

**THE ROLES OF SUPERVISORY SUPPORT BEHAVIORS AND
ENVIRONMENTAL POLICY IN EMPLOYEE ECO-INITIATIVES
AT LEADING-EDGE EUROPEAN COMPANIES**

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Abstract

We assessed the relationships of environmental policy and supervisory support behaviors respectively to employee environmental initiatives in leading-edge companies. We developed a behaviorally anchored rating scale (BARS) instrument based on “learning organization” behaviors. In a survey conducted in European companies, employees used the BARS to assess their supervisors’ daily behaviors. We analyzed the results using logit econometric analysis and other statistical tools, to reveal which environmental policy factors and management support behaviors positively related to employee eco-initiatives.

Just as all innovations begin with creative ideas from individuals or teams, so too do environmental innovations. We adopted the definitions of creativity as the production of novel and useful ideas and of innovation as the implementation of creative ideas within an organization (Amabile, Conti, Coon, Lazenby & Herron, 1996). We assumed that the transition toward environmental sustainability of businesses would be enhanced by the ability of organizations to implement creative environmental solutions from employees. This assumption had four parts. First, several researchers supported the assertion that ecological sustainability of businesses depended on innovative solutions. They demonstrated that sustainable business practices depended upon more efficient resource use in the manufacture and delivery of products and services (Fussler, 1996; Schaltegger, 1997; Steger, 1998; Ytterhus, 1997; WBCSD, 1996 a, b). Second, other literature underlined the assertion that innovation was the implementation of creative ideas from individuals and/ or teams (Amabile, Conti, Coon, Lazenby & Herron, 1996). Third, the organizational behavior literature highlighted the need to engage employees in change processes (Kanter, 1983; Pasmore, 1994; Smith, 1996; Strebel, 1996, 1998). And, finally, the literature on environmental change asserted that, as in other types of change, the degree of organizational support for employee actions determined the success of such efforts (Barrett & Murphy, 1996; Kolluru, 1994; Ruiz-Quintanilla, Bunge, Freeman-Gallant, & Cohen-Rosenthal, 1996; Wehrmeyer & Parker, 1996).

Building on the research of Amabile (1988) and Amabile, Conti, Coon, Lazenby and Herron (1996), which demonstrated that the level and frequency of creative behaviors was influenced by the social environment, we developed a survey instrument to test whether a set of organizational factors and supervisory behaviors affected employee motivation to generate new ideas in the environmental management area. For the purposes of our research we assumed that initiatives promoted by employees in the environmental area were creative ideas

that companies implemented, thus fitting with our definition of environmental innovations. We tested this assumption using interviews with employees at environmentally proactive companies in Europe and the United States and found it to be legitimate.

Our conceptual model, which formed the basis for this survey instrument, indicates that the relationship between the relative strength of the signal from supervisors and from the organization regarding protection of the natural environment had a direct impact on the willingness of employees to create self-described environmental initiatives. We used the learning organization literature and interviews at leading-edge companies as the basis for defining those supervisory behaviors that supported employee creativity. Our research demonstrated that factors of organizational encouragement and supervisory encouragement, which have been shown in the literature to support employee creativity in general, were also important to support employee *environmental* creativity. In the absence of supportive management behaviors and/ or the organizational communication of a corporate vision of sustainable activities as signaled by its environmental policy, we found fewer environmental initiatives from employees. We confirmed these results using logit analyses.

In this article, we present the results of a behaviorally anchored rating scale (BARS) survey used as a tool for employees to assess the behaviors they observe from their supervisors. This is a new use for the BARS tool. Traditionally, managers have used BARS to assess employee work performance and behaviors (Landy & Farr, 1983; Smith & Kendall, 1963). In our research, the BARS instrument proved effective in gathering data from employees about management behaviors they observed that either supported or failed to support environmental initiatives.

Employees from twelve countries employed by major European companies with proactive environmental policies were the focus of our research.¹ We defined “employees” in our research as “mid and low level workers”.

This article consists of six parts. First we define eco-innovation and influences upon it. Then, we discuss the theoretical grounding for our work and present our conceptual model, methods, and results, followed by our conclusions.

EMPLOYEE ECO-INNOVATION

Influences on Employee Eco-Innovation

In the aftermath of the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, Brazil, external influences on corporations to become sustainable, such as regulations, stakeholder pressures, and social desirability have led proactive companies to adopt policies and organizational mechanisms that support employee eco-innovations. Davis (1991) and Fussler (1996) asserted that eco-innovation was a means for corporations to become more environmentally and economically sustainable in their activities. And, Beard and Hartmann (1997) indicated that individual creative actions were the key to successful eco-innovation in firms. Furthermore, Hostager, Neil, Decker, and Lorentz (1998) and Keogh and Polonsky (1998) stressed the need for organizational support to encourage employee environmental innovations. Hostager, et al. developed a model that asserted that both organizational and individual factors influenced employee eco-innovations. In this model the firm signaled desirability for and provided organizational incentives for employees to eco-innovate, but the individual had the capacity (skills and capability) and the intrinsic motivation (values) to do so.

Our research examined the factors affecting eco-innovation that the organization controls, but did not address the individual's existing capacity (skills and capability) and intrinsic motivation (values), both of which could be affected by organizational support, but which could also exist regardless of organizational actions.

Eco-Initiatives as a Proxy for Eco-Innovations

In this study, we defined an environmental initiative as “any action taken by an employee that s/he thought would improve the environmental performance of the company”. Employee eco-initiatives improved company performance by either decreasing the environmental impacts of the company (such as recycling, pollution prevention, etc.); solving an environmental problem in the company (such as reducing the need for hazardous waste disposal, eliminating chemicals that are harmful to worker health/ natural environment, etc.); or developing a more eco-efficient product/ service (such as increasing resource efficiency by producing a less energy intensive product, replacing a product with a service, etc.). Examples of employee eco-initiatives in companies included the redesign of a cleaning system to eliminate the use of a volatile organic compound (Ramus, Steger & Winter, 1996), and the development of a cleaner diesel fuel for sale on the consumer market (Neste, 1997).

In our study, we considered eco-initiatives to be a proxy for eco-innovation in companies. Whereas it might be difficult for an employee to judge whether his/ her eco-initiative was ultimately innovative, any employee could know with certainty whether s/he had ever tried to promote one. In our study, we were interested in self-identified actions that aimed to improve company environmental performance. Therefore, we asked the respondents if they had ever promoted an environmental initiative, a simply worded question that was unlikely to create philosophical or definitional problems for an employee.

Eco-initiatives could occur at any level in the company. We were not concerned with the size of the eco-initiative, but with whether the employee tried to promote an environmental change, no matter how small or large, which s/he believed would improve the company’s environmental performance. We designed our survey for average company employees, many of who worked in blue-collar jobs on the shop floor, and we conducted it in four languages with employees from twelve countries. Therefore, our aim was to use

definitions and language in the questionnaire that would be understandable to people of different levels of education, sophistication, and from different cultural backgrounds.

Eco-Innovations Differ From General Innovations

Eco-innovations are different from general innovations in that they require a higher degree of managerial attention and commitment. But eco-innovations are similar to other innovations in that they require the same the types of organizational and supervisory encouragement. The reason is that companies do not normally consider environmental innovations as central to profitability, whereas general innovations are often seen as contributing to the *raison d'être* of the business. This separateness from the business is partly due to environmental management being a relatively new business process. As such environmental impacts have not traditionally been related to the bottom line, nor managed as consistently as other aspects of the business value chain (Steger, 1993). Our results reinforced this point by showing that management of eco-innovation received less focus and commitment than management of other activities. This was true even in environmentally proactive firms with a stated commitment to a policy of sustainable development, as were represented in our sample.

Our research also provided evidence that the types of support necessary to encourage individual innovation were the same as were necessary to encourage individual *eco*-innovations. The general organization literature indicated that organizational and supervisory encouragement support employee creativity and innovation, and environmental management researchers, like Milliman and Clair (1995), Shrivastava (1996), Stern (1992) and Storen (1997), used case study evidence to assert that these same factors could encourage employee environmental participation and eco-innovation. The unique contribution of our study is that it empirically tests which of the identified factors have a statistically significant impact on employee eco-initiatives. We found that, while both organizational and supervisory support

were helpful, some factors in these conceptual categories were significant and others were not. These findings lay the groundwork for further empirical investigation into this issue. We also studied the interaction effects between environmental policy and supervisory behavior variables on eco-initiatives, developing some interesting counter-intuitive findings.

THEORETICAL GROUNDING

Related Research and Instruments

The study of environmental issues in business organizations needs rigorous empirical research validating general models, according to Gladwin (1993). In the environmental literature, we found no scholarly work assessing the work environment (workplace) for support of employee environmental creativity and innovation. Environmental researchers measured organizational support for environmental management, as does the annual Barometer Survey in Europe (Belz & Stannegard, 1997). But neither this longitudinal study nor other research assessed quantitatively factors that had an impact on employee implementation of environmental ideas. Our study took an initial step in developing an empirically validated relationship between employee willingness to promote environmental initiatives and work environment support dimensions.

In the area of quantitative research measuring general organizational support for creativity, an empirical study, entitled “KEYS: Assessing the Climate for Creativity”, assessed perceptions of the following work environment dimensions: organizational, supervisory and work group encouragement, freedom/ autonomy, resources, challenging work, workload pressures and organizational impediments (Amabile, Conti, Coon, Lazenby & Herron, 1996). Of these dimensions, Amabile et al.’s research demonstrated that resources, work load pressures, and freedom played a less important role in organizational creativity compared to organizational and supervisory encouragement. Previous studies highlighted the role of organizational encouragement of risk taking, and idea generation, as

well as in valuing innovation from all levels of the organization (Cummings, 1965; Delbecq & Mills, 1985; Ettlíe, 1983; Hage & Dewar, 1973; Kanter, 1983; Kimberley & Evanisko, 1981). And, studies showed the importance of supervisory encouragement in employee creativity (Amabile, 1979, 1983; Bailyn, 1985; Delbecq & Mills, 1985; Kimberley, 1981; Kimberley & Evanisko, 1981; Orpen, 1990). Based on these general work environment findings, we focused our study on the dimensions of organizational and supervisory encouragement, in order to determine if these dimensions related to employee creativity as demonstrated by environmental initiatives.

Supervisory influence on creativity. Redmond, Mumford and Teach (1993) developed a model to identify manager behaviors that influenced subordinate creativity, showing that managerial behaviors that led to feelings of self-efficacy contributed to higher subordinate creativity. Hage and Dewar (1973) found that the values of supervisors explained the difference in organizational innovation rates. And, Kanter (1983) and Kimberley and Evanisko (1981) argued that the creativity of subordinates was influenced by a democratic/ considerate style of managerial behavior and an open approach to decision making. We tested whether supervisory behaviors also had a relationship to employee creativity in the environmental area. We developed BARS which included managerial behaviors that increased employees' feelings of self-efficacy, reflected open approaches to decision making, demonstrated democratic/ considerate styles of management, and valued employee environmental activities.

Supervisory influence on empowerment. Researchers have clearly recognized the role of management/ supervisory support in employee empowerment (Amabile, 1993; Bowen & Lawler, 1992; Kanter, 1989; Lawler, 1986; Spreitzer, 1995). Conger and Kanungo (1988) defined empowerment as the motivational concept of self-efficacy, or employees' feelings that they can influence their work. Spreitzer (1995) differentiated psychological

empowerment from the situational aspects of empowerment, and defined it as “an active orientation of the individual that reflects the individual’s belief that he or she can shape his or her work role and context”. Furthermore, Thomas and Velthouse (1990) noted that the individual’s perception of empowerment is a set of cognitions shaped by the work environment. Bowen and Lawler (1992), and Spreitzer (1995) described two consequences of psychological empowerment as “effectiveness” and “innovative behavior”. Thus, the academic literature showed that work environment characteristics that support employees’ sense of empowerment, such as management’s use of rewards and information sharing, were directly linked to innovations.

Psychological empowerment (as exists in “learning organizations” defined below) appeared to be a key component of supervisory and organizational encouragement. In our study, we tested whether the behaviors that support empowerment, demonstrated in part by supervisory use of environmental rewards and environmental information sharing, affected the willingness of employees to promote eco-initiatives.

Supervisory influence on organizational learning. Ferris and Fanelli (1996) defined “learning organizations” as organizations that promote the continuous learning and knowledge creation of all their employees so that the organization can grow, change and innovate. In these organizations, the role of supervisors in supporting employees in the workplace is of key importance (Cavaleri & Fearon, 1996). The characteristics of learning organizations parallel those described in the literature on organizations that are designed to support innovation and employee creativity (Argyris & Schon, 1978; Garvin, 1993; Pearn, Roderick, & Mulrooney, 1995; Peters, 1990-91; Senge, 1990; Wagner, 1991). When developing our list of supervisors’ behaviors that support employee creativity and innovation for the empirical investigation, we used the extensive literature on organizational learning to inform our choice of behaviors for our BARS.

The literature described ways in which managers influence subordinates, including role modeling, goal definition, reward allocation, resource distribution, and communication of organizational norms/ values, structuring of work group interactions, conditioning subordinates perceptions of the work environment and influence over processes and procedures used (Bass, 1981, 1985; Fleishman & Zaccaro, in press; House & Mitchell, 1968; James & James, 1989; Jaques, 1977; Yukl, 1986). Support in organizations for the attainment of expertise positively influences employee creativity (Langley & Jones, 1988). And employee perceptions of autonomy, support, trust and goal clarity contribute to creativity (Abbey & Dickson, 1983; Andrews, 1975; Ellison, James, McDonald, Fox & Taylor, 1968; Pelz, 1956; Taylor, 1963; Witt & Beorkrem, 1989). We used the description of managerial behaviors in learning organizations to help us define the organizational characteristics we tested in our survey, believing that they described the types of behaviors that could affect employee initiatives in general, and therefore might also relate to employee willingness to promote environmental initiatives.

Environmental literature related to organizational learning. The environmental literature supported our approach of using the learning organization as the basis for BARS. Winter (1997) described in detail the specific dimensions of environmental learning in organizations. Davis (1991) and Kemp and Soete (1992) described learning organization characteristics as those that support employee environmental innovations. In practice, we observed that eco-innovation and eco-efficiency were often operationalized using the creative ideas of individuals and groups using a learning culture (Fussler, 1996). Furthermore, the environmental change literature pointed to organizational learning characteristics and management behaviors that support employee participation in environmental initiatives (Brophy, 1996; Davis, 1991; Epstein, 1996; Ramus, 1997; Wehrmeyer, 1996; Welford, 1996).

CONCEPTUAL MODEL

Figure 1 depicts the conceptual model underlying our survey instrument. This figure notes that regulatory and stakeholder pressures create an impetus for environmental actions in companies, resulting in environmentally proactive firms sending signals of organizational and supervisory encouragement to employees. The figure predicts that if the respondents perceive a signal from the conceptual categories of the model (organizational encouragement and supervisor encouragement) then this will have a positive relationship to employee self-described environmental initiatives, which will improve company environmental performance. We used seven hypotheses to test the relationship between employee perceptions of support and employee self-described environmental initiatives, one for the organizational signal and six for the supervisor signal. As shown in the figure, we measured supervisory behaviors that support environmental management and behaviors that supported other general management activities in order to compare the effect of each on the dependent variable.²

Insert Figure 1 about here

Hypothesis 1: Organizational support, in the form of a well-communicated environmental policy, will be positively related to individuals' willingness to promote eco-initiatives.

A number of researchers have shown that environmental policy [broadly defined by Brophy (1996) to include corporate vision and strategy] is an important precursor to employee engagement in environmental activities (Barrett & Murphy, 1996; Brophy, 1996; Hutchinson, 1996). Therefore, we used employee knowledge of the existence/ perceptions of organizational commitment to the environmental policy as a proxy for organizational encouragement. We first tested whether, if employees perceived a strong signal from the organizational policy, this perception positively affected their willingness to promote eco-initiatives (*Hypothesis 1*). Within the environmental policy area we asked about the

employee's perception of organizational encouragement from thirteen different environmental policies. Of these thirteen policies, the first item asked about was employee knowledge of the company's published environmental policy. The other twelve policies were subsets of this general policy and include specific policies like purchasing, fossil fuel use reduction, etc. Note that hypotheses 2a-2f include other aspects of organizational encouragement, as discussed by Amabile, Conti, Coon, Lazenby & Herron (1996), testing supervisory encouragement of employee creativity and innovation.

Hypothesis 2a: Supervisory behaviors that support employee innovation will be positively related to individuals' willingness to promote eco-initiatives.

Hypothesis 2b: Supervisory behaviors that support employee competence building will be positively related to individuals' willingness to promote eco-initiatives.

Hypothesis 2c: Supervisory behaviors that support employee communication with others will be positively related to individuals' willingness to promote eco-initiatives.

Hypothesis 2d: Supervisory behaviors that support dissemination of information to employees will be positively related to individuals' willingness to promote eco-initiatives.

Hypothesis 2e: Supervisory behaviors that support employees using rewards and recognition will be positively related to individuals' willingness to promote eco-initiatives.

Hypothesis 2f: Supervisory behaviors that support employees by managing goals and responsibilities will be positively related to individuals' willingness to promote eco-initiatives.

Our second general prediction was that employees would be more likely to have tried to promote an environmental initiative if they perceived that their supervisors were using supportive daily behaviors. To test employee perceptions of supervisory encouragement we developed six hypotheses. Campbell and Cairns (1994) indicated the importance of the six areas of Innovation, Competence Building, Communication, Information Dissemination,

Rewards and Recognition, and Measurable Goals and Responsibilities for measurement of organizational learning. We tested if supervisory behaviors in each of these six areas, identified as supporting organizational learning, had a relationship to employee willingness to promote self-described environmental initiatives. Note that the categories and the behaviors were both related to general management. In the survey, we asked employees to select a supervisory behavior in each category which a) was typical in the general case and b) was typical when their supervisor was managing environmental issues. This allowed us to compare supervisory support behaviors in general management versus environmental management. Below we discuss the relevance of these six areas of supervisory behaviors.

Innovation

Hage and Dewar (1973) demonstrated that the values of supervisors could impact the rate of innovation in organizations. Previous studies demonstrated the role of encouragement of risk-taking, idea generation and valuing innovation from all levels of the organization (Cummings, 1965; Delbecq & Mills, 1985; Ettlie, 1983; Hage & Dewar, 1973; Kanter, 1983; Kimberley & Evanisko, 1981). Within the area of management support for innovation, *Hypothesis 2a*, we tested behaviors by supervisors that researchers demonstrated to have a positive or negative effect on creation of new ideas and promotion of innovations within a company. Included in this category were rank-ordered behaviors ranging from “usually objects to changes and new ideas” to “encourages partnerships with other departments in order to implement new ideas”.

Competence Building

Support in organizations for the attainment of expertise positively influences employee creativity (Langley & Jones, 1988). Ulhoi, Madsen and Rikhardsson (1994). Wehrmeyer (1996) studied the effects of employee training on their participation in environmental activities, highlighting the importance of this area in encouragement of

environmental innovations. In *Hypothesis 2b*, we tested supervisor behaviors that supported or failed to support competence building. We defined competence building as including management behaviors, which either supported or deterred employees from education, training and other knowledge development activities. The behaviors in this category ranged from “refuses to commit resources and employee time for training and education activities” to “spends time discussing and implementing a learning plan with each employee”.

Communication

Bowen and Lawler (1992), Kanter (1983), Kimberley and Evanisko (1981), and Spreitzer (1995) discussed the importance of non-hierarchical, flexible structures in encouraging employee empowerment and creativity. In *Hypothesis 2c* we tested employee perceptions of their supervisor’s communication and decision-making behaviors. Here we included behaviors that supported or failed to support open, candid and non-hierarchical approaches to sharing of ideas between the employee and the supervisor, the employee with other managers, and the employee with different divisions in the organization. The supervisory behaviors ranged from “reinforces organizational hierarchies by insisting that employees be of the same level in order to communicate directly (does not want employees to talk to other managers)” to “listens openly and attentively to suggested improvements in how s/he does his/ her job and often adopts the suggestions”.

Information Dissemination

Researchers described information as one of the foundations for innovation in the psychological empowerment literature as well as highlighting the importance of information sharing in the development of trust in the relationship between the employee and supervisor (Bowen & Lawler, 1992; Spreitzer, 1995). In *Hypothesis 2d*, we tested employee perceptions of supervisor behaviors that supported information dissemination, including the open sharing of information both about company policies and goals, and difficult subjects, like layoffs and

restructurings. Behaviors in this area ranged from “our group is often the last to know about changes in the company because our manager does not tell us things” to “clearly explains the reason for the organization’s goals or policies and forewarns employees about expected changes whenever possible”.

Rewards and Recognition

Bowen and Lawler (1992) and Lawler (1973, 1990) indicated that rewards and recognition could positively influence employee involvement in organizations. *Hypothesis 2e* tested the relationship of supervisory use of rewards and recognition to employee willingness to promote self-described environmental initiatives. Here we included behaviors that reinforced employee participation using formal awards, monetary rewards and informal recognition of employee activities. The behaviors in this area ranged from “I have seen my manager publicly reprimand another employee” to “uses bonus pay or other monetary awards to reward employees who have achieved or surpassed their goals”. Note that in the literature rewards and recognition were closely linked to organizational and individual goals, but we separated management of goals and responsibilities into another category as the management behaviors differed significantly in the two categories.

Goals and Responsibilities

Goal clarity can contribute to creativity (Abbey & Dickson, 1983; Andrews, 1975; Ellison, James, McDonald, Fox & Taylor, 1968; Pelz, 1956; Taylor, 1963; Witt & Beorkrem, 1989) and supervisors can influence subordinates by goal definition (Redmond, Mumford, & Teach, 1993). Since the manager’s role in setting measurable and clear goals can positively affect organizational learning and employee creativity, *Hypothesis 2f* tested the relationship of goal setting and sharing of responsibility for organizational goals to employee self-described environmental initiatives. The behaviors in this area of the survey tool ranged from “ tries to manage every detail of an employee’s work so that the employee has little freedom to do

his/her job independently” to “involves employees in changes by instilling ownership of problems and responsibilities for solutions in every employee”.

METHODS

Sample and Procedures

The sample was composed of 353 mid and low level employees. These employees worked at six companies head-quartered in Europe, each of which was listed by national ranking organizations within the top two hundred companies in terms of sales. The companies, employing 1500³ to 41,000 people, represented a number of industries, including chemical, entertainment, manufacturing, medical devices, oil, and retail. We randomly selected employees from diverse work force units representing different functions, divisions and geographic locations. Employees were based in twelve countries: Austria, Belgium, Canada, Finland, France, Germany, Italy, The Netherlands, Norway, Spain, the United Kingdom, and the United States. The survey instrument was available in English, German, Dutch and Finnish. (Note that 6.8% (24 of 353) of the sample respondents were from the United States or Canada as one company had operations in North America.) We were not interested in cross company comparisons, but rather wanted to test our hypotheses by obtaining a diverse sample of employees working in different countries.

We assured the respondents of confidentiality⁴. Respondents returned the questionnaires directly to the authors for processing, and only aggregate results were reported back to the organizations. We collected data in 1996 and 1997. 1465 surveys were distributed. The response rate was 24 percent.

We chose companies mentioned in environmental strategy journals, such as Business and the Environment, Environmental Excellence, Environmental Quality Management, Greener Management International and Tomorrow, for their proactive environmental management programs and published environmental policies. We interviewed environmental

managers to confirm that each company had a strong commitment to its environmental program. By this careful screening of companies, we ensured that the employees in the sample worked for organizations that were more supportive of environmental activities than the average European head-quartered company. Therefore, we acknowledge that one of the limitations of our study is the possibility of social desirability in responses.

In addition to the positive (pro-environmental protection) bias of the companies in the sample, we also believe there was a positive self-selection bias in the sample of employees. We assumed that employees responding to the survey were more likely to be interested in and/or informed about environmental issues than the population of employees from which they were drawn.

While we assume that the sample is positively biased, this bias toward support for self-described environmental initiatives was intentional. In order to examine the relationships among environmental policies, supervisory support behaviors and employee initiatives, we selected a sample of organizations where such policies and behaviors were likely to exist. In this way we could test employee perceptions of signals from the organization and their supervisors. We believe that the positive biases in the sample tended to reduce variance in responses. Despite the lower variance caused by this intentional bias, we found statistically significant support for our hypotheses.

Thus, our sample is representative of employees from large, environmentally proactive companies with headquarters in Europe. These companies had international operations and took a proactive approach to managing the environmental impacts of their businesses. We did not control for national culture or industry in our sample because the sample per company or per country was too small.

Survey Design and Measures

The survey instrument had three parts. We developed it by conducting literature reviews, interviews, and focus groups, using standard qualitative research and validation methods (Cooper & Emory, 1991; Remenyi, Williams, Money, & Swartz, 1998). The first part of the questionnaire consisted of a list of thirteen environmental policies. (Our sample included companies that had environmental policy statements for most or all of the thirteen policies.) We developed the list by reviewing the environmental literature, then modifying the preliminary list using two focus group discussions with 15 company environmental managers at each. The first policy question asked about employee knowledge of the general published environmental policy, whereas, each of the other twelve policies were more specific, sub-policies of this main environmental policy statement. We used this design in order to test if specific policies, like environmental purchasing, training, fossil fuel use reduction, etc. were as positively related to employee self-described environmental initiatives as the general environmental policy statement. (See Table 1 for complete list.)

We measured the impact of employee knowledge of the existence of these policies, and their perceptions of organizational commitment to these policies. In our survey, we listed each of the thirteen policies as an affirmative statement. From the responses we tested for 1) whether or not the employee was aware that the policy exists (knowledge of the existence of the environmental policy), and 2) employee perception of company commitment to the said policy. These two measures used a five-point scale (Strongly Agree, Partially Agree, Don't Know, Partially Disagree, and Strongly Disagree). We measured employee knowledge of existence of the policy by the answer of "agree" (meaning that the employee knows that this policy exists), "don't know" (meaning that the employee doesn't know if this policy exists) or "disagree" (meaning that the employee does not think that this policy exists). We measured employee perception of organizational commitment with the descriptors "highly or partially"

agree or disagree. (For instance, we measured whether the employee “highly agrees” that the policy exists, if there is an increased probability that the employee had tried an environmental initiative compared to other responses, like “partially agrees”, etc.)

Insert Table 1 about here

We developed the second part of the survey using the literature on work performance measurement regarding behaviorally anchored rating systems (BARS) (Farr, Enscore, Dubin, Cleveland, & Kozlowski, 1980; Hampton, Summer, & Webber, 1987; Landy & Farr, 1983). As the literature indicates, this type of measurement tool made for a more precise assessment process by filtering the value judgment into a universal set. It also helped evaluators refrain from speculating about the causes of behaviors. Instead of asking the employee to provide an opinion about the supervisor, the questionnaire asked the employee to select, from a set of behaviors, which one s/he believed was most typical of their supervisor. We used the BARS instrument in a novel way. While there was a long history of using BARS for traditional manager assessment of employee work performance (Smith & Kendall, 1963), we instead used the tool for an employee assessment of their direct supervisor’s work behaviors that support environmental initiatives.

Using the process described in Farr, Enscore, Dubin, Cleveland, and Kozlowski (1980) we developed the six BARS. The process had five steps, starting with a literature review to develop the performance categories and an initial list of behaviors of interest to the study; employee interviews to develop a modified list of supervisory behaviors; a questionnaire for allocating the behaviors to the six performance characteristic categories; a scaling questionnaire process where employees used another questionnaire to rank-order the behaviors; and, development and testing for validation of a draft questionnaire⁵.

Using this process, we developed a preliminary list of general organizational learning behaviors based on the literature. We used interviews with 50 employees from different job

functions (including shop floor employees) at five companies (who were noted in the environmental literature as supporting employee environmental involvement) to confirm that those organizational learning behaviors noted in the literature as supporting employees in general were also the behaviors that employees perceived to be supportive of their self-described environmental initiatives. We used these interviews to modify and validate the behavior list, resulting in a new list of 132 behaviors that employees said provided effective and ineffective support for their environmental activities. Using an allocating questionnaire, and then a scaling questionnaire, managers and employees from 10 companies further refined these behaviors into a rank-ordered list that we developed into a draft questionnaire. We validated the questionnaire using a sample of 50 randomly selected low and mid-level employees (some of which worked on the shop floor) from six departments in one company. We finalized the questionnaire based upon this test and a focus group with 15 managers. (See Table 2 for the complete ranked list of the supervisory behaviors used in the survey).

Insert Table 2 about here

In the third part of the survey, we asked respondents if they had ever “tried to promote an environmental initiative within the company”. The questionnaire gave them a choice of a “yes” or “no” response to this question. We used responses to this question as the dependent variable in our logit analyses.

In our study, we explored self-reported eco-initiatives. We believe that these give an accurate reflection of the reality within the company of the willingness of personnel to promote environmental innovation. In other words, if an employee reported that s/he had tried to promote an environmental initiative, it was very likely that s/he actually had done as reported. Thus, this single measure was a very good proxy for actual employee eco-initiatives in companies.

We understand that researchers often independently verify dependent variables, but in our study we addressed whether or not the respondent felt s/he had tried an environmental initiative, not whether someone else knew that they had. We tested the employees' perceptions of their own actions, and of their supervisors' behaviors that supported or failed to support the employee's environmental initiatives.

Analytical Procedures

The objective of the analysis was to examine the relationship between environmental policies (*Hypothesis 1*) and employee self-described environmental initiatives, and the relationship between supervisory behaviors (*Hypotheses 2a-2f*) and employee self-described environmental initiatives. We tested these seven hypotheses using logit analyses and likelihood ratio tests (Cramer, 1991; Greene, 1993). In all cases the dependent variable was whether or not the employee had tried to promote a self-described environmental initiative.

The independent variables for hypothesis 1 were thirteen environmental policies. And for hypotheses 2a-2f the independent variables were the six BARS. The questionnaire asked employees to use the same BARS to evaluate both the general and environmental behaviors of their direct supervisor. We used a chi-square test of differences to analyze if there was a statistically significant difference between supervisors' support behaviors in the general management versus environmental management cases.

As we expected significant correlations between factors and multicollinearity problems, we performed correlation analyses. We also used classical descriptive statistics to compare results.

Limitations

One of the possible limitations of our study was that we measured both the independent and dependent variables using the same instrument, creating the potential for common method bias. Consistency bias can occur when respondents attempt to maintain

consistency among attitudes, perceptions and attributions in their self-reported responses (Staw, 1975). This type of bias could have occurred in our study, since respondents had the opportunity to alter their responses based on their potential ability to associate the independent variables with the dependent variable. We analyzed the data, but did not observe any systematic bias in results that would lead us to believe that respondents were basing their responses to the questions concerning company policy and supervisory behaviors upon their responses to the question concerning environmental initiatives. Since we observed contradictory results from respondents on some questions, consistency bias did not appear to exist in our study. For example, while some respondents who tried environmental initiatives found their managers to be supportive, others found their managers to be unsupportive. Therefore, responses to supervisory behavior question responses did not appear to be related to the environmental initiative responses.

The two other types of method bias, acquiescence and social desirability, probably do not exist in most cases, according to Spector's research (1987). In our case, since we surveyed employees from companies with proactive environmental policies, there may have been social desirability in some of the individual responses. By protecting confidentiality, we believe we have minimized this possibility. But, since respondents in the sample worked for companies with policies of sustainable development, we would expect the sample to reflect a more knowledgeable set, and possibly a more proactive set of responses than one might find in the population at large. For instance, we believe that potentially a larger percentage of employees in these companies tried environmental initiatives than one would find at other companies without such policies.

Finally, it is important to note that the interpretation of our results is limited by our dependent variable, which measured incremental change using self-identified eco-initiatives.

RESULTS AND DISCUSSION

In *Hypothesis 1* we tested the probability that employees who perceived a strong organizational signal from a well-communicated policy of environmental protection would be more likely to have tried to promote a self-described environmental initiative. Table 3 gives means, standard deviations, and correlations of the environmental policy questions. The mean and standard deviation for responses to the first environmental policy question shows that respondents generally reported that they “strongly agreed” that their organization had a published environmental policy. The majority of the respondents also “strongly agreed” that their organizations had environmental performance targets and used an environmental management system. There was less agreement by respondents on the remaining ten listed environmental policies. In general, the result of the descriptive statistical analysis showed that employees were less knowledgeable (tend to agree less strongly) that the company has the specific policies (questions 2 through 13).

Insert Table 3 about here

The correlation results show significant positive correlations between nearly all policies. We were not surprised by this result as we would anticipate that employee knowledge of different environmental policies might be correlated to one another as the method of communication of the general environmental policy and its different sub policies may be similar.

Table 4 shows the results of logit analyses examining the relationships between the dependent variable (employee self-described environmental initiatives) and the independent variables, employee perceptions of the thirteen environmental policies. We performed the regressions taking each of the thirteen independent variables one at a time in order to avoid problems of multicollinearity, as occurs in cases of strong correlation between the variables. Nonetheless, we also performed a likelihood ratio test of significance considering the 13 policies together and found that taken together, policies have a significant impact on eco-

innovation at $p\text{-value} = 0.00$ even though we could not interpret individual coefficients because of multicollinearity. For individual variable analysis, we thus performed a series of bivariate regressions. The results of these logit analyses showed that there was a relationship ($p\text{-value} = 0.02$) between employees promoting a self-described environmental initiative and their knowledge that a published environmental policy existed. This result not only showed strong significance, but represented a strong impact too (as indicated by the strength of the coefficient). The probability, calculated from the logit formula, that respondents who strongly agreed that the company had a published environmental policy would try to promote an eco-initiative, was 50%, versus only 19% for those who strongly disagreed. Having a well-communicated and convincing environmental policy was thus, the single most important policy factor associated with employee eco-initiatives. Specific environmental policies (questions 2-13), and how these were perceived by employees, mattered less, as shown through our multiple bivariate logit analyses, than a strong commitment and communication of the general policy itself. This was an important result, as from it we confirmed our hypothesis that one of the drivers of employees' eco-initiatives was most certainly the published environmental statement, in the absence of which employees were far less likely to put their creative energy toward environmental improvements in the workplace.

Insert Table 4 about here

The sub-policies (questions 2-13) showed weaker relationships ($p\text{ value} > 0.05$), except in the case of a policy of fossil fuel use reduction ($p\text{-value} = 0.04$), which was negatively related to employee self-described environmental initiatives. In four of the six companies in the survey, the environmental managers independently verified that no such "fossil fuel reduction" policy existed in their companies. Thus, it was possible employees who were well informed about the lack of a company fossil fuel policy were also those more likely to try a self-described environmental initiative (hence the negative coefficient). This

result could indicate that those employees who were better informed about the organizational signal of environmental policy (whether the signal is positive or negative) may also be those who were more likely to use that information to encourage their self-described environmental initiatives. The separate logit analysis we performed with question 1 (general policy) and question 10 (fossil fuel policy) reinforced this supposition. This analysis identified a statistically significant relationship even when both independent variables were included in the formula (p-values: 0.01 for Q1; 0.02 for Q10. Coefficients: 0.41 for Q1; -0.20 for Q10).

Insert Table 5 about here

In *Hypotheses 2a-2f* we tested the probability that employees who perceive supportive behaviors from their supervisors would be likely to try to promote a self-described environmental initiative in their company. Table 5 gives the mean, standard deviations and correlations for the behaviorally anchored rating scales we created for supervisory behaviors. We found that all of the independent variables had statistically significant positive correlations in the BARS (p-value ≤ 0.001). This was not a surprising result since management behaviors may be related to one another. For instance, a supportive manager may have higher ratings on many of the variables, whereas a less supportive manager may have consistently lower ratings across the BARS.

By comparing the means in Table 5, we found that supervisors were relatively less supportive of employee environmental activities than they were of employees in general business activities. We used a chi-square test of differences to verify whether this conclusion was valid (Cooper & Emory, 1991). (See Table 6 for results.) The chi-square test compared the environmental versus the general management supervisory behaviors in the areas of innovations, competence building, communication, information dissemination, rewards and recognition and management of goals and responsibilities. Our analysis identified a statistically significant result at p-value ≤ 0.001 in all cases. The result of the test indicated

that employees consistently selected less positive behaviors from the BARS when answering the environmental question, indicating that they felt their supervisors used less supportive behaviors than when managing general business issues. This was further verified by an analysis of the most frequent responses on the environmental behaviors questions.

Consistently, the most frequently selected response was that the supervisor “neither encourages, nor discourages” the employee’s environmental activities in all six areas of innovation, competence building, communication, information dissemination, rewards & recognition, and management of goals and responsibilities.

Insert Table 6 about here

In Table 7 we show the results of multiple logit analyses examining the relationship between the dependent variable (employee self-described environmental initiatives) and the independent variables of BARS for supervisory behaviors. We performed the regressions taking each of the twelve (six environmental and six general) independent variables one at a time in order to avoid problems of multicollinearity which result from correlated variables, as mentioned above. The results of these logit analyses showed that, for 5 of the 6 environmental questions, employees who perceived supportive behaviors from their supervisors showed an increased probability of trying to promote a self-described environmental initiative (significant at $p\text{-values} \leq 0.05$). Specifically, employees were more likely to have tried to promote a self-described environmental initiative if they perceived supervisory support in the areas of environmental innovation, environmental competence building, environmental communication, use of environmental rewards and recognition, management of environmental goals and responsibilities. General innovation, general rewards and recognition, and management of general goals and responsibilities each also had a positive relationship to employee self-described environmental initiatives (significant at $p\text{-value} \leq 0.05$).

Insert Table 7 about here

Interestingly though, these general categories of behaviors had systematically lower significance than the environmental categories of behaviors. We confirmed this by performing likelihood ratio tests on multinomial logit regressions. If taken together, both general BARS and environmental BARS variables had a strong impact on eco-innovation, as a likelihood ratio test shows (p-value = 0.00) (although individual coefficients could not be interpreted due to multicollinearity, as noted above.) Adding general BARS to environmental BARS had no significant impact on eco-innovation (p-value = 0.82), as the likelihood ratio test showed, while adding environmental BARS to general BARS was highly significant (p-value = 0.00). We concluded that overall environmental BARS matter more and subsume the impact of general BARS on eco-innovation.

Analyzing in more detail using binomial regressions, we also noted that the coefficient of each of the significant general categories was lower than the coefficient of the corresponding environmental category, demonstrating lower impact. (See Table 7.) The statistical analysis showed several of the general behaviors to be important to support employee eco-initiatives, but even more important were the environmental support behaviors. For example, calculations using the logit formula showed that strong supervisory support of environmental innovation brought the probability of an employee's eco-initiative from a minimum level of 33.5% (with minimum support) to a level of 58.5% (with maximum perceived support). And, strong managerial support for environmental competence building brought the probability of an employee's eco-initiative from a minimum level of 30.5% (with minimum support) to a level of 63.5% (with maximum perceived support). In comparison, general innovation had less impact (smaller coefficient) and less significance (larger p-value) than environmental innovation, with the probability of an employee's eco-initiative only reaching 55% with maximal general support versus 58.5% with maximal environmental

support. Hence, general behavioral support, although it could often be helpful to generate eco-initiatives, was not as effective as supervisory behaviors directed specifically at environmental management. Thus, we concluded that companies that want employee eco-initiatives can do so most effectively by encouraging supervisory support for environmental activities of employees.

One exception in the BARS results is worth noting. The variable of environmental information dissemination (i.e. the sharing of specific environmental information to employees) had no apparent relationship to employee willingness to promote self-described environmental initiatives. The literature confirmed this result, with the assertion that pressures from information coming from outside the organization may influence employee behaviors more strongly (Steger, 1998).

Insert Figure 2 about here

Figure 2 shows the conceptual model revised with the results of the bivariate logit analyses, indicating where independent variables had a direct impact on the dependent variable.

Interactions Between Two Sets of Independent Variables

We performed a separate set of tests, including correlation significance, likelihood ratio tests, and logit regressions, on the two sets of independent variables (IVs) to identify potential interaction effects between environmental policy and supervisory behavior variables, and if any, whether the effect was additive or substitutive⁶. The correlations between the two sets were relatively small in value (ranging from 0.00 to 0.31 with the majority having values below 0.12), so, in most cases, we were not concerned with direct correlation effects. For example, policy 1 (the policy shown previously to have the most significant impact on eco-innovation) had no correlation with any supervisory behavior of more than 0.13 and only one was significantly different from zero at the 1% level.

We then ran likelihood ratio tests to check that running the two sets (policies and supervisory behaviors) together in a logit regression gave stronger results than when either set was run separately. Even though individual variables' coefficients were difficult to interpret (because of the multicollinearity issues stressed in previous sections), likelihood ratio tests show that the 25 variables (policies plus BARS) together were more significant than using only the supervisory behaviors (p-value=0.02 of accepting the null hypothesis of no difference) or than using only the policies (p-value=0.00 of accepting the null hypothesis of no difference). Likelihood ratio tests on different sub-samples confirmed this overall result. Clearly policies and supervisory behaviors were not pure substitutes.

We were then concerned about understanding the structure of the interaction that may arise between the two sets of variables at the individual variable level. We first built logits regressing the same dependent variable on one supervisory behavior and one policy variable, in all possible combinations (156 regressions). Although the results are too cumbersome to give here in detail, the multinomial regressions gave similar results to tables 4 and 7, the independent variables coefficients' values and significance being only marginally (and non significantly) lower. An economically weak and statistically insignificant substitution effect between policies and supervisory behaviors appeared to be present.

Suspecting a non linear and more complex interaction effect, we ran regressions for each of the BARS on sub-samples (two regressions for each BARS, one with a sample of employees who perceive that the company has an environmental policy and one with a second sample of employees who do not perceive that such a policy exists). We did this for each environmental policy and each BARS (312 regressions). First we looked at the most significant policy, the published environmental policy. For employees that agreed that there was a written environmental policy, results were very similar to Table 7 results, with similar coefficients and similar significance. For the sample of employees who do not perceive that

there was a written environmental policy (a small sample of 33 out of a total of 353), all significance of supervisory behavior was lost at $p\text{-value} \leq 0.05$. For this sub-sample of employees, supervisory behaviors that support environmental innovation, competence building, communication, rewards and recognition and management of environmental goals and responsibilities had no impact on their decision to be eco-innovative. On the other hand, employees who agreed that the company had a written environmental policy AND who perceived positive support behaviors from their supervisors in the five environmental BARS areas listed above, were more likely to have tried to promote an environmental initiative in their company. Notice also that our previous conclusion remains, i.e. that supervisory support of environmental information dissemination does not have a significant impact on employee willingness to eco-innovate.

Another interesting result was that these asymmetric results held for the eleven policies that we deemed statistically insignificant in table 4. We found the same pattern with all policies except for policy 10 (fossil fuel reduction). These results indicated that policies, even when they did not have a direct impact on eco-innovation, potentially had an indirect impact by making employees who perceived these policies sensitive to supervisory support. Notice that such a systematic result did not exist when conditioning the impact of policies on the BARS. The results were not symmetric.

In conclusion, although there was no strict substitution effect between policies and supervisory behaviors' impact on eco-initiatives, we could not deem the interaction effect simply additive either. Interaction was highly nonlinear and appeared to be conditional. Supervisory behaviors affected eco-initiatives among employees that perceived strong policies to be in place, while these behaviors had little or no effect on other employees. Further analysis of interaction between supervisory support and policies deserved more extensive research beyond the scope of this paper.

CONCLUSIONS

This research was an initial step in identifying an empirically validated relationship between employee willingness to promote self-described environmental initiatives and their perceptions of factors of organizational and supervisory encouragement in leading-edge companies for such initiatives. Using a sample of employees at environmentally proactive companies, we demonstrated that employees who perceived strong signals of organizational and supervisory encouragement more likely developed and implemented creative ideas that positively affected the natural environment than employees who did not perceive such signals. Thus, organizational and supervisory factors indicated in the general and environmental literature had a positive relationship to employee eco-innovations. But, we also found a number of unexpected results in our study. Notably, eleven out of thirteen environmental policies of sustainability did not have a statistically significant direct effect on employee self-described eco-initiatives, nor did supervisory behaviors that supported environmental information dissemination affect these initiatives. Policies potentially had indirect, or conditional effects on employee willingness to try eco-initiatives.

Results from our study indicated that employees responded positively with creative ideas in the environmental area, if they perceived a strong commitment to the environment from the organization. The strong linkage between the existence of a published environmental policy and the willingness of employees to attempt self-described environmental initiatives demonstrated this finding. In fact, having a convincing environmental policy tripled the probability of employee eco-initiatives. But, eleven of the sub-policy areas were less important drivers of innovation than this general policy. We recommend future research to find out if these policies were less relevant to employees' daily work, if companies did not communicate these policies effectively, if the companies exhibited

less commitment to these individual policies, or if other alternative factors explained this result.

Supervisory support behaviors encouraging environmental innovation, competence building, communication, rewards and recognition, and management of goals and responsibilities had a statistically significant impact on employee willingness to promote eco-initiatives. But, the sixth factor of supervisory support for environmental information dissemination, which we found frequently mentioned in the general and environmental literature, had no significant impact on employee eco-initiatives. Possible explanations for this result included the possibility that supervisors potentially did not disseminate environmental information regularly to employees, which reduced the likelihood that this information encouraged employee environmental innovation. Or, supervisors potentially did not relate environmental information, such as progress toward company goals or environmental activities occurring elsewhere in the company, in a way that employees associated this information with their personal actions. We believe this area warrants further research.

Our results also indicated that supervisors, even in our positively-biased sample of European companies with strong environmental commitment, used less-supportive behaviors when managing environmental, as compared to general business, activities. Furthermore, our statistical results demonstrated that environmental support behaviors from supervisors were a better driver for employee eco-initiatives than more general support not aimed at environmental management.

One important implication of the results of the behavioral analysis was that in the future companies that want to eco-innovate apparently need managers who use supportive behaviors to encourage employee environmental actions. Another future implication for companies is that effective communication of their respective published environmental

policies can encourage employee eco-initiatives. Furthermore, the interaction effect between sustainability policies and supervisory behaviors seems to indicate that companies who want to encourage employee eco-initiatives can benefit from the communication of their sustainability policies, since employees who perceive these policies may be more sensitive to managerial support.

We recommend several areas for further research. One potential weakness of our research was its reliance on self-reported eco-initiatives. While the definition of our dependent variable allowed us to test organizational policy and supervisory behavior independent variables, and while this definition was sufficiently robust for our work, narrowing the definition of an initiative to include only eco-initiatives that improve the sustainability of an organization could be an interesting refinement. Measuring such a “sustainable eco-innovation” dependent variable may be difficult, but independently verifying these initiatives in practice might strengthen the results of future studies.

We selected a sample of companies with proactive environmental policies and expected that they employed supervisors who provided above-average support for employee environmental initiatives. We acknowledged that responses in such a sample potentially had a social desirability bias. Therefore, a future survey in companies controlling for bias toward support for eco-initiatives and directly addressing the issues of social desirability could reveal some interesting data for comparison.

Future research to better understand the interaction between policies and supervisory behaviors could lead to greater clarity as to how these affect eco-innovation, and probably company performance in general.

Finally, we note that employees and managers have pre-existing values and capabilities that can affect eco-innovation. It would be interesting to see the results of a study that controls for these personal values and capacity factors.

Perhaps one of the most important conclusions we drew from this research was that the types of organizational and supervisory support noted in the general organization literature were also those that supported employee environmental innovation and creativity. Our research provided an empirical test of the theory that empowerment leads to employee initiatives in an environmental context. The organizational behavior literature of Cummings (1965) and Lawyer (1992), and the empowerment literature of Bandura (1977), Conger and Kanungo (1988), Kanter (1983), and Spreitzer (1995) emphasized the importance of supervisory behaviors, such as openness of communication, goal-setting, non-bureaucratic and non-hierarchical approaches, openness to employee participation in decision-making, feedback on performance and goals, openness to experimentation, and exposure of employees to learning opportunities. Our research was the first empirical study that found a statistically significant relationship between use of these types of supervisory behaviors (tested in the BARS) and employee eco-initiatives, showing which factors affected employee eco-innovation and how they interacted with environmental policy influences.

ENDNOTES

¹ Since we studied companies with a stated commitment to environmental protection and sustainability, there was a possibility that social desirability influenced employee responses.

² We tested the assumption made in the literature that the learning organization behaviors that supported general activities were those that supported environmental activities. Since the BARS were general in nature, we asked two questions to test this assumption, one to find out from respondents the behavior their supervisor used in general, and another to find the behavior used in the environmental case. From the two responses we determined that supervisors used different support behaviors when managing environmental as compared to other issues. We also determined that positive general support behaviors did not have as much impact on employee self-described environmental initiatives as positive behaviors directed toward support for environmental initiatives.

The same parallel between general organizational policies and environmental policies did not exist. There was no reason for us to believe that strong human resource policies, for instance, would necessarily signal organizational support for environmental initiatives by employees. Therefore, we did not attempt to make any comparison between general organizational policies (on any subjects unrelated to environment) and environmental policies.

³ All but one of the companies in the sample had between 3200 and 41,000 employees. The company with 1500 employees hired approximately 2300 contractors (from a diversity of nationalities) on average per year, and held these contract employees to the same high level of environmental performance as its permanent employees. For instance, it held environmental training courses for both contract and permanent employees.

⁴ To ensure respondents of the confidentiality of their responses, we did not ask them to self-identify demographic or job position characteristics. This precaution was necessary to prevent desirability bias in answers to highly sensitive questions asked about supervisory behaviors.

⁵ Space does not permit a complete description of the BARS development process, which was conducted over one year using focus groups and validation techniques. The authors can provide further details upon request.

⁶ We thank an anonymous reviewer for suggesting that we analyze this issue.

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TABLE 1

Corporate Environmental Policies

My company:

1. Publishes an Environmental Policy.
2. Has Specific Targets For Environmental Performance.
3. Publishes an Annual Environmental Report.
4. Uses an Environmental Management System.
5. Applies Environmental Considerations to Purchasing Decisions.
6. Provides Employee Environmental Training.
7. Makes Employees Responsible For Company Environmental Performance.
8. Uses Life Cycle Analysis.
9. Has Management Which Understands/ Addresses Issue Of Sustainable Development.
10. Systematically Reduces Fossil Fuel Use.
11. Systematically Reduces Toxic Chemicals Use.
12. Systematically Reduces Consumption Of Unsustainable Products.
13. Applies the Same Environmental Standards At Home And Abroad.

Employee choice of response when asked if the company had such a policy:

Strongly Agree(2), Partially Agree(1), Don't Know(0), Partially Disagree(-1), Strongly Disagree(-2)

TABLE 2
Behaviorally - Anchored Rating Scales of Supervisory Behaviors
 Ranked from least supportive to most supportive

| | |
|---|--|
| <p><u>Innovation</u></p> <p>My direct supervisor:</p> <ol style="list-style-type: none"> 1. Usually objects to changes and new ideas and finds excuses why they can not be implemented. 2. Seldom experiments with new ideas or methods of doing things. 3. I would never approach my manager with a suggested change because I know s/he would be angry with me for interfering in his/her area of responsibility. 4. Neither encourages nor discourages new ideas from employees. 5. Gives feedback to employees on their ideas and suggestions, even if they are not adopted. 6. Would accompany an employee to discuss and promote the employee's idea to another manager. 7. Experiments with new ideas in order to examine whether they are profitable/feasible to adopt on a large scale. 8. When someone makes a mistake, we usually discuss, as a group, how to avoid the problem in the future. 9. Sends employees to other locations in the company and elsewhere to learn about innovative processes and other ways of doing business. 10. Encourages partnerships with other departments in order to implement new ideas. | <p><u>Information Dissemination</u></p> <ol style="list-style-type: none"> 1. Our group is often the last to know about changes in the company because our manager does not tell us things. 2. Tries to hide unpopular decisions and information from employees. 3. Gives incomplete or inaccurate information to employees. 4. Keeps information about problems in our area private from the rest of the company and tries to solve them without help. 5. Neither actively aids nor hinders information flow to employees. 6. Uses information systems, such electronic bulletin boards, videos, computer systems, etc. to share information amongst employees. 7. If there is too much information, s/he sets priorities and establishes what is most important for employees to know. 8. Encourages employee trust by openly announcing information without delay about troubling situations, like lay-offs or restructurings. 9. Clearly explains the reason for the organization's goals or policies and forewarns employees about expected changes whenever possible. |
| <p><u>Competence Building</u></p> <ol style="list-style-type: none"> 1. Refuses to commit resources and employee time for training and education activities. 2. Delays giving employees the training/education they need when they change their job functions. 3. Neither encourages nor discourages employee participation in training and education. 4. Usually encourages participation in any appropriate learning situation in which an employee would like to engage. 5. If there is something new I need to know, my manager will make sure I have training/ education on it quickly. 6. Realigns employee responsibilities to allow employee time for training, site visits, or exploring new techniques for doing his/her job. 7. Spends time discussing and implementing a learning plan with each employee. | <p><u>Rewards and Recognition</u></p> <ol style="list-style-type: none"> 1. I have seen my manager publicly reprimand another employee (or my manager has criticized me in front of others.) 2. If I do a good job, I am not certain that my manager will notice. But, if I make a mistake, I am sure s/he will notice and probably criticize me for the mistake. 3. Seldom, if ever, rewards or recognizes an employee for work well done. 4. Neither recognizes nor discourages employee contributions. 5. If the company does well, my manager will reward all of his/her employees. 6. Looks for opportunities to praise positive employee performance, both privately and in front of others. 7. Rewards a good idea by implementing it and giving the responsible employee(s) credit. 8. Uses company award systems to recognize particularly good performance of employees. 9. Uses bonus pay or other monetary awards to reward employees who have achieved or surpassed their goals. |
| <p><u>Communication</u></p> <ol style="list-style-type: none"> 1. Reinforces organizational hierarchies by insisting that employees be of the same level or the level immediately above in order to communicate. (i.e. Does not want employees to talk to other managers.) 2. Avoids difficult discussions and ignores problems as they are developing. 3. Listens to employees, then forgets/ignores what they have said. 4. Neither encourages nor discourages employee communication. 5. Encourages employees to express concerns about company decisions and policies so that the concerns can be openly discussed. 6. Creates an open environment in which to discuss decisions which affect the business. For example, welcomes employee discussions about possible changes, improvements or problems that need solving. 7. Answers questions honestly even if the answer is not what the employee wants to hear. 8. Listens to and values input from employees and managers from all parts of the company. 9. Listens openly and attentively to suggested improvements in how s/he does his/her job and often adopts the suggestions. | <p><u>Management of Goals and Responsibilities</u></p> <ol style="list-style-type: none"> 1. Tries to manage every detail of an employee's work so that the employee has little freedom to do his/her job independently. 2. Seldom talks to employees about goals and responsibilities, except when required by company policies. 3. Is often vague about what s/he wants from an employee. 4. Neither encourages or discourages employees from taking responsibility. 5. Keeps responsibility for all decisions. 6. Delegates specific tasks to employees and tells them precisely how the tasks should be performed. 7. Talks regularly with employees to assess progress toward explicit employee goals. 8. Tells an employee right away when there is something wrong with his/her work. 9. Uses both quantitative (numbers) and qualitative (quality) measures to assure individual is making progress toward or contributing to company goals. 10. Involves employees in changes by instilling ownership of problems and responsibilities for solutions in every employee. |

TABLE 3
Descriptive Statistics and Correlation Table for Environmental Policies

| Independent Variables | Mean | s.d. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| 1 Published Environmental Policy. | 1.61 | 0.73 | | | | | | | | | | | | |
| 2 Specific Targets For Environmental Performance. | 1.46 | 0.71 | .48*** | | | | | | | | | | | |
| 3 Publishes Annual Environmental Report. | 1.08 | 1.01 | .41*** | .47*** | | | | | | | | | | |
| 4 Uses Environmental Management System. | 1.22 | 0.91 | .37*** | .51*** | .45*** | | | | | | | | | |
| 5 Environmental Considerations In Purchasing Decisions. | 0.75 | 1.05 | .36*** | .45*** | .33*** | .38*** | | | | | | | | |
| 6 Employee Environmental Training. | 0.58 | 1.22 | .25*** | .36*** | .35*** | .32*** | .35*** | | | | | | | |
| 7 Employees Responsible For Company Environmental Performance. | 0.86 | 1.20 | .25*** | .34*** | .33*** | .37*** | .37*** | .53*** | | | | | | |
| 8 Life Cycle Analysis. | 0.21 | 0.99 | .18*** | .23*** | .29*** | .21*** | .37*** | .28*** | .31*** | | | | | |
| 9 Management Understands/ Addresses Issue Of Sustainable Development. | 0.66 | 1.01 | .32*** | .30*** | .35*** | .34*** | .39*** | .31*** | .41*** | .39*** | | | | |
| 10 Systematically Reduces Fossil Fuel Use. | 0.14 | 1.27 | .08 | .23*** | .14** | .31*** | .27*** | .15*** | .28*** | .25*** | .30*** | | | |
| 11 Systematically Reduces Toxic Chemicals Use. | 0.73 | 1.15 | .17*** | .29*** | .18*** | .22*** | .31*** | .05 | .13** | .21*** | .35*** | .34*** | | |
| 12 Systematically Reduces Consumption Of Unsustainable Products. | 0.40 | 1.12 | .19*** | .23*** | .21*** | .20*** | .40*** | .16** | .25*** | .37*** | .36*** | .51*** | .59*** | |
| 13 Applies Same Environmental Standards At Home And Abroad. | 0.64 | 1.09 | .19*** | .24*** | .17*** | .19*** | .26*** | .31*** | .25*** | .18*** | .27*** | .03 | .14** | .13* |

*** $p \leq 0.001$

** $p \leq 0.01$

* $p \leq 0.05$

Scale: Strongly Agree(2), Partially Agree(1), Don't Know(0), Partially Disagree(-1),
Strongly Disagree(-2)

TABLE 4
Logit Analyses of Dependent Variable on Environmental Policy Independent Variables

| | Constants | p-values for constants | Independent Variables | Coefficients | p-values |
|----|-----------|------------------------|---|--------------|----------|
| 1 | -0.74 | 0.01* | Published Environmental Policy. | 0.37 | 0.02* |
| 2 | -0.31 | 0.21 | Specific Targets For Environmental Performance. | 0.13 | 0.40 |
| 3 | -0.33 | 0.04* | Publishes Annual Environmental Report. | 0.19 | 0.08 |
| 4 | -0.13 | 0.46 | Uses Environmental Management System. | 0.00 | 1.00 |
| 5 | -0.14 | 0.29 | Environmental Considerations In Purchasing Decisions. | 0.02 | 0.81 |
| 6 | -0.20 | 0.10 | Employee Environmental Training. | 0.13 | 0.15 |
| 7 | -0.14 | 0.30 | Employees Responsible For Company Environmental Performance. | 0.02 | 0.78 |
| 8 | -0.14 | 0.20 | Life Cycle Analysis. | 0.08 | 0.47 |
| 9 | -0.19 | 0.14 | Management Understands/ Addresses Issue Of Sustainable Development. | 0.09 | 0.38 |
| 10 | -0.15 | 0.16 | Systematically Reduces Fossil Fuel Use. | -0.18 | 0.04* |
| 11 | 0.00 | 1.00 | Systematically Reduces Toxic Chemicals Use. | -0.17 | 0.07 |
| 12 | -0.07 | 0.54 | Systematically Reduces Consumption Of Unsustainable Products. | -0.16 | 0.11 |

| | | | | | |
|----|-------|------|--|------|------|
| 13 | -0.23 | 0.07 | Applies Same Environmental Standards At Home And Abroad. | 0.15 | 0.12 |
|----|-------|------|--|------|------|

* p-value \leq 0.05

Dependent Variable = Employee Environmental Initiatives

TABLE 5
Descriptive Statistics and Correlation Table for Supervisory Behaviors (BARS)

| Independent Variables | Mean | s.d. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|
| 1 Environmental Innovation | 6.02 | 2.30 | | | | | | | | | | | |
| 2 Environmental Competence Building | 5.70 | 1.79 | .31*** | | | | | | | | | | |
| 3 Environmental Communication | 6.26 | 2.08 | .41*** | .41*** | | | | | | | | | |
| 4 Environmental Information Dissemination | 6.95 | 2.13 | .33*** | .43*** | .51*** | | | | | | | | |
| 5 Environmental Rewards/Recognition | 5.93 | 2.25 | .30*** | .40*** | .47*** | .45*** | | | | | | | |
| 6 Environmental Management Goals/Responsibilities | 5.85 | 2.60 | .35*** | .38*** | .54*** | .50*** | .54*** | | | | | | |
| 7 General Innovation | 6.49 | 2.21 | .51*** | .25*** | .38*** | .27*** | .27*** | .38*** | | | | | |
| 8 General Competence Building | 5.84 | 1.79 | .22*** | .50*** | .32*** | .31*** | .37*** | .29*** | .23*** | | | | |
| 9 General Communication | 6.28 | 2.18 | .24*** | .33*** | .58*** | .42*** | .42*** | .41*** | .34*** | .32*** | | | |
| 10 General Information Dissemination | 7.09 | 2.31 | .26*** | .37*** | .40*** | .68*** | .37*** | .40*** | .27*** | .39*** | .48*** | | |
| 11 General Rewards/Recognition | 6.00 | 2.54 | .27*** | .26*** | .38*** | .36*** | .71*** | .38*** | .29*** | .35*** | .40*** | .37*** | |

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| | | | | | | | | | | | | | |
|---|------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 12 General Management Goals/Responsibilities | 6.21 | 2.67 | .28*** | .29*** | .43*** | .43*** | .39*** | .65*** | .38*** | .34*** | .41*** | .47*** | .42*** |
|---|------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|

*** p-value \leq 0.001

Scale: Maximum = 10; Minimum = 1

TABLE 6
Chi-square Test of the Differences in Answers to Environmental and General Management BARS

| Environmental vs General | Empirical Chi-square value | Theoretical Chi-square value | p-value |
|-----------------------------------|-------------------------------|---------------------------------|----------|
| Innovation | 23.02 | 16.92 | 0.006*** |
| Competence Building | 24.58 | 12.59 | 0.000*** |
| Communication | 27.17 | 15.51 | 0.001*** |
| Information Dissemination | 29.70 | 15.51 | 0.000*** |
| Rewards/Recognition | 40.43 | 15.51 | 0.000*** |
| Management Goals/Responsibilities | 28.07 | 16.92 | 0.001*** |

*** p-value \leq 0.001

TABLE 7
Logit Analysis of Dependent Variable on Supervisory Behaviors Independent Variables

| | Constants | p-values of constants | Independent Variables | Coefficients | p-values |
|----|-----------|-----------------------|---|--------------|----------|
| 1 | -0.79 | 0.01** | Environmental Innovation | 0.11 | 0.02* |
| 2 | -0.98 | 0.01** | Environmental Competence Building | 0.15 | 0.01** |
| 3 | -1.09 | 0.00** | Environmental Communication | 0.16 | 0.00** |
| 4 | -0.61 | 0.10 | Environmental Information Dissemination | 0.07 | 0.17 |
| 5 | -0.93 | 0.00** | Environmental Rewards/Recognition | 0.13 | 0.01** |
| 6 | -0.81 | 0.00** | Environmental Management Goals/Responsibilities | 0.12 | 0.01** |
| 7 | -0.77 | 0.02* | General Innovation | 0.10 | 0.05* |
| 8 | -0.42 | 0.25 | General Competence Building | 0.05 | 0.39 |
| 9 | -0.67 | 0.05* | General Communication | 0.08 | 0.09 |
| 10 | -0.70 | 0.05* | General Information Dissemination | 0.08 | 0.09 |
| 11 | -0.81 | 0.00** | General Rewards/Recognition | 0.11 | 0.01** |
| 12 | -0.77 | 0.01** | General Management Goals/Responsibilities | 0.10 | 0.01** |
| | * | p-value ≤ 0.05 | Dependent Variable = Employee Environmental Initiatives | | |
| | ** | p-value ≤ 0.01 | | | |

FIGURE 1

Conceptual Model for Assessment of Employee Perception of Organizational and Supervisory Encouragement of Environmental Initiatives

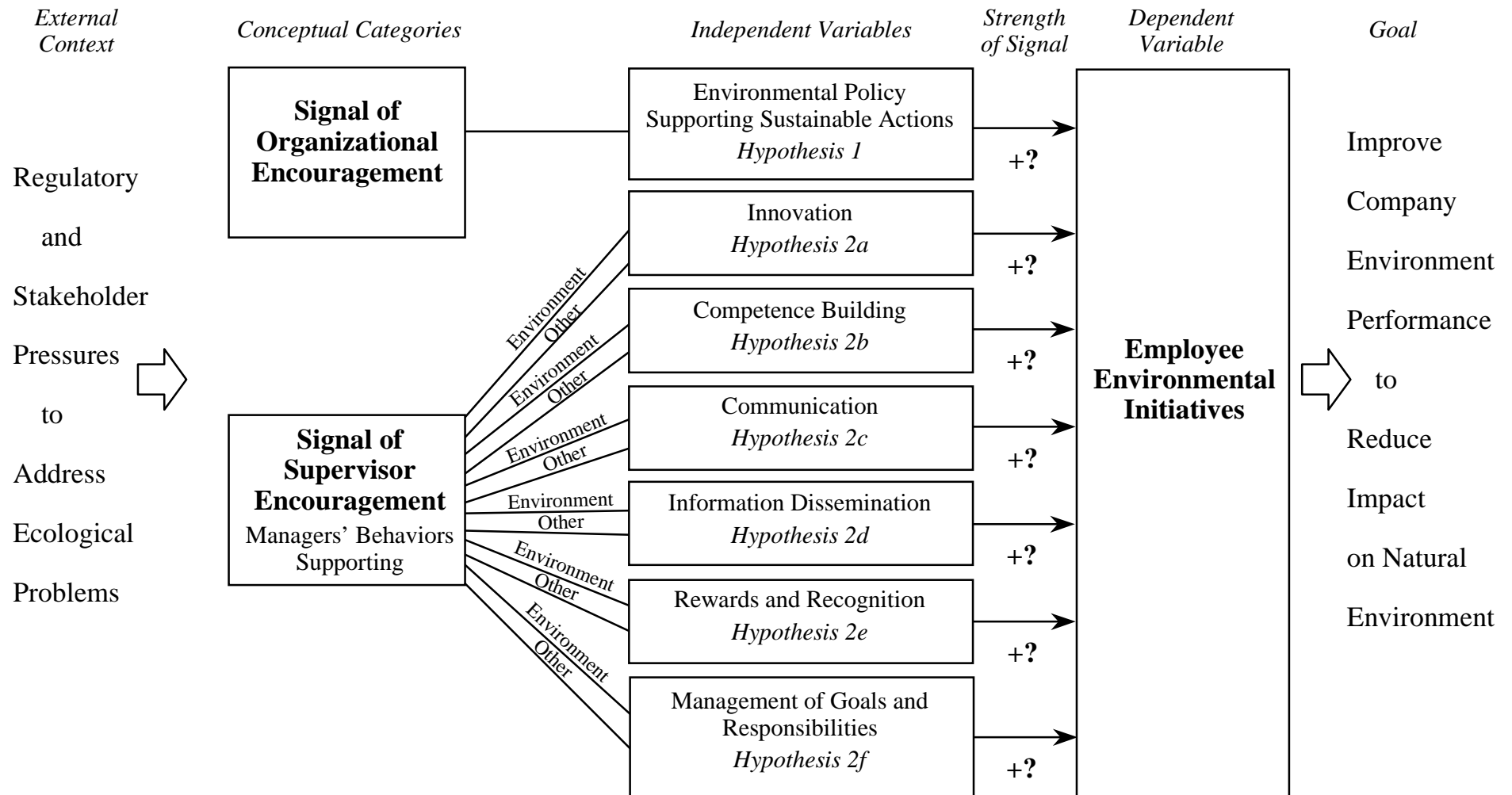


FIGURE 2

Test of Conceptual Model Hypotheses

Results from Bivariate Logit Analyses of Independent Variables on the Dependent Variable

