 certification only if the certification process was not perceived to be rigorous and verifiable.

The RBV states that intangible resources are more difficult to value than tangible resources such as physical plants or equipment. When knowledge is tacit, it cannot be effectively transferred in codified form. Its exchange must rely on intimate human contact (Teece 1996). Partnerships with external stakeholders could be employed to acquire and share information. And such partnerships can result in the development of “sympathetic systems, procedures and vocabulary,” which may encourage effective transfer of knowledge (Pisano 1990).

ISO 14001 is imperfect in dealing with the measurement of environmental performance. While ISO 14001 does not preclude companies from engaging in extensive outreach and information-sharing activities with external stakeholders, public disclosure of information pertaining to the management system and environmental performance is not an explicit requirement of the standard. 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. Under ISO 14001, the only element of the EMS that is required to be made publicly available is the organization’s environmental policy statement. However, preliminary data in the U.S. suggest that even this information is not provided by ISO-certified companies on a regular basis. For example, a 1999 U.S. EPA study requesting the policy statements of 175 U.S. ISO-certified firms received responses from only 101 organizations, 58 percent of the total (U.S. EPA 1999). It is therefore difficult for stakeholders to value the environmental improvements that have been implemented inside the facility.

Because ISO 14001 is a system standard, certification, even if credible, only tells external stakeholders that the system conforms to the management prerequisites spelled out in the language of the standard. When the EMS becomes a public matter, for example, through advertising claims associated with certification, the absence of performance requirements coupled with insufficient reporting requirements, means that external stakeholders may not be able to assess exactly what the impact of certification was on a particular site. Until the confidence of these external stakeholders is gained, the full value of certifying to ISO 14001 will go largely unrealized.

There are two main avenues that firms might take to provide credible information to stakeholders: the first one is to integrate stakeholders in the design of the firm’s EMS; the second is to invest in external communication with stakeholders on the final and certified EMS adopted by the firm.

The first avenue involves the ability to establish trust-based collaborative relationships with a wide variety of stakeholders, especially those with non-economic goals. These stakeholders may include local communities, environmental groups, regulators, and NGOs. The standard states that an organization must develop a process or processes for dealing with external communication but does not specify how this process should be organized. Section 4.4.3 of the standard is the only section that mentions stakeholders and that is in the context of external communications. It states that if an external party requests information about the EMS, the organization must have a set procedure for handling this request.

The level of stakeholder involvement is therefore left to the discretion of the firm. An

organization must have a plan for public disclosure, which could include active stakeholder participation, but the plan could at the same time be virtually meaningless.

Barriers to Imitation

The second essential requirement for a resource to be valuable is that it be in short supply. If the resource is plentiful, any competitor could acquire it and so replicate the firm's advantage (Barney 1991). Further, to be a source of sustainable competitive advantage, the rarity of the resource must persist over time. Inimitability is therefore at the heart of value creation because it limits competition. Possessing a resource that competitors can readily copy will only generate temporary value—it cannot be the basis for a long-run strategy. Some resources are difficult to imitate because of path dependency in their accumulation. These are resources that cannot be instantaneously acquired, but rather must be built over time. One source of inimitability is causal ambiguity. This implies that potential replicators either cannot disentangle what the truly valuable resource is, or cannot identify the precise recipe for duplicating it. Resources marked by causal ambiguity are often organizational capabilities. They are embedded in an array of complex social structures and interactions and may even depend on the personality of a few exceptional individuals. From this perspective, involvement of stakeholders in the design and structure of ISO 14001 sets-up a path dependency process generating the sort of causal ambiguity just described and, with it, increases in the difficulty of imitating the process for other competing firms. These arguments can be formalized as follows.

PROPOSITION 2. The greater the involvement of external stakeholders in the design process of ISO 14001, the greater the competitive advantage gained from certification.

ISO 14001 and Past Experience

The RBV of the firm emphasizes the importance of past experience in developing resources (i.e., path dependency). Although ISO 14001 is open to any company that wishes to invest in obtaining the certification, there is an initial learning experience curve, at the firm, sector, or even institutional level that might facilitate the adoption of the certification.

ISO 14001 is clearly derived from ISO 9000, which is the standard for total quality management. Firms familiar with ISO 9000 should be more inclined to obtain ISO 14001 certification (Corbett and Kirsch 2001). Companies with an existing quality standard (ISO 9000, QS-9000, or AS 9000) can implement ISO 14001 faster due to the commonality of elements in these standards. With ISO 9000, a registered company has a defined management structure, quality management review meetings, documents and record procedures, internal audits, and a procedure for corrective actions.

At the sectoral level, having an existing EMS means a company will have many of the ISO 14001 elements in place. It is thus easier for a firm in a particular industry to obtain certification in an environment where other firms in that same industry have already been certified. Since the standard does not offer much guidance, it is important that firms be able to benefit from the experience of other firms. In an environment where many firms within the same industry have been certified, the development of knowledgeable consulting companies will be useful for firms in search of certification. By contrast ISO 14001 might be a resource difficult to acquire for those firms unable to benefit from an environment where other similar firms have already had experience with the certification procedure. It might be difficult for firms to involve suppliers, service contractors, and customers in the process. The environmental management of the value creation chain appears to be the real bottleneck for reaping the full potential of EMS, in a context where only a small minority of companies is ready to start an EMS.

There is therefore an apparent tension between the fact that ISO 14001 is easier to acquire in a context where other firms' are certified and the fact that the potential competitive value

of certification may be reduced in that case. However, even if the institutional system would be set up to facilitate ISO 14001 certification by all firms, the involvement of stakeholders would remain an organizational capability that is difficult to imitate, i.e., a potential source of competitive advantage.

I will now test these propositions with a sample of U.S. ISO 14001–certified companies. This will allow us to assess the actual impact of external stakeholders as compared to firm managers and employees on the development of a competitive advantage.

Research Method

The case of ISO 14001 certification in the United States is used to support my propositions. A questionnaire mailed to U.S. certified companies was used to evaluate how stakeholders' involvement in the design of ISO 14001 would impact the competitive advantage of firms. Of the 152 corporate questionnaires mailed, 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.

The geographical location of respondents closely mirrors the distribution of certified firms in the U.S. (see Edwards et al. 1999, p. 66). The distribution of responding firms by industry is also close to the actual distribution of ISO 14001 U.S. certified firms. The sectors with the most frequent responses are electronics (18%), transport equipment (16%), and the chemical industry (9%). Seventy-eight percent of the certified facilities in the sample belonged to large companies with annual sales greater than \$500 M. Eighty-five percent of the facilities were also ISO 9000 certified.

The data collection process proceeded in three phases. First, a case study performed on a U.S. certified company outlined the main variables of the study. Second, by reviewing the literature, measurement scales were developed. Finally, the questionnaire was presented to a group of academics. A single informant was used for each company. Although the use of multiple respondents would have reduced concerns about potential response bias, the respondent had to be knowledgeable about ISO 14001 process. In a large sample study, identifying and obtaining responses from multiple well-informed respondents is extremely problematic. The key methodological solution in using a single respondent approach is to find the most appropriate respondent (John and Reve 1982). Our respondents were qualified, as they were in charge of ISO 14001 certification of the firm. Environmental managers were potentially less qualified to assess the economic impact of ISO 14001, so we developed a general question concerning the competitive advantage of the company instead of using more specific measures of performance.

The corporate questionnaire asked senior environmental managers of ISO 14001–certified U.S. firms to rate their perception of various aspects of the EMS (see a copy of the questionnaire in Edwards et al. 1999, p. 145). Two of the questions from the survey were selected for analysis in this paper. The first one relates to the level of stakeholders' involvement in the design of the facility's ISO 14001 EMS. The second one pertains to the impact of ISO 14001 EMS on the firm's overall economic performance: access to new markets, access to international markets, and overall competitive advantage. One may argue that the sequence of the questionnaire, from incentives to implementation and results, may force environmental managers to rationalize their choices. There is some correlation between the variable that represents competitive advantage as a reason for seeking ISO 14001 and improved competitive advantage as a result of ISO 14001 certification (Pearson correlation 0.487**). Some variables representing the incentives to seek certification and the results of certification are also correlated. It is very difficult to assess whether the incentives at the time of certification were actually the ones that are reported in the questionnaire. The time lag between certification and the questionnaire could have been up to 2 years (the questionnaire

was sent at the end of 1998, and the 1st certifications started in 1996). Furthermore, environmental managers may not have participated in the decision to seek certification. Since I am not using the variables relating to the choice of certification, it is therefore reasonable to assume that environmental managers were in the position to provide accurate responses on the actual results of ISO 14001 and the way it was implemented in their company.

Dependent Variable

The dependent variable relates to the effectiveness of ISO 14001 in terms of competitive advantage (ADVANT). It is based on the question: "how has ISO 14001 EMS impacted your facility's overall performance in terms of overall competitive advantage?" The responses were given on a 5-point scale. The anchors were "decreased" (0.00) and "increased" (1.00). The coding of the responses was from 0 to 1 with 0.00, decreased; 0.25, slightly decreased; 0.50, no change; 0.75, slightly increased; and 1.00, increased.

Independent Variables

The independent variables are derived from a question on the level of stakeholder involvement in the design of the facility's ISO 14001 EMS. Eleven variables represented the involvement of stakeholders: Corporate Representatives (CORPREP), Senior Management (SRMGR), Environmental Managers (ENVMGR), Employees (EMP), Customers/Clients (CLIENT), Shareholders (SHARE), Community Members (COMMEM), Distributors (DIST), Lawyers (LAW), Marketing/Public Relations (PR), and Regulatory Officials (REGOF).

The responses were given on a five-point scale. The anchors were "not involved" (0.00) and "very involved" (1.00). The coding of the responses was from 0.00 to 1.00 with 0.00, not involved; 0.25, somewhat involved; 0.50, involved; 0.75, quite involved; and 1.00, very involved.

Control Variables

Our control variables represent the size of the firm in terms of its number of employees (CORPEMP), whether the company is publicly held (PUBLIC), whether it has an ISO 9000 standard in place (ISO) and also variables representing industrial sectors (CHEMICAL, ELECTRON, TRANSPOR). The respondents could choose between three items for the question used to define CORPEMP: small (under 1,000 employees), medium (1,000-5,000), and large (over 5,000). The responses were ranked from 0.00 to 1.00 with 0.00 for small, 0.50 for medium, and 1.00 for large. The variable ISO was coded 0.00 for no ISO 9000 and 1.00 for the presence of ISO 9000 certification. The variable PUBLIC was coded 0.00 for not publicly held and 1.00 for publicly held. To control for potential industry effects, three variables were created for the most represented sectors in the sample: CHEMICAL representing chemical companies, ELECTRON, representing electronic firms, and TRANSPOR representing the transport equipment firms. These variables were coded 1.00 when belonging to the sector and 0.00 when not.

Results

The descriptive statistics of the variables are presented in Table 1. Because of missing data, the number of usable observations dropped from 55 to 52. With respect to increased competitive advantage, more than half of the respondents noted an overall increase. The other half experienced no significant changes. Looking at frequencies of the variable ADVANT, 59.3% of the firms considered that the EMS had a positive impact on competitive advantage.

I performed a structural analysis to look at the impact of "external stakeholders" as compared with "employees." I used a structural modeling approach and estimated the model using AMOS 4 (Arbuckle 1997). AMOS belongs to the second generation of the multivariate analysis family of techniques, which also includes LISREL. Structural modeling addresses structural and measurement issues frequent in survey-designed research and has been used

TABLE 1
Descriptive Statistics

Correlations	N	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1. CORPREP	52	0.5433	0.3629	1																		
2. SRMGR	52	0.6875	0.2368	0.517**	1																	
3. ENVMGR	52	0.8750	0.2689	0.069	0.087	1																
4. EMP	52	0.6442	0.2233	0.315*	0.382**	0.102	1															
5. CLIENT	52	0.2019	0.2044	-0.087	-0.063	0.245	0.048	1														
6. SHARE	52	0.1442	0.2443	0.288*	0.286*	-0.448**	0.24	0.142	1													
7. COMMEM	52	0.1010	0.1661	0.089	-0.086	0.096	0.029	0.435**	0.359**	1												
8. DIST	52	0.0576	0.1273	0.131	-0.041	-0.072	-0.083	0.297*	0.436**	0.704**	1											
9. LAW	52	0.2067	0.2788	0.14	0.07	0.155	-0.154	0.006	0.129	0.202	0.21	1										
10. PR	52	0.2452	0.2734	0.299*	0.014	0.142	0.132	0.281*	0.157	0.308*	0.325*	0.206	1									
11. REGOFC	52	0.1587	0.2667	0.232	0.121	0.145	0.143	0.278*	0.338*	0.544**	0.627**	0.209	0.464**	1								
12. PUBLIC	51	0.6275	0.4883	-0.186	-0.208	0.195	-0.402**	0.046	-0.236	0.07	-0.025	0.184	-0.037	-0.211	1							
13. ISO	51	0.8431	0.3673	-0.336*	-0.173	-0.155	-0.209	-0.038	0.086	-0.152	0.079	-0.310*	-0.215	0.001	0.1	1						
14. CORPEMP	40	0.7500	0.3581	-0.318*	-0.168	0.169	-0.329*	-0.05	-0.230	0.027	0.032	0.141	-0.017	-0.28	-0.561**	-0.132	1					
15. ADVANT	52	0.6587	0.1488	0.165	0.078	0.352*	-0.001	0.296*	0.032	0.182	0.154	0.139	0.381**	0.342*	-0.02	0.18	-0.092	1				
16. TRANSPOR	52	0.1731	0.3820	0.510	0.069	0.119	-0.241	-0.017	-0.010	0.028	-0.008	0.394**	-0.039	0.014	0.038	0.058	0.088	-0.148	1			
17. ELECTRON	52	0.1923	0.3980	-0.025	-0.026	-0.137	-0.263	-0.125	-0.039	-0.003	0.164	0.032	-0.081	-0.155	0.038	0.200	0.354*	-0.029	-0.223	1		
18. CHEMICAL	52	0.0769	0.2691	0.051	0.068	0.119	-0.241	0.0158	-0.023	0.152	0.154	-0.151	0.072	0.236	-0.228	0.126	-0.118	-0.132	-0.132	-0.141	1	

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

increasingly in strategic management research (Capron 1999; Simonin 1999). A model for AMOS estimation consists of two primary parts: (1) an inner structural model that captures the structural relationship between the endogenous and exogenous latent variables, and (2) an outer measurement model that captures the manifestation of constructs or latent variables in terms of observable measures.

Measurement Model

An exploratory factor analysis (EFA) was performed (SPSS 1996). I performed a principal component analysis followed by a varimax rotation with the independent variables to verify whether a differentiation between environmental managers, employees, and stakeholders was statistically valid. The first component included external stakeholders DIST, CLIENT, SHARE, COMMEM, PR, and REGOFC (Eigenvalue 3.2, 29.05% of variance). The second one involves employees CORPREP, SRNGR, and EMP (Eigenvalue 1.9, 17.37% of variance). The third one corresponds to environmental managers ENVMGR (Eigenvalue 1.5, 13.7% of variance), which do not show any communality with other variables. The rotated structure pattern coefficient matrix accounts for 60% of the postrotational variance. A fourth component containing the variable LAW showed an Eigenvalue of 1.130 and explained 10% of the variance. Since this is a cut-off value I decided not to take this component into account and keep LAW in the first component representing External Stakeholders.

Therefore I created two latent variables. The first one represents the firm's employees: with CORPREP, SRMGR, and EMP. The second one represents external stakeholders with the following variables: DIST, CLIENT, SHARE, COMMEM, PR, REGOFC, and LAW. The individual item reliability of these latent variables is examined with Cronbach's α (see Table 2). The regression weights of the observed variables on latent variables are provided in Table 3 along with their critical ratios. All of the non-fixed indicator loadings for each construct are significant ($p < 0.01$) and range from 1.00 to 2.34. A common rule of thumb is to accept items with more explanatory power than error variance (Carmines and Zeller 1979). In practice, this implies accepting loading greater than 0.7. This criterion is met for all items (see Table 3).

Shareholders represent a special case within all stakeholders. From a principal agent perspective, stockholders hire managers to operate the firm on their behalf, through the board of directors. Managers, as the agents of stockholders, are charged with making decisions that enhance the wealth of stockholders, the principals. The interests of employees and shareholders should therefore be aligned in the search of competitive advantage. The variable SHARE representing shareholders shows positive and significant correlations with SRMGR representing senior managers and CORPREP representing corporate representatives. That is why I decided to load the variable SHARE for both Employees and Stakeholders. The potential correlation of environmental managers with Employees is taken into account. SHARE is also loaded on environmental managers to test a potential correlation.

Structural Model Fit

Turning to the structural model itself, Figure 1 reports the parameter estimates and goodness-of-fit indicators of the structural equation system. The overall goodness-of-fit is

TABLE 2
Means, Standard Deviations (SD) and Internal Consistencies (Cronbach's α) of the Latent Variables

Measures	Number of Items	Mean	SD	α	Correlations
Employees	3	0.777	0.63	0.67	0.179 with Stakeholders; 0.122 with ENVMRG
Stakeholders	5	0.87	0.80	0.72	0.101 with ENVMRG

TABLE 3
Results of Measurement Model

Path From	Path To	Unstandardized Estimates	Critical Ratio (Estimate/SE) ¹
Employees	ADVANT Competitive advantage	0.098	0.515
CORPREP Corporate representatives	Employees	1.990	2.987***
SRMGR Senior management	Employees	1.584	2.987***
EMP Line employees	Employees	1.00	Fixed
Stakeholders	ADVANT Competitive advantage	0.397	2.006***
CLIENT Customers/clients	Stakeholders	0.891	3.161***
SHARE Shareholders	Stakeholders	1.145	4.282***
SHARE Shareholders	Employees	0.921	2.717***
COMMEM Community members	Stakeholders	1.286	6.027***
PR Marketing/Public relations	Stakeholders	1.201	3.187***
REGOFC Regulatory officials	Stakeholders	1.869	5.417***
LAW Lawyers	Stakeholders	0.725	1.836*
DIST Distributors	Stakeholders	1.00	Fixed
ENVMGR Environmental Managers	ADVANT Competitive advantage	0.175	2.483***
ENVMGR Environmental Managers	SHARE	-0.498	-5.651***

¹ CR values greater than 1.64, 1.96, and 2.32 are statistically significant at 90%, 95%, and 99% confidence level, respectively. ***p < 0.01, **p < 0.05, *p < 0.10.

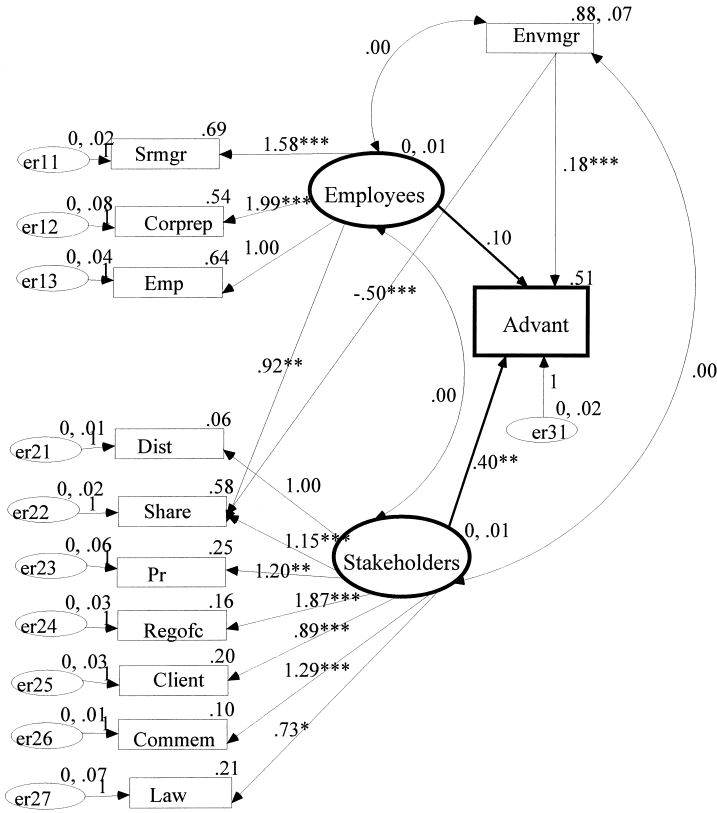
acceptable ($\chi^2 = 47.6$; 48 d.f.; $p < 0.50$). The ratio of χ^2 to degrees of freedom (1.20 less than 2) corresponds to a satisfactory fit (Carmines and McIver 1981), while the other fit indices (NFI = 0.95, CFI = 1.00, and RMSEA = 0.00) and the low standardized root mean square residual (RMR = 0.09) are all within acceptable ranges so that a substantial amount of variance is accounted for by the model (Bagozzi and Yi 1988). The Root Mean Square Error of Approximation (RMSEA) has only recently been recognized as one of the most informative criteria in covariance structure modeling. Values less than 0.05 indicate good fit, and values as high as 0.08 represent reasonable errors of approximation in the population (Byrne 1998). Hence the model is a reasonable representation of the data. The results are displayed in Figure 1.

Looking at the parameter estimates, the first important outcome is that the effect of employee involvement on competitive advantage, although positive, is not significant (0.01, $p < 0.10$). Therefore Proposition 1 is not supported.

The second notable result consists of the significant positive effect of stakeholders on competitive advantage (ADVANT) (0.40 $p < 0.05$). This supports Proposition 2.

The correlation between External Stakeholders and Employees is relatively low (0.07). The covariance is also low (0.001). This supports the independence of our propositions.

The third result consists of the positive and significant link between ENVMGR and ADVANT (0.17; $p < 0.01$). This result should be taken with caution since environmental managers are the respondents to the questionnaire and may have overstated their role in the design and implementation of the standard. They may also have understated the role of shareholders with whom they usually have little interaction. One can assume that shareholders, by delegating their authority to senior management, are therefore less inclined to deal with environmental managers who are dealing with operational issues. This would explain the high negative correlation that exists between the variables representing the involvement of environmental managers (ENVMGR) and shareholders (SHARE). The importance of this negative correlation appears when I run the model without the explicit link between ENVMGR and SHARE. The overall model is not significant, and modification indices suggest regressing ENVMGR ON SHARE to improve the model. The model has been run without the variable SHARE. The results, when



$\chi^2 = 47.6$; 48 d.f.; $p < 0.50$; NFI = 0.95; CFI = 1.00; RMSEA = 0.00; RMR = 0.09, *** $p < 0.01$, ** $p < 0.05$

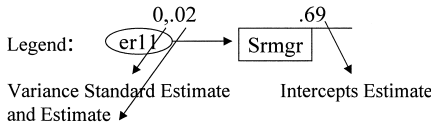


FIGURE 1. AMOS Results of Structural Equation Modeling.

compared with the previous model are similar but with a better fit. The overall good fit indices are improved ($\chi^2 = 44.5$; 40 d.f.; $p < 0.325$; NFI = 0.95, CFI = 0.99; RMSEA = 0.04; and RMR = 0.09). The effect of EMP and ADVANT is still insignificant (0.103). The coefficient for Stakeholders is positive and significant (0.385*).

A test was performed including our control variables: CORPEMP, PUBLIC, ISO, CHEMICAL, ELECTRON, and TRANSP. These variables are shown to have an insignificant impact on competitive advantage.

Discussion and Conclusion

Our analysis shows that external stakeholders play an important and positive role in assisting firms to gain a competitive advantage. There is a strong and positive impact of external stakeholder involvement (customers/clients, shareholders, community members, distributors, and regulatory agencies) on competitive advantage. The impact of employees is less strong. Of course, a multitude of factors may have given rise to these tentative trends, although the survey explicitly asked EH&S managers to indicate the degree of change they

associated directly with EMS. Thus, assuming that managers may partly have accounted for confounding factors in their judgment, the results imply that ISO 14001 has the potential to influence a company's competitive advantage if firms involve their external stakeholders.

As we have seen, ISO 14001 focuses not on outcomes, such as pollution output, but rather on processes. Therefore the involvement of external stakeholders in the process of ISO 14001 facilitates the communication of credible information on the standard, and external stakeholders are therefore more inclined to value it positively. In addition, by involving external stakeholders, firms transform certification into an organizational capability and are protecting themselves against imitation.

The role of senior managers and corporate representatives is not sufficient in itself to induce a competitive advantage from ISO 14001. The involvement of corporate managers in the process of ISO 14001 has to be linked to the participation of external stakeholders. Although ISO 14001 is linked to an audit, this audit may remain confidential, and the results of the audit do not provide any quantitative information in terms of environmental performance.

The role of environmental managers is shown to be positive and significant. Environmental managers definitely play a major role in implementing ISO 14001. They may well be the catalysts in drawing stakeholders' attention to ISO 14001 certification. The standard being used by environmental managers as a leverage tool provides them with more power inside the organization. There could also be a bias in the survey as environmental managers were filling out the questionnaire. They may be overstating their impact on corporate performance.

In terms of the resource-based view, these results show that not only customers, but external stakeholders play a role in a firm's competitive advantage. I highlighted the importance of the management of stakeholders as increasing the value of the environmental management system. In addition, this organizational capability could be used to reduce the uncertainty of rapidly changing environments. By directly accessing the values and agendas of stakeholders, firms may be able to react rapidly to these changes.

The value of stakeholders' involvement into the design of ISO 14001 stems mainly from the lack of clear performance requirements in the standard. Confidence can be gained if ISO 14001 certification is perceived by stakeholders to be a rigorous and credible process. In such a case ISO 14001 would become a more tangible resource, and we could expect that this may decrease the need to involve external stakeholders in firms' EMSs. In comparison to ISO 14001, one of the primary aims of EMAS, the European EMS standard, is to build the confidence of stakeholders, such as regulators and the general public, by requiring information on the environmental performance of participating companies. EMAS attempts to achieve this level of credibility by ensuring independent verification of the participating company's management systems and environmental performance, as well as providing for a credible accreditation system for the environmental "verifiers." It is an instructive model.

I have described the case of ISO 14001, but stakeholder involvement may be a valuable organizational capability for other environmental management programs. For example, Responsible Care, which is an industry code of EH&S practice by the U.S. chemical industry, bears some similarities with ISO 14001. Since it does not require a quantitative measure of environmental performance, there is little homogeneity in the implementation of the code between firms (Howard, Nash, and Ehrenfeld 2000). The financial performance of the entire industry has improved since 1990, suggesting that the benefits of Responsible Care may have spilled over to non-members. Further research could look at which parts of Responsible Care may actually be attributable to this increase in corporate performance. Likewise, the 1990 Clean Air Act Amendments (CAAA), Section 112 (r) requires firms to develop a Risk Management Plan for any facility that uses any one of a number of regulated hazardous chemicals. The rule does not delineate precise procedures or technical equipment to meet the requirements. Some researchers have found evidence that large firms are moving away from merely reporting incidents and accidents, i.e., outcome-based performance measures, and

toward process measures, including ongoing prevention and awareness/education programs that involve stakeholders (Chinander, Kleindorfer, and Kunreuther 1998). It would be interesting to see whether the involvement of stakeholders in those firms has had an impact on their corporate performance.

These results have to be interpreted in the American context. The involvement of external stakeholders and employees varies greatly according to the country in which the firm operates. As I described above, the involvement of external stakeholders is facilitated in context where a certain number of firms have already been through the certification process. The institutional environment plays an important role here and can favor the development of a standard. Although ISO 14001 is open to any company that wishes to invest in obtaining the certification, there is a learning curve at the sector or even institutional level that might facilitate the adoption of the certification. In the European context, the European Commission, in conjunction with industry, has been at the origin of the development of EMAS (for a comprehensive analysis of EMAS see Orts 1995). Cultural elements in Europe such as better relationships between regulatory agencies and industry have favored the involvement of stakeholders in firms' EMS adoption (Steger 2000). For example, German authorities have begun to ease administrative enforcement requirements on EMAS certified sites. Additionally, 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 14001 system will assist them in monitoring industry. In Asia as well, regulatory agencies have actively pushed the development of ISO 14001. Among these countries, Singapore, Thailand, Korea, Japan, and China also offer technical or financial assistance to companies taking up ISO 14001. Some proactive countries even had their pilot project put in place prior to the official publication of ISO 14001, to prepare their national certification bodies and industry for a quick implementation of the standard (OECD 1998). In addition to regulatory agencies, local government administrations are also taking a number of measures to promote the use of ISO 14001. In Japan, for example, Kanagawa Prefectural government, a leading proponent of environmental administration in the country, issued an Ordinance on Conservation of Living Environment, which contains new incentives for company sites certified to ISO 14001. The Ordinance allows these company sites to be exempted from frequent inspections and reporting requirements (Yano 1998). Further research might consider a comparative study of these different contexts.

While these first results shed some important light on the process of stakeholder involvement in obtaining a competitive advantage, further refinement is desirable through the investigation of exactly which stakeholders are important for which benefit. I have treated competitive advantage as a general notion. It would be interesting to consider whether, for example, the involvement of regulatory agencies in the design of ISO 14001 would ease the permitting process with consequent reductions in regulatory compliance costs for ISO 14001 companies. It would also be useful to analyze whether the involvement of financial institutions would ease ability to obtain loans and credits. Such questions were included in the questionnaire. However, the small number of observations hampered my effort to perform a statistical analysis of these variables.¹

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