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Motivations for Participating in a U.S. Voluntary Environmental Initiative: The Multi-state Working Group and EPA's EMS Pilot Program

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Abstract

While many different types of organizations in the United States (U.S.) are better managing their environmental activities, a relatively small proportion of them are also choosing to participate in voluntary environmental initiatives. This study addresses why organizations participate in these programs and examines how motivations vary for different types of enterprises. It emphasizes the importance of external and internal factors that influenced three types of facilities' (publicly traded, privately owned and government) decisions to participate in the Multi-State Working Group and the Environmental Protection Agency's EMS Pilot Program. The results show that despite the vast differences among these enterprises, a common theme in their motivation was the importance of regulatory pressures, which supports the idea that these pressures encourage all organizations to behave similarly. The results also support the suggestions posited by the 'natural' resource-based view of the firm and show that continuous innovation and basic environmental management proficiencies are embedded in publicly traded facilities' more advanced types of environmental management capabilities. Privately owned and government facilities, however, are lacking in these prior proficiencies, but appear to be fortifying their internal capacities by seeking external assistance from regulators, thus enabling them to participate in the voluntary environmental initiative.

Introduction

Over the last thirty years, many U.S. organizations are better managing their environmental activities, although a relatively small proportion of them have chosen to participate in a voluntary environmental initiative (VEI). Little is known about the factors that influence organizations to participate in a VEI and how these motivations differ among various types of enterprises. Previous studies have considered aspects of these decisions (Arora and Cason, 1996; King and Lenox, 2000; Welch, Mazur and Bretschneider, 2000; Khanna and Damon, 1999) and attributes of firms' decisions to employ industry codes of conduct (Nash and Ehrenfeld, 1996; Howard, Nash and Ehrenfeld, 2000). These studies, however, only consider either large publicly traded organizations or all types of organizations in aggregate, (for example, they include publicly traded, privately owned, government or non-profit operations together), without making distinctions among them. Yet different types of organizations are participating in VEIs, and little is known about their similarities and differences. These prior studies, moreover, evaluate only the external factors that motivate organization's participation decisions. But multiple internal capabilities are likely to play an important role (see for example Cordano and Frieze, 2000; Rugman and Verbeke, 1998; Sharma, 2000; Russo and Fouts, 1997; Welford, 1992; Egri and Herman, 2000; Sharma and Vredenburg 1998; Andersson and Bateman, 2000; Klassen, 2000; Hart 1995, 1997; Christmann, 2000; Florida, 1996). As such, a deeper understanding of organizations' prior internal capabilities seems key in examining the rationales for why different organizations participate in a VEI.

This study addresses these issues by taking an integrative approach, exploring both the external and internal factors that comprise the participation decisions for three types of organizations—publicly traded, privately owned and government enterprises. The first half of

this study relates institutional theory to an organization's decision to join a VEI to assess the external factors that encourage participation. This analysis is then coupled with an examination of the resource-based view of the firm (RBV) to consider the internal factors that influence participation. These two theoretical contexts are then applied to discussion of the three types of organizations to hypothesize how various external and internal factors affect their participation decisions differently. The second half of this study explains the research methods used to test the differences between facility-level decisions to participate in a VEI that encourages environmental management system (EMS) adoption. Using data from the National Database on Environmental Management Systems (NDEMS) the results show that basic organizational capabilities are embedded in their decisions, although some types of organizations possess greater levels of these capabilities than others. The study ends with a discussion of the theoretical implications of this research.

External Participation drivers

External drivers comprise all factors outside an organization that influence its routines and competencies (Aldrich, 1999) and motivate it to participate in a VEI. While multiple theories have emerged which define the factors that shape firms to appear and behave similarly, DiMaggio and Powell's (1983) framework has gained substantial prominence in organizational studies. The authors suggest three types of external pressures (coercive, mimetic and normative) shape organizational isomorphism.

Coercive pressures are the formal and informal forces exerted on organizations by institutions that they are dependent on. They include regulatory forces, market pressures such as mandates upon suppliers and demands from customers and cultural or societal expectations, while mimicry is the actions taken by organizations to model themselves on other enterprises

(DiMaggio and Powell, 1983). Normative pressures are related to professionalism and psycho-emotional factors (Bansal and Roth 2000), and a result of networks such as industry associations and educational processes. When these networks are formalized they have a greater influence on organizational isomorphism.

Building on this framework, recent studies have considered this neo-institutional paradigm by examining the motivators for organizations' decisions to behave in an environmentally proactive manner. They suggest, for example, that regulatory pressures influence organizations' environmental actions (Henriques and Sadorsky, 1996, 1999; Hart, 1995; Jaffe et al., 1995; Hoffman, 2000; Khanna and Damon, 1999; Porter and van der Linde, 1995; Welch, Mazur and Bretschneider, 2000; Arora and Cason, 1996). These pressures come in various forms and include coercive mandates to adopt specific control technology, apply for operating permits, monitor and report on its media-specific environmental discharges, allow regulatory audits of their environmental activities and address any emissions violations, potential violations or legal implications of non-compliance. To the extent that organizations can influence the formation of regulation, managing their environmental impacts may serve as a signal to lawmakers to increase restrictions for industry as a whole (Salop and Scheffman, 1983) or to preempt more stringent environmental regulation (Welch, Mazur and Bretschneider, 2000; Lutz, Lyon and Maxwell, 2000). There may be informal regulatory benefits from participating in a VEI, including increased recognition by government officials and improved relations with regulators.

Regulatory pressures are also taking on a new shape as EPA and states expand their basket of VEIs. Increasingly regulators are offering technical assistance grants as incentives for organizations to participate in VEIs and achieve their environmental goals (Davies et al., 1996).

The Multi-state Working Group on Environmental Management Systems (MSWG) and EPA's EMS Pilot Program, EPA's Performance Track Program and EPA's Region I StarTrack Program are just a few examples of VEIs that offer participants technical assistance as incentives for participation in programs that encourage EMS development. While still operating as an institutional pressure, these regulatory incentives are less coercive than is the traditional regulatory regime, and as such may lead to greater variation in organizational responses (Jennings and Zandbergen, 1995).

Prior literature also emphasizes the importance of market pressures on organizations' environmental change (Arora and Cason, 1996; Hoffman, 2000; Bowen, 2000; Khanna and Damon, 1999; Konar and Cohen, 1997). Market pressures refer to the interplay of all potential buyers and sellers involved in the production, sale or purchase of a particular commodity or service. Markets include consumers, customers and competitors who are influencing companies to proactively manage their environment management strategies (Hoffman, 2000). As information has become more readily available about companies' environmental activities, customers and firms have increasingly considered the environment when making their purchasing decisions (Arora and Gangopadhyay, 1995; Marshall and Mayer, 1991). Some firms, for example, may seek only to do business with factor suppliers that have adopted certified EMSs, as doing so helps to ensure that their final product is more environmentally conscious (Bowen et al., 2001; Darnall, Gallagher and Andrews, 2001; Darnall et al., 2000). By participating in a VEI suppliers may better satisfy these market demands.

Finally, social pressures also influence organizations' environmental actions (Klassen and McLaughlin, 1996; Henriques and Sadorsky, 1996, 1999; Arora and Cason, 1996; Konar and Cohen, 1997; Welch, Mazur and Bretschneider, 2000; Garrod and Chadwick, 1996; Hoffman,

2000). These pressures are derived from an organization's external constituents that must be actively managed in order to develop effective and successful operating strategies (Hoffman, 2000). Constituents include environmental groups, citizens groups and the media, and can mobilize public sentiment, alter accepted norms and change the way people think about the environment and the role of the organization in protecting it (Hoffman, 2000). Social drivers have gained increasing attention since the 1980s due to the heightening influence of stakeholders on organizational strategy (see for example, Klassen and McLaughlin, 1996; Henriques and Sadorsky, 1996, 1999; Arora and Cason, 1995; Konar and Cohen, 1997; Welch, Mazur and Bretschneider, 2000; Garrod and Chadwick, 1996; Hoffman, 2000; Muoghalu, Robinson and Glascock, 1990; Hamilton, 1995). Part of this changing focus may be due to highly publicized stories of catastrophic environmental disasters like the nuclear accident at Three Mile Island, the Union Carbide toxic gas leak in Bhopal and the Exxon oil spill, which has personalized the importance of organizations' environmental management activities (Rajan, 2001).

The basic premise of all of these institutional views is that organizational tendencies toward conformity with external influences lead to *homogeneity* among organizational behavior (Oliver, 1997). The organization is thus cast as a passive participant that responds to external pressures and expectations. This view is criticized, however, by researchers who argue that organizations are dynamic and evolving, and can respond to external pressures in a variety of ways based on the resources and capabilities that they posses (Oliver, 1997; Perrow, 1986). As such, an understanding of an organization's prior internal capabilities may be important factors that affect why different organizations participate in a VEI.

Internal participation drivers

RBV suggests that external factors, while important in shaping organizational strategy, cannot alone lead to valuable resources (Barney, 1986). Instead, an organization's competitive strategies depend significantly on it specific capabilities (Sharma and Vredenburg, 1998) and its ability to put these proficiencies to routine productive use (Grant, 1991; Collis and Montgomery, 1995; Russo and Fouts, 1997). These capabilities include less tangible knowledge-based advantages such as socially complex organizational processes and reputational assets (Barney, 1991; Rumelt, 1984, 1991; Penrose, 1959; Wernerfelt, 1984; Oliver, 1997) and are necessarily path dependent in that they are a function of unique organizational actions and learning that accrue over a period of time (Barney, 1991; Hart, 1995).

Applied to environmental management, RBV informs why enterprises might also participate in a VEI. Recent literature in this area can be categorized into two frameworks. The first framework consists of studies that focus on 'human capital' as capabilities that foster environmental action. This framework emphasizes the importance of managerial attitudes and views (Cordano and Frieze, 2000; Sharma, Pablo, and Vredenburg 1999; Sharma and Nguan, 1999), managerial interpretations (Sharma, 2000), environmental values and leaders (Egri and Herman, 2000) and environmental champions (Andersson and Bateman, 2000). In each case key individuals influence management decisions and explain in part why organizations engage in particular environmental activities.

A second framework focuses on 'higher-order learning processes' as capabilities, which are triggered by environmental responsiveness (Sharma and Vredenburg, 1998; Hart, 1995; Christmann, 2000) and continuous improvement strategies (Hart, 1995; Russo and Fouts, 1997; Florida, 1996; Rugman and Verbeke, 1998; Sharma and Vredenburg, 1998). This framework

focuses on actual management practices and suggests that in order to engage in environmental management practices that rely on higher-ordered learning proficiencies, basic capacities must first be in place (Hart, 1995; Christmann, 2000). For example, to achieve greater levels of internal environmental competency and efficiency (such as product stewardship) an organization must first be proficient in basic environmental capabilities (such as pollution prevention) (Hart, 1995). Organizations that adopt environmental strategies without these basic-level competencies lack the capabilities to support them and are less likely to achieve their organizational goals (Christmann, 2000).

While developing 'foundational' proficiencies are necessary to lead to competitive advantage, they are not sufficient. Competitors will over time replicate effective learning systems (Sharma and Vrendburg, 1998), and for this reason organizational competencies must be continually improved (Sharma and Vredenburg, 1998; Russo and Fouts, 1997; Hart, 1995) in order to generate a stream of innovations and achieve competitive advantage (Sharma and Vredenburg, 1998). Organizations that possess continual improvement processes, moreover, are more competent at transferring general basic capabilities and generating momentum to encourage commitments in environmental management (Klassen, 2000; Hart, 1995), and achieve proactive environmental change (Lawrence and Morell, 1995; Florida, 1996; Andrews et al., 2001).

An organization's environmental management proficiencies—in both RBV frameworks—depend on its ability to allocate resources towards achieving basic competencies (Russo and Fouts, 1997; Aragon-Correa, 1998; Arora and Cason, 1996). Slack resources provide a foundation for environmental management by creating opportunities for organizations to develop their internal capabilities and assist them in moving beyond compliance (Bowen, 2000;

Arora and Cason, 1996; McGuire, Schneeweis and Sundren, 1988; McGuire, Schneeweis and Branch, 1990; Lawrence and Morell, 1995; Hart and Ahuja, 1996; Waddock and Graves, 1997). More specifically, managers that possess greater levels of discretionary slack (Sharma, 2000) have a greater ability to attempt costly or risky environmental investments (Henriques and Sadorsky, 1996; Ahmed, Montagno and Firenze, 1998).

These two RBV perspectives—the 'human capital' and the 'higher-order learning process'—are complements in that organizational leaders are likely to champion the basic organizational activities that are embedded in the more sophisticated environmental action, which the second framework describes. Data constraints limit this study to considering only the second structure and its role in organizational decisions to participate in a VEI. Within this framework, continuous improvement capabilities, environmental management resources and access to resources emerge as factors that may affect organization's participation decisions.

While organizations' internal resources and capabilities may be controlled by the enterprise itself, different types of organizational structures may affect the enterprise's ability to access to them. Various types of organizations, moreover, are also likely to respond differently to the institutional pressures exerted on them. It is thus important to address how external and internal drivers for VEI participation differ among varying types of organizations.

Organizational differences and hypotheses for VEI participation

The population of organizations that are choosing to participate in VEIs varies along many dimensions including size, structure, resources and other factors. However one key distinction that can be made among the population of enterprises is in the goals that they aspire towards, especially among for-profit organizations—both publicly traded and privately owned—and government organizations. This difference accounts for many broader distinctions that can

be hypothesized about the external and internal drivers that motivate organizations to participate in a VEI.

For-profit organizations. Neo-classical economics suggests that both publicly traded and privately owned organizations operate with the goal to increase profits. Ownership in the publicly traded organization is widely dispersed among many shareholders, who themselves do not make the daily decisions about prices, output, employment and other factors. Instead, managers supervise routine operations. Such an arrangement creates a 'separation' in organizational goals, as shareholders wish to maximize their shareholder revenues and managers wish to ensure their job security by maximizing sales (Browning and Browning, 1992). This separation, however, does not diminish the publicly traded organization's ability to increase profits, as managers enjoy some degree of discretion inasmuch as they are able to achieve a minimum-profit constraint (Baumol, 1976; Alchian and Demsetz, 1972).

Privately owned firms, in contrast, are owned by one or a handful of individuals who operate the business. For these companies, the owner(s) is often engaged directly in decisions concerning which inputs to use, who to hire or fire and what price to charge for their product. This structure creates a tighter 'coupling' between the organization's ownership and profit-focused goals.

As resources enter either type of for-profit firm, they are allocated towards achieving operational efficiency (Browning and Browning, 1992). If allocated efficiently, the company has a greater opportunity to grow and generate slack resources. There are differences, however, in firms' abilities to achieve this end, which largely rest on their structural variations. Publicly traded organizations are generally larger than private businesses and are more likely to have a parent company with multiple facilities and divisions. Because of their larger scale of operations,

publicly traded firms are also more likely to have a greater market share and access to resources for environmentally innovative behavior (Greening and Gray, 1994; Russo and Fouts, 1997; Bowen 2000).

In contrast, the vast majority of privately owned organizations are small and medium-sized enterprises. Because of their smaller presence in the market place, private companies are less likely to have the same level of market share and access to resources than are publicly traded firms. The combination of all these factors suggests that private companies will have more modest internal capabilities that support environmental action than does publicly traded firms.

H1: Publicly traded organizations have stronger internal environmental capabilities than do privately owned organizations prior to participating in a VEI.

An organization's modest internal resources may be moderated, however, by external regulatory drivers. These drivers include government assistance programs in pollution prevention, management system training, environmental monitoring and continual improvement, or government grants to hire consultants. Access to these programs may facilitate privately owned organizations' decisions to participate in a VEI, because they are less likely to have the higher-order learning processes and capacities to manage their environmental activities.

H2: Privately owned organizations are more influenced by the availability of environmental technical assistance programs than are publicly traded organizations when deciding to participate in a VEI.

Because of their profit-focused goals, market pressures are expected to influence both types of for-profit organizations similarly. There is one exception, however. With their greater market share, publicly traded companies are more likely to have operational units in foreign

countries and do business with international customers. For this reason, they are also more likely to be influenced by the demands of international customers.

H3: Publicly traded and privately owned organizations are influenced similarly by all market drivers (except international customers' pressure) when deciding to participate in a VEI.

Finally, as noted earlier, larger scaled organizations generally have greater access to resources. Publicly traded organizations are generally larger than privately owned companies and more likely to have parent companies that can support their facility-level environmental management activities.

H4: Publicly traded organizations have greater access to resources prior to participating in a VEI than do privately owned enterprises.

Government organizations. The generalized view of the government organization is that it exists for the purpose of increasing public welfare. It thus operates differently from the for-profit firm. In making its operational decisions, the government enterprise not only considers the benefits to the organization of its action or inaction, but also the benefits to society. Because of its societal interest, the government organization is more likely than is the for-profit firm to invest in activities that attempt to improve social well-being (Stokey and Zeckhauser, 1978).

Government's ability to improve public welfare, however, is often confounded by the diverging goals between and among its owners, political appointees and managers. Government's ownership is widely dispersed among taxpayers, voters and interest groups who influence the legislative process, but do not manage the resulting public programs. Instead political appointees oversee program implementation while career officials manage the details (Levine and Kleeman, 1992; Ingraham and Rosenbloom, 1990). Both political appointees and

career officials have an incentive to ensure their job security, and do so by increasing their political capital and cultivating relationships with influential political actors, rather than pursuing exclusively the goal of increasing social well-being (Wilson, 1989; Kettl, 1993; Blais and Dion, 1991; Levine and Kleeman, 1992; Ingraham and Rosenbloom, 1990). This structure creates a similar (although more extreme) 'separation' in the goals of government enterprises' than is seen in the publicly traded firm and tends to produce goals that are complex and varied, which and often conflict with public welfare ideals (Kettl, 1993). It also creates a tendency for government officials to focus on inputs rather than outcomes (Behn, 1981), which further separates the goals of political appointees and career officials from that of the goals of voters, taxpayers and interest groups.

This scenario is further complicated because of government's not-for-profit structure, lengthy documentation procedures and fewer performance criteria (Kettl, 1993). These factors make it difficult for government entities to remove career officials who do not confine their self interests. Once created and institutionalized, moreover, government operations are difficult to disassemble and the threat of their demise is small, which allows self-interested managers to persist and flourish (Wilson, 1989; Blais and Dion, 1991). Fiscal rules, moreover, restrict more efficient government enterprises from keeping their surplus revenues (Wilson, 1989). Such a structure encourages organizational inefficiencies that are less tolerated by the for-profit firm and hampers government's ability to achieve its social and legislative goals (Kettl, 1993).[2]

Governments' capacity to garner resources also differs from the for-profit organization. The resources available to governmental organizations are derived from the taxpayer and the legislative process, and while the number of taxpayers is vast the resources available to these entities has become progressively more constrained. Since the early 1990s, U.S. voters have

become less and less willing to accept additional tax burdens and government's fiscal budgets have become increasingly reduced (Gordon and Milakovich, 1998).

The combination of government's less efficient resource allocation and reduced access to resources hampers its ability to develop assets, capabilities and less tangible knowledge-based advantages that facilitate VEI participation. Void of a competitive advantage environment, moreover, government organizations have fewer reasons to invest (Kettl, 1993) in developing these capabilities.

H5: Compared to publicly traded and privately owned organizations, government entities have weaker internal environmental capabilities prior to participating in a VEI.

While RBV might suggest that investments in developing internal proficiencies will lead to greater organizational efficiencies, because government managers are motivated to maximize their political capital, this efficiency argument is undermined. For these reasons, the pressure exerted on government organizations to participate in a VEI is more likely to be derived from external factors such as regulatory and social pressures. This is expected to be true for all external drivers except market drivers, as government organizations are less affected by market because of their not-for-profit status.

H6: Government organizations are more likely to be influenced by external pressures (other than market pressures) than internal pressures when deciding to participate in a VEI.

H7: Market pressures exert less influence on government organizations' decisions to participate in a VEI than they do for profit-oriented organizations.

Similar to privately owned companies, government organizations' more modest internal resources may be moderated by external factors including government assistance programs such as those described earlier.

H8: Government enterprises, like privately owned organizations, are more likely to be influenced by the availability of environmental technical assistance programs than are publicly traded organizations when deciding to participate in a VEI.

Finally, traditional regulatory pressures are expected to have similar influence on all three types of organizations (Henriques and Sadorsky, 1996). Regardless of an organization's goals, it must address its regulatory compliance or risk additional regulatory scrutiny and the threat of being shut down. For these reasons, all organizations are expected to seek regulatory relief if it is possible. By better managing their regulatory pressures, moreover, all organizations have the potential to change their relationships with regulators by moving from a highly coercive regulatory regime to a more cooperative one, which is expected to be attractive for all three types of enterprises.

H9: All three types of organizations—publicly traded, privately owned, and government—are influenced similarly by traditional regulatory pressures when deciding to participate in a VEI.

Methodology

To evaluate these hypotheses, an organization's decision to participate in a VEI was applied to facilities' decisions to participate in the EMS Pilot Program. This program was initiated with support from the Multi-state Working Group for EMSs (MSWG), whose members[3] in concert with EPA initiated ten state-level pilot programs to encourage and facilitate EMS adoption in approximately 60 U.S.-based facilities. The pilot program was designed to determine

the potential EMSs have for environmental performance and future regulation. States recruited many different types of enterprises to participate and as a condition for their participation facilities were required to contribute EMS adoption data to a publicly accessible database called the National Database on EMSs (NDEMS).[4] In return, EPA and MSWG states offered technical assistance, small grants for EMS design training, consultant support and data collection assistance, in addition to public recognition. Regulatory compliance was a requirement for program participation, as was a pledge by pilot facilities to implement an EMS.[5]

NDEMS contains data for all pilot program participants. The data were collected from environmental managers in each pilot facility using a standardized set of protocols that were reviewed by multiple researchers, government officials and facility managers prior to pilot testing and final utilization. NDEMS contains information on facilities' baseline operations during the three years prior to adopting an EMS, in addition to data on the processes by which they designed and implemented their EMSs. In the future, the database will also contain post-EMS performance data that may be used to determine the overall impact of EMS adoption on participants' environmental performance.

Facility data included in this analysis were for all pilot program participants that had contributed baseline and EMS design data between 1998 and July 2001.[6] The sample consists of 46 facilities (21 publicly traded, 17 privately owned and 8 government facilities) that had provided complete information for the measures of interest.

Measures

External drivers. Regulatory drivers were measured by six variables. The first five variables represent traditional regulatory pressures and focus on regulatory compliance. They are measured by whether the organization had incurred at least one environmental compliance

violation, non-compliance and/or potential non-compliance during the three years prior to participating in the VEI.[7] These variables were coded as dichotomous responses, 1 if yes and 0 otherwise. In addition, pilot managers reported using a three-point ordinal scale (high, medium, low) [8] whether they participated in the pilot program because they believed that doing so would improve their compliance with environmental regulations. Finally, two incentive-based regulatory drivers were also included. Using the same three-point ordinal scale (high, medium, low) pilot facility managers reported whether they participated in the pilot program (1) in hopes that doing so would lead to regulatory benefits in the future and whether (2) government assistance programs (that included technical assistance, small grants for EMS design training and consultant support and periodic meetings in which facility managers could share their participation experiences) made participation in the pilot program attractive.

Market drivers were measured by eight variables, all of which were based on facility managers' perceptions. Pilot managers reported on a three-point ordinal scale (high, medium, low) whether they participated in the pilot program because they believed that EMS adoption (1) was being pressured by domestic customers, (2) was being pressured by international customers, (3) may be a valuable marketing tool, (4) may provide a competitive advantage, (5) was increasingly being supported by environmental management professionals, (6) was being pressured by shareholders, (7) might reduce their costs, (8) might increase their revenues. While including information about facilities' factor supplier pressures would also be a relevant to include, NDEMS does not contain these data.

Social drivers were the last category of external drivers considered and were measured by the number of public inquires each facility received about its environmental activities during the three years prior to participating in pilot program. Responses were coded in three ordered

categories: less than 10 inquires per year, between 11 and 50 inquiries per year and greater than 50 inquiries per year. In addition, pilot managers reported on an ordinal scale (high, medium, low) whether they participated in the pilot program because they believe that (1) outside interested parties were pressuring them to do so and (2) it may be a valuable public relations tool.

Internal capabilities. To measure an organization's continuous improvement capability facilities were asked whether they had implemented either Total Quality Management Principles (TQM) prior to EMS implementation or ISO 9000 quality management systems (QMS). The latter measure is a more advanced form of a continuous improvement capability that is certified by independent auditors, while TQM is a more basic form. These variables were coded 1 if yes and 0 otherwise.

Facilities' environmental management proficiency was measured by whether they had engaged in any pollution prevention activities prior to adopting an EMS. In addition, a second more advanced form of pollution prevention capability was also included—whether or not facilities had adopted a formal pollution prevention plan (Henriques and Sadorsky, 1996) prior to participating in the VEI. Both variables were coded 1 if yes and 0 otherwise.

Finally, facilities' slack resources were measured three variables. The first variable, facility size (employees), was coded in three ordered categories: less than 100 employees, between 101 and 299 employees and 300 or more employees. While a more precise measure of organizational slack would have incorporated specific information about discretionary slack (Sharma, 2000) or separated the effects of slack from societal visibility (Bowen, 2000), such data were unfortunately not available. The two parent organization measures were also included to measure slack resources because implementation of environmental initiatives in multi-plant organizations depends on the incentives and the resources available to facilities (Bowen, 2000).

It was first determined whether the facilities had parent organizations, and if so whether the parent organization provided EMS adoption assistance (financial support, technical assistances or support from sister facilities). Both measures were coded as dichotomous variables, 1 if yes and 0 otherwise.

Responses were grouped by the external and internal drivers described above for each of the three types of facilities. Because two types of responses were elicited—ordinal and discrete—the data were evaluated independently rather than by employing an index. In addition to evaluating the statistical results of the three-point ordinal responses, these data were also assessed by combining high and medium responses and comparing them to low responses. This additional comparison was performed because external and internal pressures that have a moderate or high influence are more likely to prompt organizational action than are factors with low influences.

Data comparisons were performed using Fisher's exact test for contingency tables. This nonparametric approach was employed because the NDEMS sample was necessarily small and as such typical parametric approaches lead to poor approximations and model misspecification (Hess and Orphanides, 1995; Stokes, Davis and Koch, 1995). Fisher's exact test was used to determine the strength of the association between each participation driver and the three different facility types.

In adjusting for sample size, Fisher's exact estimates highly conservative *p*-values. For this reason, in addition to conventional levels ($p<0.05$) more liberal levels of significance ($p<0.10$) are also reported (Grusky, 1959; Rice, 1988; Kahn and Goldenberg, 1991; Hirota et al., 1999; Beirle and Konisky, 2000). Two-tailed statistical tests were performed on all comparisons.

Facility descriptions

The descriptive statistics show that publicly traded and privately owned enterprises were largely manufacturing operations (SIC codes 2000-3999), as seen in Table 1, although there were a few non-manufacturing facilities that had chosen to adopt an EMS.[9] Of the government facilities, five were local governments. The others consisted of two national level government facilities and a university.

<<Insert Table 1 about here>>

Prior to participating in the pilot program almost all of the publicly traded companies were marketing their products (95 percent) and producing their goods internationally (86 percent), as seen in Table 2. This contrasts with the privately owned companies, which were more subdued in the international arena. Sixty-five percent of the privately owned companies were marketing their products internationally and 35 percent were involved in international production prior to participating in the pilot program. As might be expected, the government facilities were much less involved in the international arena.

<<Insert Table 2 about here>>

Finally, all three types of facilities were certifying their EMSs to ISO 14001 while participating in the pilot program, although certification occurred at different rates. Seventy-six percent of the publicly traded facilities were certified or were in the process of seeking ISO 14001 registration and 71 percent of privately owned facilities were doing the same, as shown in Table 3. In contrast, 38 percent of the government facilities were registered or were seeking registration. Other differences were related to the influence of facilities' parent organizations. Compared to single-facility operations (40 percent), nearly two times (72 percent) as many pilot facilities that belong to a larger organization have certified their EMS to ISO 14001. Parent

organizations, as noted earlier, are hypothesized to be an important influence on facilities' access to resources, and are a topic for discussion in the following sections.

<<Insert Table 3 about here>>

External drivers

The empirical results of the factors that affect facilities' rationales for EMS adoption are illustrated in Table 4. The table describes the influences of the external and internal pressures on participation decisions for the three types of pilot facilities.

<<Insert Table 4 about here>>

Regulatory drivers. Of the external drivers, all three types of facilities reported that traditional regulatory pressures had the greatest influence on their decisions to adopt an EMS. Between 29 percent and 62 percent of each type of facility had experienced a violation, non-compliance or potential non-compliance in the three years prior to participating in the pilot program. Most of the facilities, moreover, adopted an EMS to improve their compliance with environmental regulations, as between 75 and 100 percent of them reported that the possibility of compliance improvement had either a high or moderate influence on their EMS adoption decisions.

Consistent with Hypothesis 9, traditional regulatory drivers affected all three facilities' decisions similarly, and there is no statistically significant difference between them (see Table 5). There are two exceptions, however, which relate to non-traditional regulatory factors. Despite the high pressure that facilities perceive by environmental requirements, the influence of potential regulatory benefits motivated government facilities' EMS adoption decisions more than they did for publicly traded and privately owned facilities ($p<0.04$). It is unclear why these differences exist, but they may be due to the slightly higher number of regulatory non-

compliances and potential noncompliance that government facilities experienced prior to participation (72 percent). While regulatory benefits have yet to be realized, pilot facilities had anticipated that they would come in the form of expedited and consolidated permitting. Some facilities also hoped that regulators would waive some state and federal regulations if they achieve environmental results that are superior to those otherwise required by law.

<<Insert Table 5 about here>>

Perhaps the most important finding related to regulatory drivers is the role that government assistance programs played in influencing privately owned and government facilities' participation decisions. These programs influenced 47 percent of private organizations and 88 percent of government pilots. In contrast, only 9 percent of publicly traded facilities were motivated by receiving aid ($p<0.01$). These differences support Hypotheses 2 and 8 and suggest that privately owned and government facilities were more influenced than were publicly traded facilities by the availability of environmental technical assistance programs.

Market drivers. In general, market pressures had only a moderate influence on all facility-level decisions and there are no statistically significant differences between publicly traded and privately owned facilities. These findings partially confirm Hypothesis 3, which suggests that while all market drivers influence both types of organizations similarly, they differ in the level of pressure endured by international customers' pressure. Despite the fact that publicly traded facilities operate more in the international domain ($p<0.05$) than do the other facility groups, publicly traded facilities did not experience greater pressures from international customers than did privately owned organizations.

Market drivers are less relevant, however, to government facilities, and confirm Hypothesis 7. These differences are statistically significant ($p<0.01$) across two dimensions—

that implementing an EMS in the VEI was expected to be a useful marketing tool and that it might help them gain a competitive advantage. For publicly traded and privately owned facilities, these two pressures had a greater influence on their participation decisions. The other market drivers lack statistical significance because publicly traded and privately owned facilities also reported them to have a low influence on their EMS adoption decisions.

Additionally, publicly traded and privately owned facilities see in EMSs the possibility of increasing their revenues (63 percent and 38 percent respectively) and reduce costs (76 percent and 89 percent report them as high or medium influences), which suggest that these facility managers are considering an EMS as a tool to increase organizational efficiency. In contrast, government facilities only considered half of the efficiency argument. That is, they reported that while reducing costs was an important factor in their EMS adoption decisions, the possibility of increasing revenue was not. Part of this difference may be ascribed to the fact that for-profit organizations derive their revenues from sales, while government organizations are funded through the political process, which generally appropriates funding based on political and legislative factors rather than efficiency arguments.

Social drivers. Social drivers are the least influential of the external drivers for all three types of facilities. Low relevance of stakeholder pressures in addition to low numbers of stakeholder requests yielded no differences among the three facility groups. It is worth noting, however, that when designing the VEI, regulators had hoped that the pilot program facilities might be influenced to adopt an EMS if they were offered benefits in the form of enhanced publicity (that is press releases and announcements, media events, pollution prevention awards and highly advertised annual conferences). It appears that increased public relations opportunities did moderately influence all pilot participants' EMS adoption decisions.

Internal drivers

When considering the differences among for-profit facilities, statistical variation in their internal drivers was more prevalent. For government facilities, moreover, while the overall influence of internal drivers was an important factor, regulatory drivers appear more important to their decision to participate in the pilot program, as was anticipated by Hypothesis 6.

Continuous improvement capability. In evaluating facilities' continuous improvement capabilities, prior to EMS adoption many (71 percent) of publicly traded and privately owned facilities had ISO 9000 capabilities in place. Because of this preexisting capability, EMS implementation likely demanded fewer internal resources and was more easily integrated into the facilities' management practices (Sarkis and Kitazawa, 2000). This is a stark contrast to government facilities ($p<0.01$), of which none had in place a certified QMS prior to EMS adoption.

The resource-based view of the firm advises that because TQM practices are a more basic form of the principles embodied in ISO 9000 facilities should thus adopt TQM practices prior to ISO 9000. Customer requirements for ISO 9000, however, have no doubt disrupted this natural progression. For those facilities that were not pressured by such influences, simply following the TQM principles may have been sufficient to satisfy their continual improvement needs.

Because of ISO 9000's relatively high prevalence in publicly traded and privately owned facilities, an additional investigation was done to determine its relevance to facility decisions to participate in the pilot program. Environmental managers in five (three publicly traded and two privately owned) facilities were interviewed. They reported that their preexisting ISO 9000 QMS offered a foundation upon which to integrate their EMS. These facility managers all confirmed that in making their decision to participate in the pilot program, they believed that by utilizing

their QMS, they could reduce the transaction costs of participation, because they were higher up the learning curve in documenting their internal operations. All five facilities, moreover, integrated their EMS into their QMS, so as to formalize their environmental goals a component of their quality-focused production (see Darnall, Gallagher and Andrews, (2001) for a greater discussion).

Environmental management capability. With respect to facilities' prior environmental management capability, most of the publicly traded and privately owned facilities had engaged in pollution prevention activities prior to EMS adoption (91 and 94 percent, respectively) while only 62 percent of government facilities had done so ($p<0.05$). Despite these differences when considering whether facilities had adopted a formal pollution prevention plan prior to adopting an EMS there is no statistical difference between the three types of facilities. While engaging in pollution prevention activities demonstrates a basic level of environmental management capability, a formal pollution prevention plan requires additional levels of organizational commitment, capabilities and transaction costs. As such, fewer of all the pilot facilities had these capabilities in place prior to EMS adoption.

Slack Resources. In comparing facility sizes, 71 percent of publicly traded facilities were had over 300 employees and 10 percent had less than 100 employees. Privately owned and government facilities were more diverse, however, in that between 47 and 50 percent of them, respectively, had 300 or more employees. These differences are statistically significant ($p<0.10$). Facilities also differed in whether or not they had parent companies in that all of the publicly traded enterprises belong to larger organizations, while 65 percent of privately owned ($p<0.03$) and 62 percent of the government facilities had parent organizations. Finally, of those organizations that had parent companies, publicly traded facilities were more likely than

privately owned facilities to receive financial and technical support from them ($p<0.04$) and government facilities were less likely than for-profit organizations to receive this support ($p<0.05$). These findings support Hypothesis 4 that publicly traded facilities have greater access to resources prior to participating in the pilot program than do privately owned and government enterprises.

Collectively, the internal driver results offer insight on publicly traded facilities' internal capabilities, as these enterprises had greater overall access to resources and proficiencies that support EMS adoption. They also confirm Hypotheses 1 and 5, which proposed that publicly traded facilities have greater internal capabilities that support VEI participation than do privately owned facilities and government facilities. Government facilities, moreover, had the lowest internal capabilities to support their VEI participation.

In summary, the empirical results offer support for the nine hypotheses, as described in Table 6.

<<Insert Table 6 about here>>

Discussion and implications

This study begins to understand the occurrence of VEI participation by exploring why facilities participated in the MSWG/EPA's EMS pilot program. It extends previous research by evaluating how motivations vary for different types of organizations, emphasizing that both external and internal organizational-level factors comprise participation decisions.

The results of this analysis, while somewhat limited due to sample size constraints, underscore the importance of the U.S. environmental regulatory system as a motivator for VEI participation for all facility types. They also support Henriques and Sadorsky's (1996)

suggestion that the presence of the regulatory system itself fosters facilities' decisions to consider environmental management goals as part of their profit generating goals.

The regulatory system, however, while traditionally coercive has recently begun to incorporate incentives for good behavior through the use of VEIs (Davies et al., 1996). This change has created a more cooperative institutional arrangement for organizations (Jennings and Zandbergen, 1995) that choose to participate in voluntary programs. It also has resulted in greater variation in the influence that different regulatory incentives have on facility-level decisions to participate in a VEI. More specifically, publicly traded facilities were influenced less by regulatory incentives, while privately owned were influenced moderately and government facilities were influenced greatly by them.

This variation is also likely due to an interaction between external drivers and facilities' internal capabilities. Publicly traded facilities, for example, had stronger internal capabilities that fortified their EMS adoption decisions, making external resources such as government assistance less relevant to them. As such, a greater understanding of organizations' prior internal capabilities appears to be an important factor in examining the rationales for why the different organizations participate in a VEI.

In examining these interactions, a relevant issue that this study brings to the fore is the embeddedness of organizations' internal capabilities and their relationship with external resources. Consistent with previous research, this study shows that continuous innovation (Hart, 1995; Sharma and Vredenburg, 1998) and basic environmental management capabilities (Hart, 1995; Christmann, 2000) are embedded in facilities' decisions to employ advanced forms of environmental management such EMS development in a VEI. Interestingly, while some of the facilities in this study were lacking in these prior capabilities they relied on external assistance

from regulators to fortify their internal capacities, thus enabling them to participate in the pilot program.

As cooperative arrangements between regulators and organizations expand, additional research is needed that explores the interaction between external and internal pressures on environmental change. While several researchers have recognized the importance for such integration of institutional and RBV (Rugman and Verbeke, 1998; Henderson and Mitchell, 1997; Christmann, 2000; Oliver, 1997), the field is ripe for additional explanation and empirical examination. In exploring these issues further, we may better understand the relationship that emerging regulatory arrangements have for organizations' internal capabilities, and whether they may create competitive advantage for the enterprises that utilize them. As future research emerges, it will also be interesting to know how the experiences of U.S. organizations differ from other types of enterprises in different countries.

Finally, in considering future research on EMSs, two topics merit future exploration. First, while EMS adoption occurs at the facility level, many facilities' decisions about their environmental management strategies are made at the corporate level. Evidence of this corporate-level influence is seen in the descriptive statistics above—75 percent of the publicly traded facilities adopted their EMSs because of corporate mandate and 15 percent more did so because they were encouraged by their parent company. Thus, a key question for future research on EMSs is what factors influence parent organizations to mandate or encourage EMS adoption in their facilities and how they might differ from facility-level adoption decisions.

Second, the results of this study apply to facilities that participated in the MSWG/EPA's EMS pilot program. Future research should study how these facilities and their parent organizations differ from facilities that do not adopt an EMS and whether they differ from

facilities that adopt an EMS outside a voluntary environmental program. It is likely that the pilot facilities, because of the program's environmental compliance requirements for participation, had compliance records that were better than average. In order to achieve these better-than-average compliance records, these facilities and their parent organizations were likely to have greater internal capacities than did non-participating enterprises, which suggests that the availability of external resources may be even more relevant for participation by the broader organizational landscape.

There is still much that can be learned about the voluntary environmental management activities that lead to an organization's decision to participate in a VEI. The information presented here provides a framework for exploring these decisions by integrating both the external and internal factors that influence organizational decisions (see Figure 1), and offers preliminary evidence about how these factors vary for different types of enterprises.

<<Insert Figure 1 about here>>

References

Ahmed, N.U., R.V. Montagno and R.J. Firenze (1998), 'Organisational performance and environmental consciousness: an empirical study,' Management Decision, 36(2), 57-63.

Alchian, A. and H. Demsetz (1972), 'Production, information costs, and economic organization,' American Economic Review, 62(5), 777-795.

Aldrich, Howard E. (1999), Organizations Evolving, Sage Publications: London.

Andersson, L.M. and T.S. Bateman (2000), 'Individual environmental initiative: championing natural environmental issues in U.S. business organizations, Academy of Management Journal, 43(4), 548-570.

Andrews, Richard N.L, Nicole Darnall, Deborah Rigling Gallagher, Suellen Terrill Keiner, Eric Feldman, Mathew Mitchell, Deborah Amaral, Jessica Jacoby (2001), 'Environmental Management Systems: History, Theory, and Implementation Research,' Cary Coglianese and Jennifer Nash (eds.) Regulation from the Inside: Can Environmental Management Systems Achieve Policy Goals? Washington, DC: Resources for the Future.

Aragon-Correa, J.A. (1998), 'Strategic proactivity and firm approach to the natural environment,' Academy of Management Journal, 41(5), 556-568.

Arora, S. and S. Gangopadhyay (1995), 'Toward a theoretical model of voluntary overcompliance,' Journal of Economic Behavior and Organization, 28(3), 289-309.

Arora, S. and T. Cason (1996), 'Why do firms volunteer to exceed environmental regulations? Understanding participation in EPA's 33/50 program,' Land Economics, 72(4), 413-32.

Bansal, P. & Roth, K. (2000), "Why companies go green: a model of ecological responsiveness," Academy of Management Journal, 43 (4): 717-736.

Barney, J. (1986), 'Strategic factor markets: expectations, luck, and business strategy,' Management Science, 32(10), 1231-1241.

Barney, J. (1991), 'Firm resources and sustained competitive advantage,' Journal of Management, 17(1), 99-120.

Baumol, William J. (1976), Business Behavior, Value and Growth, rev. ed. New York: Harcourt, Brace & World.

Behn, R. (1981), 'Policy analysis and policy politics,' Policy Analysis, 7(2), 199-226.

Beirle, T.C. and D.M. Konisky (2000), 'Values, conflict, and trust in participatory environmental planning,' Journal of Public Policy Analysis and Management, 19(4), 587-602.

Blais, Andre and Stephane Dion, eds. (1991), The Budget-Maximizing Bureaucrat: Appraisals and Evidence, Pittsburgh: University of Pittsburgh Press.

Borcherding, Thomas, ed. (1977). Budgets and Bureaucrats: The Origins of Government Growth, Durham, North Carolina: Duke University Press.

Bowen, F. E. (2000), 'Does size matter? A meta-analysis of the relationship between organisation size and environmental responsiveness,' paper presented at the International Association for Business and Society Annual Meeting, Vermont.

Bowen, F.E., P.D. Cousins, R.C. Lamming and A.C. Faruk (2001), 'The role of supply chain management capabilities in green supply,' Production and Operations Management, 10(2), 174-189.

Browning, Edgar K. and Jacquelene M. Browning (1992), Microeconomic Theory and Applications, 4th ed. New York: HarperCollins Publishers Inc.

Christmann, P. (2000), 'Effects of 'best practices' of environmental management on cost competitiveness: the role of complementary assets,' Academy of Management Journal, 43(4), 663-880.

Collis, D.J. and C.A. Montgomery (1995), 'Competing on resources: strategy in the 1990's,' Harvard Business Review, 73(4), 118-128.

Cordano, M. and I.H. Frieze (2000), 'Pollution reduction preferences of U.S. environmental managers: applying Ajzen's theory of planned behavior,' The Academy of Management Journal, 43(4), 627-641.

Darnall, Nicole, Deborah R. Gallagher and Richard N.L. Andrews (2001), 'ISO 14001: greening management systems,' Joseph Sarkis (ed.), Greening Manufacturing and Operations: From Design to Delivery and Back, Sheffield, UK: Greenleaf Publishing.

Darnall, N., D.R. Gallagher, R.N.L. Andrews and D. Amaral (2000), 'Environmental management systems: opportunities for improved environmental and business strategy,' Environmental Quality Management, 9(3), 1-9.

Davies, Terry, Janice Mazurek, Nicole Darnall, and Kieran McCarthy (1996), Industry Incentives for Environmental Improvement: Evaluation of U.S. Federal Initiatives, Washington DC: Resources for the Future, Center for Risk Management.

DiMaggio, P. and W. Powell (1983), The iron cage revisited: institutional isomorphism and collective rationality in organizational fields, American Sociological Review, 48(2), 147-160.

Egri, C.R. and S. Herman (2000), Leadership in the North American environmental sector: values, leadership styles, and contexts of environmental leaders and their organizations, The Academy of Management Journal, 43(4), 561-604.

Florida, R. (1996), 'Lean and green: the move to environmentally conscious manufacturing,' California Management Review, 39(1), 80-105.

Garrod, B. and P. Chadwick (1996), 'Environmental management and business strategy: towards a new strategic paradigm,' Futures, 28(1), 37-50.

Gordon, George J. and Michael E. Milakovich (1998), Public Administration in America, Boston, MA: Bedford/St. Martin's.

Grant, R.M. (1991), 'The resource-based theory of competitive advantage,' California Management Review, 33(3), 114-135.

Greening, D.W. and B. Gray (1994), 'Testing a model of organizational response to social and political issues,' Academy of Management Journal, 37(3), 467-498.

Grusky, O. (1959), 'Organizational goals and the behavior of informal leaders,' American Journal of Sociology, 65(1), 59-67.

Hamilton, J.T. (1995), 'Pollution as news: media and stock market reactions to the toxics release inventory data,' Journal of Environmental Economics and Management, 28(1), 98-113.

Hart, S. (1995), 'A natural-resource-based view of the firm,' Academy of Management Review, 20(4), 986-1014.

Hart, S. and G. Ahuja (1996), 'Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance,' Business Strategy and the Environment, 5(1), 30-37.

Henderson, R. and W. Mitchell (1997), 'The interactions of organizational and competitive influences on strategy and performance,' Strategic Management Journal, 18(7), 5-14.

Henriques, I. and P. Sadorksy (1999), 'The relationship between environmental commitment and managerial perceptions of stakeholder importance,' The Academy of Management Journal, 42(1), 89-99.

Henriques, I. and P. Sadorsky (1996), The determinants of an environmentally response firm: an empirical approach, Journal of Environmental Economics and Management, 30(3), 381-395.

Hess, G. and A. Orphanides (1995), 'War politics: an economic, rational-voter framework,' The American Economic Review, 85(4), 828-846.

Hirota, S., T. Saijo, Y. Hamaguchi and T. Kawagoe (1999), 'Does the free-rider problem occur in corporate takeovers? Evidence from laboratory markets,' Paper presented at New Developments in Experimental Economics Conference, Osaka, Japan.

Hoffman, Andrew (2000), Competitive Environmental Strategy: A Guide to the Changing Business Landscape, Washington, D.C.: Island Press.

Howard, J., J. Nash and J. Ehrenfeld (2000), Standard or smokescreen? Implementation of a voluntary environmental code, California Management Review, 42(2), 63-82.

Ingraham, P.W. and D.H. Rosenbloom (1990), 'Political foundations of the American federal service: rebuilding a crumbling base,' Public Administration Review, 50(2), 210-219.

Jaffe, A., S. Peterson, P. Portney and R. Stavins (1995), 'Environmental regulation and the competitiveness of US manufacturing: what does the evidence tell us? Journal of Economic Literature, 33(1), 132-163.

Jennings, P.D. and P.A Zandbergen (1995), 'Ecologically sustainable organizations: an institutional approach,' Academy of Management Review, 20(4), 1015-1052.

Kahn, K. and E. Goldenberg (1991), 'Women candidates in the news: an examination of gender differences in US Senate campaign coverage,' Public Opinion Quarterly, 55(2), 180-199.

Kettl, Donald (1993), Sharing Power: Public Governance and Private Markets. Washington, DC: Brookings Institution Press.

Khanna, M. and L.A. Damon (1999), 'EPA's voluntary 33/50 program: impact on toxic releases and economic performance of firms,' Journal of Environmental Economics and Management, 37(1), 1-25.

King, A. and M. Lenox (2000), 'Industry self-regulation without sanctions: the chemical industry's responsible care program,' Academy of Management Journal, 43(4), 698-716.

Klassen, R.D. (2000), 'Exploring the linkage between investment in manufacturing and environmental technologies,' International Journal of Operations and Production Management, 20(2), 127-147.

Klassen, R.D. and C.P. McLaughlin (1996), 'The impact of environmental management on firm performance,' Management Science, 42(8), 1199-1214.

Konar, S. and M. Cohen (1997), 'Information as regulation: the effect of community right to know laws on toxic emissions,' Journal of Environmental Economics and Management, 32(1), 109-124.

Lawrence, A.T. and D. Morell (1995), 'Leading edge environmental management: motivation, opportunity, resources and processes,' Research in Corporate Social Performance and Policy, Supplement 1, 99-126.

Levine, Charles H. and Rosalyn S. Kleeman (1992), 'The quiet crisis for civil service,' Patricia W. Ingraham and Donald Kettl, (eds.), Agenda for Excellence: Public Service in America, Chatham, NJ: Chatham House.

Lutz, S., T.P. Lyon and J.W. Maxwell (2000), 'Quality leadership when regulatory standards are forthcoming,' Journal of Industrial Economics, 48(3), 331-348.

Marshall, M.E. and D.W. Mayer (1991), 'Environmental training: it's good business,' Business Horizons, March/April, 54-57.

McGuire, J.B., T. Schneeweis and B. Branch, (1990), 'Perceptions of firm quality: a cause or result of firm performance,' Journal of Management, 16(1), 167-180.

McGuire, J.B., A. Sundren and T. Schneeweis, (1988), 'Corporate social responsibility and firm financial performance,' Academy of Management Journal, 31(4), 854-872.

Miller, G.J. and T.M. Moe (1983), 'Bureaucrats, legislators, and the size of government,' American Political Science Review, 77, 297-322.

Muoghalu, M., H.D. Robinson, J.L. Glascock, (1990), 'Hazardous waste lawsuits, stockholder returns, and deterrence,' Southern Economic Journal, 57(2), 357-370.

Nash, J. and J. Ehrenfeld (1996), 'Code green,' Environment, 38(1), 16-45.

Niskanen, William A., (1971), Bureaucracy and Representative Government, Chicago: Aldine, Atherton.

Oliver, C. (1997), 'Sustainable competitive advantage: combining institutional and resource-based views,' Strategic Management Journal, 18(9), 679-713.

Penrose Edith (1959), The Theory of the Growth of the Firm, 3rd ed., Basil Blackwell: Oxford, U.K.

Perrow, Charles (1986), Complex Organizations: A Critical Essay, 3rd ed. New York: Random House.

Porter, M. and C. van der Linde (1995), 'Green and competitive: ending the stalemate,' Harvard Business Review, September/October, 120-137.

Rajan, R. (2001), "What disasters tell us about environmental violence: the case of Bhopal," in Michael Watts and Nancy Peluso (eds.), Violent Environments, Ithaca: Cornell University Press.

Rice, W.R. (1988), 'A new probability model for determining exact p-values for 2X2 contingency tables when comparing binomial proportions,' Biometrics, 44(1), 1-22.

Rugman, A. and A. Verbeke (1998), 'Corporate strategies and environmental regulations: an organizing framework,' Strategic Management Journal, 19(4), 363-375.

Rumelt, Richard P. (1984), 'Towards a strategic theory of the firm.' Robert B. Lamb (ed.), Competitive Strategic Management, Englewood Cliffs, NJ: Prentice-Hall.

Rumelt, R. P. (1991), How much does industry matter? Strategic Management Journal, 12(3), 167-185.

Russo, M. and P. Fouts (1997), 'A resource-based perspective on corporate environmental performance and profitability,' Academy of Management Journal, 40(3), 534-559.

Salop, S.C. and D.T. Scheffman (1983), 'Raising rivals' costs,' American Economic Association Papers and Proceedings, 73(2), 267-271.

Sarkis, J. and S. Kitazawa (2000), 'The relationship between ISO 14001 and continuous source reduction programs.' International Journal of Operations and Production Management, 20(2), 225-248.

Sharma, S. (2000), 'Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy,' The Academy of Management Journal, 43(4), 681-697.

Sharma, S. and O. Nguan (1999), 'The biotechnology industry and strategies of biodiversity conservation: the influence of managerial interpretations and risk propensity.' Business Strategy and the Environment, 8(1), 46-61.

Sharma, S., A. Pablo, and H. Vredenburg (1999), 'Corporate environmental responsiveness strategies: the role of issue interpretation and organizational context,' The Journal of Applied Behavioral Science, 35(1), 87-109.

Sharma, S. and H. Vredenburg (1998), 'Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities,' Strategic Management Journal, 19(8), 729-753.

Stokes, Maura E., Charles S. Davis and Gary G. Koch (1995), Categorical Data Analysis: Using the SAS System, Cary, NC: The SAS Institute.

Stokey, Edith and Richard Zeckhauser (1978), A Primer for Policy Analysis, New York: W.W. Norton and Co.

Tullock, Gordon (1965), The Politics of Bureaucracy, Washington, DC: Public Affairs Press.

Waddock, S. and Graves, S. (1997), The corporate social performance—financial performance link, Strategic Management Journal, 18(4), 303-319.

Welch, E., A. Mazur and S. Bretschneider (2000), 'Voluntary behavior by electric utilities: levels of adoption and contribution of the climate change program to the reduction of carbon dioxide,' Journal of Public Policy Analysis and Management, 19(3), 407-425.

Welford, R. (1992), 'Linking quality and the environment: a strategy for the implementation of environmental management systems,' Business Strategy and the Environment, 1(1), 25-34.

Wernerfelt, B. (1984), 'A resource-based view of the firm,' Strategic Management Journal, 5(2), 171-180.

Wilson, James Q. (1989), Bureaucracy: What Government Agencies Do and Why They Do It, New York: Basic Books.

Table 1: Numbers of Sample Organizations by Industry Type

Facility Type	Industrial Type		
• Publicly Traded Facilities (21)	17 = manufacturing	3 = electric services	1 = wholesale furniture
• Privately Owned Facilities (17)	16 = manufacturing	1 = lab research	—
• Government Facilities (8)	5 = local government	2 = national government	1 = university

Table 2: Numbers of Sample Organizations Involved in International Production and International Marketing[a]

Facility Type	International Production	International Marketing of Products
• Publicly Traded Facilities (21)	86% (18)	95% (20)
• Privately Owned Facilities (17)	35% (6)	65% (11)
• Government Facilities (8)	0% (0)	25% (2)
Facility Total (46)	52% (24)	72% (33)

a Some facilities were engaged in both international production and foreign marketing of their products, while others were involved in one but not the other. A few facilities were not involved in either international activity.

Table 3: Sample Organizations' Relationship with ISO 14001

Facility Type	Facility with Parent Organization			Single Facility		Total ISO Certified[b] Facilities
	Total	*ISO 14001*	*Parent Requires or Encourages EMS*[a]	*Total*	*ISO 14001*	
• Publicly Traded (21)	95% (20)	75% (15)	90% (18)	5% (1)	100% (1)	76% (16)
• Privately Owned (17)	65% (11)	82% (9)	64% (7)	35% (6)	50% (3)	71% (12)
• Government (8)	62% (5)	40% (2)	20% (1)	38% (3)	33% (1)	38% (3)
Facility Total (46)	***78% (36)***	***72% (26)***	***72% (26)***	***22% (10)***	***40% (4)***	***67% (31)***

a EMS may or may not be ISO 14001 certified.

b Denotes those facilities that were certified to ISO 14001 or were seeking third party certification to ISO 14001. Facilities that declared 'self-certification' or did not utilize third party registration were excluded from these counts.

Table 4: Statistical Analysis Results

Drivers	Facility Type								
	Publicly Traded (n=21)			*Private (n=17)*			*Government (n=8)*		
	H	M[a]	L	H	M[a]	L	H	M[a]	L
EXTERNAL DRIVERS:									
Regulatory Drivers									
1. # Violations	37%	–	63%	44%	–	56%	29%	–	71%
2. # Non-compliances	44%	–	56%	29%	–	71%	62%	–	37%
3. # Potential Non-compliances	39%	–	61%	38%	–	62%	62%	–	38%
4. Improve Compliance	48%	28%	24%	53%	29%	18%	75%	25%	0%
5. Potential Regulatory Benefits	33%	28%	38%	23%	41%	35%	75%	0%	25%
6. Environmental Technical Assistance	0%	9%	91%	35%	12%	53%	25%	63%	12%
Market Drivers									
1. U.S. Customer Pressures	19%	19%	62%	12%	12%	76%	0%	0%	100%
2. International Customer Pressures	14%	19%	67%	12%	0%	88%	0%	0%	100%
3. Potential Marketing Tool	35%	35%	30%	18%	24%	59%	0%	0%	100%
4. Increase Competitive Adv.	33%	52%	14%	29%	41%	29%	0%	25%	75%
5. Environmental Professionals Support EMSs	5%	35%	60%	12%	18%	71%	0%	25%	75%
6. Shareholders/Owner Pressures	14%	14%	71%	12%	6%	82%	0%	0%	100%
7. Potential Cost Reduction	43%	33%	23%	41%	47%	12%	38%	25%	38%
8. Potential Revenue Increases	16%	47%	37%	13%	25%	63%	0%	0%	100%
Social Drivers									
1. # Stakeholder Requests	10%	9%	71%	6%	12%	82%	12%	38%	50%
2. Stakeholder Pressures	0%	5%	95%	0%	0%	100%	0%	0%	100%
3. Improve Public Relations	19%	29%	52%	24%	47%	29%	38%	35%	37%
INTERNAL DRIVERS:									
Continual Improvement Capability									
1. Total Quality Management Principles	48%	–	52%	29%	–	71%	12%	–	88%
2. ISO 9000	71%	–	29%	71%	–	29%	0%	–	100%
Environment Mgt. Capability									
1. Pollution Prevention Activities	91%	–	9%	94%	–	6%	62%	–	38%
2. Pollution Prevention Plan	57%	–	43%	53%	–	47%	25%	–	75%
Resources									
1. # Employees	71%	19%	10%	47%	24%	29%	50%	0%	50%
2. Parent Organization Exists	100%	–	0%	65%	–	35%	62%	–	38%
3. Parent Organization Offers EMS Financial or Technical Support	90%	–	10%	66%	–	34%	60%	–	40%

Note: Sums of percentages that do not total 100 percent are due to rounding.
a '–' represents a dichotomous variable.

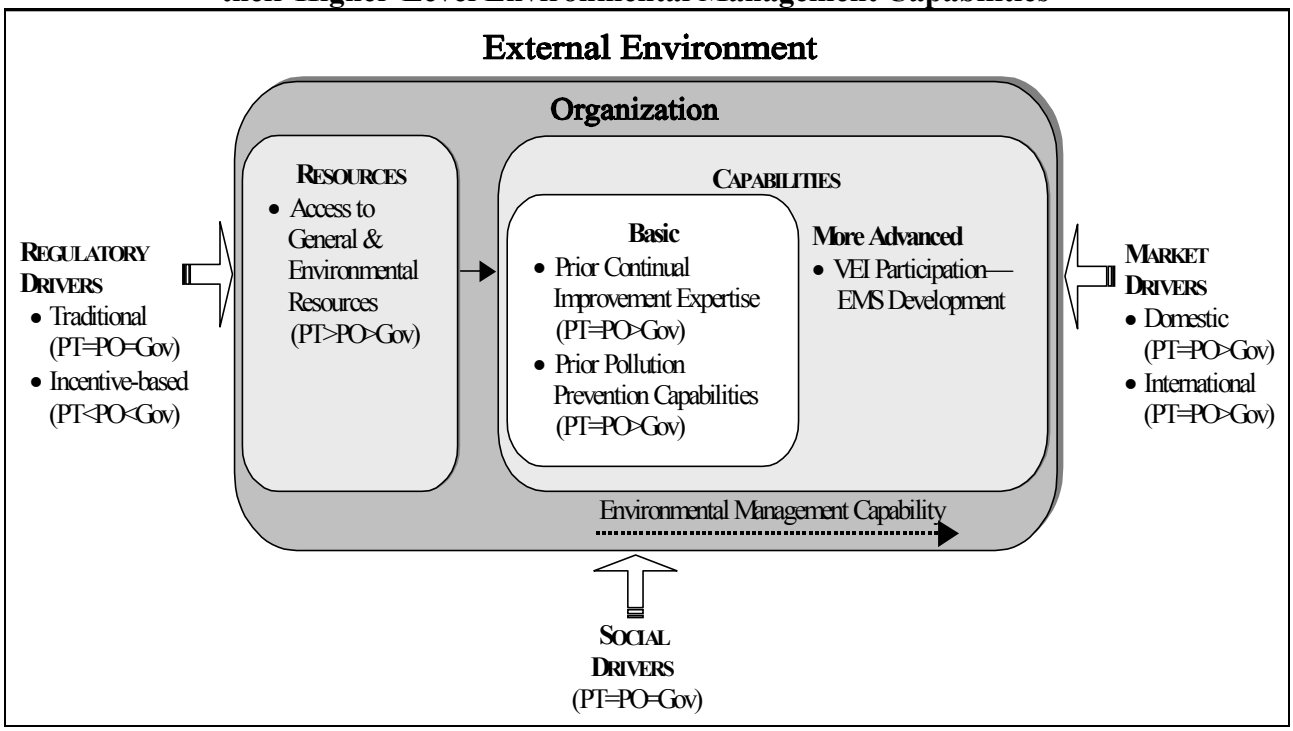
Table 5: Statistical Differences of Individual Drivers

Drivers	Statistical Differences (*p* value <, two-tail test) between:	
	Govt. & For-profit Facilities	**Publicly Traded & Private Facilities**
EXTERNAL DRIVERS:		
Regulatory Drivers		
Regulatory Benefits	0.04	—
Environmental Technical Assistance	0.01	0.01
Market Drivers		
Marketing Tool	0.01	—
Competitive Advantage	0.01	—
Increase Revenues	0.03	—
INTERNAL DRIVERS:		
Continual Improvement Capability		
ISO 9000	0.01	—
Environment Mgt. Capability		
Pollution Prevention Activities	0.05	—
Slack Resources		
# Employees	0.10	0.02
Parent Organization Existence	—	0.03
Parent Organization Offers EMS Technical Support	0.05	0.04

Table 6: Summary of Findings

Hypotheses:	Evidence Offered
H1: Publicly traded facilities have stronger internal environmental capabilities than do privately owned facilities prior to participating in a VEI	Some
H2: Privately owned organizations are more influenced by the availability of environmental technical assistance programs than are publicly traded organizations when deciding to participate in a VEI.	Yes
H3: Publicly traded and privately owned facilities are influenced similarly by all market drivers (except international customers' pressure) when deciding to participate in a VEI.	Yes
H4: Publicly traded facilities have greater access to resources prior to participating in a VEI than do privately owned and government enterprises.	Yes
H5: Compared to publicly traded and privately owned facilities, government entities have weaker internal environmental capabilities prior to participating in a VEI.	Some
H6: Government facilities are more likely to be influenced by external pressures (other than market pressures) than internal pressures when deciding to participate in a VEI.	Yes
H7: Market pressures exert less influence on government facilities' decisions to participate in a VEI than they do for profit-oriented facilities	Yes
H8: Government enterprises, like privately owned organizations, are more likely to be influenced by the availability of environmental technical assistance programs than are publicly traded organizations when deciding to participate in a VEI.	Yes
H9: All three types of facilities—publicly traded, privately owned, and government—are influenced similarly by traditional regulatory pressures when deciding to participate in a VEI	Some

Figure 1: Interaction Among External Pressures, Organizations' Basic Capabilities and their Higher-Level Environmental Management Capabilities[a]



a 'PT' = Publicly traded facility, 'PO' = Privately owned facility, 'Gov' = Government owned facility

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[2] Some researchers have identified similarities among quasi-government institutions and publicly traded organizations. Similarities are evident, for example, between public utilities and for-profit utility providers as well as between the U.S. Postal Service and its for-profit competitors. The characterization offered here, however, emphasizes the differences between traditional government and for-profit firms, and while there are no doubt exceptions to the traditional view, the differences between the goals and revenue sources for government and for-profit firms create inherently different incentive structures for them. The literature on these arguments is voluminous. See, for example, Blais and Dion, (1991); Niskanen, (1971); Tullock, (1965); Borcherding, (1977); Miller and Moe (1983); Kettl, (1993); Wilson, (1989).

[3] The Multi-state Working Group on Environmental Management Systems (MSWG) was initiated in 1997 by government officials in ten states, EPA, NGOs, universities and industry associations with the collective goal to determine whether EMSs increase the environmental performance of organizations that adopt them. Today nearly all U.S. states participate in the MSWG, which by November 2001 had over 200 participants. The National Database on Environmental Management Systems, however, contains data from pilot facilities in the original ten MSWG states, as they are the only states participating in the EMS Pilot Program.

[4] States solicited NGOs, government facilities, privately owned firms and facilities, as well as operational units of publicly traded companies to participate in the pilot program.

[5] One pilot facility was removed from the program when it was unable to adhere to the program's minimum compliance requirements.

[6] Fifteen facilities were excluded from this study because they had not provided completed baseline and EMS design data by July 2001.

[7] A violation is defined as any environmental non-compliance that resulted in a formal enforcement action against the facility. Similarly, a non-compliance is any non-conformity in fulfilling environmental regulatory requirements that resulted in no enforcement action.

[8] Actual NDEMS data employ a four-point scale ordinal scale (high, medium, low and not applicable). Because of the lack of strong distinction between low and not applicable pressures, these responses were collapsed into a single category.

[9] The sample size constraints unfortunately restricted an extensive examination of the types of industries that these facilities comprise.