WORKING PAPER 1998-13

sustainable forest management network

réseau sur la gestion durable des forêts

Shades of Green: Cognitive Framing and The Dynamics of Corporate Environmental Response

A Network of Centres of Excellence
Un réseau de centres d'excellence

I.B. Vertinsky and C. Zietsma

For copies of this or other SFM publications contact:

Sustainable Forest Management Network
G208 Biological Sciences Building
University of Alberta
Edmonton, Alberta, T6G 2E9
Ph: (780) 492 6659
Fax: (780) 492 8160
http://www.biology.ualberta.ca/sfm

Shades of Green:

Cognitive Framing and the Dynamics of Corporate Environmental Response*

by

Ilan B. Vertinsky

Forest Economics and Policy Analysis Research Unit
The Faculty of Forestry
2nd Floor, Forest Sciences Centre
2045-2424 Main Mall
Vancouver, B.C., Canada
V6T 1Z4
Phone: (604) 822-3886
Fax: (604) 822-6970
e-mail: fepa@interchg.ubc.ca

and

Charlene Zietsma

Forest Economics and Policy Analysis Research Unit
The Faculty of Forestry
2nd Floor, Forest Sciences Centre
2045-2424 Main Mall
Vancouver, B.C., Canada
V6T 1Z4
Phone: (604) 822-5002
Fax: (604) 822-6970
e-mail: zietsma@interchange.ubc.ca

*The authors gratefully acknowledge the support of the Sustainable Forest Management Network of Centres of Excellence and the Social Sciences and Humanities Research Council. Helpful comments on earlier drafts were provided by Dev Jennings and Martin Martens. Correspondence should be addressed to the second author.

ABSTRACT

Firms' voluntary efforts to improve their environmental performance are increasingly important. We review and integrate prior research at three levels of analysis and from several theoretical perspectives to develop a model of corporate greening. By examining leaders' cognitive frames, we identify which determinants are salient to whom, and when. We predict how leaders' frames change as a result of endogenous and exogenous influences. Analyzing environmental cognitive frames enriches our understanding of how values and morals impact knowledge structures.

INTRODUCTION

Environmental degradation around the globe continues at a pace beyond that which the planet can sustain. Governments have historically attempted to curtail environmental degradation using regulation and economic instruments, but such interventions are usually not sufficient to bring about a sustainable development path. Furthermore, it is often not clear what kind of regulations or interventions will be most effective.

As the business context increasingly globalizes, it is becoming more difficult for any single government to affect global environmental solutions. Though multinational corporations must comply with legislation at multilateral, regional, national, subnational and municipal institutional levels (Rugman et al. 1997), they can move production from one locale to another to find the right mix of firm- and country-specific advantages (Rugman and Verbeke 1998). Though there is no evidence of the emergence of pollution havens, some companies seek to avoid regulation by investing in countries with lax regulations. Others may seek first mover advantages by choosing to operate in locations with more stringent environmental regulations (Porter and van der Linde 1995).

In a world characterized by firm mobility, the importance of voluntary efforts by firms to improve their environmental protection performance is increasing. There is growing recognition that "...changes in corporate organization, culture and procedures can yield environmental improvement in ways that a compliance-based approach cannot" (Roht-Arriaza 1997:294), though Porter and van der Linde (1995) note that changes in regulation are often necessary to overcome organizational inertia and prompt action.

Without long-term commitment by firms to environmental values, performance depends on governments and markets, which are highly susceptible to failures[1]. High commitment to environmental values, marked by corresponding actions to protect and enhance the environment by a firm, is a better predictor of its long run performance. We argue that the depth and scale of the process of corporate greening (i.e., the development of commitment to environmental protection and enhancement goals and the development of capabilities to respond to changes in the natural environment) is an important determinant of the likelihood of attaining sustainable development.

[1]For example, government regulation may fail to be enforced. Market mechanisms may be ineffective since consumers are largely unable to verify "green" claims by manufacturers, and media exposes of false claims lead all such claims to be suspect.

We have two primary research questions: (1) Why do firms within the same industry (who therefore face similar external incentives and constraints), have environmental performance which indicates they are at quite different stages of "greening"? (i.e., what determines a firm's stage of greening?), and (2) What makes firms move from one stage of greening to another?

Researchers from a number of theoretical perspectives have attempted to address these questions in the past. At the organizational level, researchers have been informed by two fundamental paradigms of firm behavior: economic rationality and sociological theories such as institutional theory. The economic rationality framework suggests that firms will act in environmentally responsible ways when economic incentives are in place which force firms to bear the costs of irresponsible environmental actions (e.g., Kneese and Schultz 1975; Baumol and Oates 1988), or when consumer markets demand environmental responsibility (Arora and Cason 1996). The sociological paradigm focuses on the normative, cognitive and regulative pressures exerted on the firm by external organizations (DiMaggio and Powell 1991), resulting in norms, values and practices being diffused within the organizational field (Hoffman 1997; Jennings et al. 1997). At a more micro level, researchers discuss the need for strong environmental issue leaders (e.g., Winn 1995), the roles those leaders play (e.g., Welford 1995), the importance of individuals' attitudes, beliefs and values (e.g., Dunlap and Van Liere 1978; Flannery and May 1994), and the effects of the interpretive frameworks individuals use to make sense of their social, economic and natural environment (Andersson 1998; Sharma et al. 1998).

While the existence of separate perspectives allows for economy in the research (through the introduction of constructive biases) it does not necessarily lead to the emergence of a synthetic understanding of a multidimensional phenomena. Instead of a productive dialogue, it sometimes balkanizes the research process and its application to organizational problems. A number of authors have, therefore, called for the integration of multiple perspectives in the study of organizations (e.g., Oliver 1991; Jennings and Zandbergen 1995; Tolbert and Zucker 1996).

Informed by alternative paradigms of the behavioral sciences and by prior empirical work on corporate environmental response, we develop an integrative model of greening behavior. It incorporates insights derived from the rational paradigm of behavior (economics), sociological theory, and social cognitive psychology. This static model identifies a number of potential influences on corporate greening. From the extant literature on stages of greening and from a number of case studies of firms' environmental performance, we infer six prototypical cognitive

frames through which leaders interpret environmental issues. These cognitive frames identify which of the determinants in the static model firms will attend to. We predict specific corporate environmental responses associated with each frame.

We then examine dynamic processes of greening, i.e., how firms move from one frame (and thus one type of corporate environmental response), to another. Our process model predicts the effects that various changes in the environment and the firm itself may have on the firm's cognitive frame and environmental response.

Contributions to the Literature.

This paper is expected to make a number of contributions to the literature. First, our focus on three levels of analysis (individuals, firms, and organizational fields), and the contributions of three disciplines allows us to achieve a broader understanding of determinants of corporate environmental response. Second, by examining the leaders' cognitive frames, we identify which determinants of greening will influence firms under various contingencies, allowing us to predict a firm's environmental strategy at a specific point in time. Third, we examine dynamic aspects of the model: how the three levels interact with each other, create and resolve misalignments and how firms become more or less green over time. In this way, we answer the calls of a number of researchers to develop process models. Fourth, we advance the literature on cognitive frames by using a richer gradation of frames than has been typically used in the past. We also consider frames in a domain that is often value-laden for decision-makers and that carries a heavy moral tone, enriching our understanding of how values and morals impact knowledge structures. Finally, by facilitating a better understanding of how environmental issues are framed by firms, we can identify those interventions that can help improve firms' voluntary environmental protection performance.

THE DETERMINANTS OF CORPORATE ENVIRONMENTAL PERFORMANCE

Our static model, presented in Figure 1, represents the following causal paths: corporate environmental performance is the result of organizational actions initiated by leaders. Leaders' influence on organizational behavior is a function of their position and power. In business organizations, the CEO is designated in the formal structure as the leader of the organization,

however, for specific issues other members in the organization may assume leadership positions, or as gatekeepers, may act as perceptual filters for stimuli entering the organization.

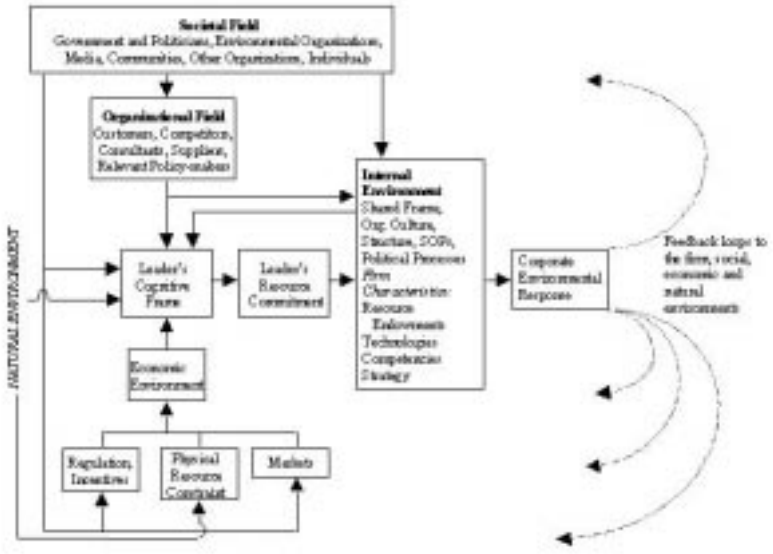

Figure 1. The Integrative Model of Corporate Environmental Response

Leaders interpret the economic, natural and social environments for the organization, establishing strategies and plans for the firm to take specific actions, then committing resources to them. The leader's commitments are interpreted by members of the organization. Whether or not they are implemented as planned depends on a number of factors, such as a) the congruence of those intentions with organization's internal institutions (culture, structure, standard operating procedures), b) the availability of resources dedicated to implementation, c) the political processes of key players who may or may not want to implement, and d) the capability of the firm to implement (given its technology, ability to generate new technologies, and its resources.

Our model recognizes several types of influences that shape organizational behavior: those from social and economic environments, those from within the firm itself and those from

leaders' own attitudes, beliefs and experiences. These influences are interpreted by firm leaders, who act in response to their interpretation. We briefly summarize the logic supporting each of the model variables. Empirical and/or theoretical support for these variables is cited in Table 1.

The economic environment, which is defined by resource allocation systems (e.g., central planning, markets), physical resource constraints and government-imposed regulations (as they are enforced) and incentives, determines the feasible economic payoffs (rewards and penalties) available to firms. When the leader relates these to the organization's own characteristics (e.g., technology, resource endowments, competencies, etc.), he/she interprets the economic expectancies associated with various firm actions. In the long run, these may affect organizational survival. In the short run, they influence the level of resources and determine the feasibility of actions available to the organization and its members. Ultimately, economic systems constrain managerial discretion in for-profit firms.

The natural environment imposes constraints (e.g., scarcity of natural resources, limitations of its carrying capacity), and provides direct stimuli (e.g., visible pollutants, health consequences)[2]. If natural stimuli cause organizational or societal stress, they may be socially constructed as 'crises', raising their salience to leaders and others and triggering actions.

The social environment is also influential in affecting the firm. In our model, exogenous organizations such as competitors, customers, communities, environmental organizations, government and the media exert social pressures on the firm. At the *societal* level, institutionalization is mirrored in the evolution and legitimacy of economic institutions (e.g., markets)[3] and the social valuation of organizational output. Governments play, in most societies, the prime role of confirming or withdrawing legitimacy from particular actions and

[2] Clark and Jennings (1997) relate one organization's story of how employees noticed natural stimuli in their relationship to the environment: a small chemical spill killed a number of frogs living in a cement pit. The sight of the dead frogs apparently meant more to employees than did any of the environmental awareness training sessions they had undergone.

[3] In fact, MacNaghten and Urry (1995: 206) make the point that market forces have become institutionalized as 'natural' within Western societies, "and therefore not to be interfered with or contested". Nature, they assert, has been institutionalized as 'wild', 'invisible background' and separate from the social world.

Table 1. Key findings in support of model variables.

Model Variable	Key Findings and Authors
Markets	Firms with greater consumer contact over-comply with environmental legislation (Arora and Cason 1996).
Competencies	Firms with competencies in R&D over-comply (Clark et al. 1994; DeCanio 1994; Arora and Cason 1996; Sanchez 1997).
Resource Endowments	Large firms are more likely to over-comply because they have the resources (UNCTAD 1993; Clark, et al. 1994; Sanchez 1997). Firms in economic trouble are less likely to over-comply (Nasi et al. 1997; Zhang 1997).
Technology	Clean technologies lead to better environmental behavior (Henriques and Sadorsky 1996). Search for technological improvements can lead to environmental improvements (Florida 1996).
Regulatory Environment/ Incentives	Regulation is the most important source of pressure on firms to attend to environmental issues (Henriques and Sadorsky 1996). Firms in highly regulated, highly pressured industries will tend to over-comply (McKinsey and Company 1991; UNCTAD 1993). Those in intermediate industries are subject to less pressure, thus are less likely to over-comply (Williams et al. 1993). When incentives are in place, firms will act environmentally responsibly (Kneese and Schultz 1975; Baumol and Oates 1988).
Strategy	Green strategy leads to competitive advantage (Douglas and Judge 1995).
Natural Environment	Direct evidence of environmental degradation can increase the salience of the environment among employees (Clark and Jennings 1997). Physical resource constraints may encourage firms to develop resource-efficient production or recycling methods (van der Linde 1993).
Societal Field	The societal field exerts pressures upon firms to act in environmentally responsible ways. Pressures can come from environmental groups, communities, etc. and are often amplified by the media (McKinsey and Co. 1991; UNCTAD 1993; Hoffman 1997; Stanbury and Vertinsky 1997). Environmental groups socially constructed environmental crises, gradually shifting societal values. These value shifts are reflected in regulatory changes and changes in consumer demand (MacNaghten and Urry 1995).
Organizational Field	Norms, values and practices are diffused within organizational fields by interaction among industry members, trade associations, consultants, common requirements of financial institutions (Hoffman 1997; Jennings et al. 1997) and executive migration (Kraatz and Moore 1998). Firms may resist, avoid or comply with organizational field pressures (Oliver 1991).
Stakeholders	Firms will comply with stakeholders' pressures for environmental performance to the extent that they are dependent on those stakeholders (Nasi et al. 1997). Board members act to ensure environmental responsibility as a result of their personal legal accountability (Stafford and Hartman 1996).
Internal Environment	Norms and values become shared and elaborated in organizational cultures, structures and standard operating procedures. Political processes moderate their influence. (Selznick 1957).
Leader's Commitments	Environmental initiatives are diffused faster and more comprehensively when there is top management commitment (Winn 1995). Leaders establish policies, programs, budgets and reward systems to guide and control organization members (Portugal and Yukl 1994). The more the leaders of the organization are committed to environmental protection, the more likely that the firm will formulate an environmental plan and set up a related organizational structure (Clark et al. 1994).
Leader's Frame	CEOs' attitudes, values and beliefs matter to corporate environmental performance (Bowman and Davis 1989; Flannery and May 1994). Individuals have different underlying paradigms about the environment that affects the way they respond to it (Dunlap and van Liere 1978). If leaders consider the environment as a corporate rather than a personal responsibility, they may institute only publicity-driven initiatives (Ballantyne and Gerber 1994).

organizations. In addition to formal legislation, government can use a variety of instruments (e.g., award of prizes for environmental stewardship, advertising names of offenders or promoting "best practices", certifying environmental products) to increase or decrease the legitimacy of certain organizations and actors. Governments can also use their influence on educational systems and the media to mold social values. In democratic societies, the media determines in part which issues receive attention. The media is an important player in socially constructing environmental crises, mobilizing groups to action and helping change public opinion. The influence of environmental groups may be felt through direct actions such as boycotts or protests, or indirectly through lobbying government and mobilizing communities and industry groups. Communities often take actions such as protests, blockades or lobbying government when a local health or environmental risk is perceived. The emergence of environmental groups both reflects fundamental shifts in societal values and helps construct or accelerate those shifts.

These societal institutions shape values and influence organizational fields. Organizational fields are the set of firms, suppliers, customers and competitors, which are considered to be in the same business area (Jennings and Zandbergen 1995). These institutionalized fields act to mold and codify organizational practices, response patterns and programs such that they become taken for granted as social facts (Meyer and Rowan 1977). Institutional elements (norms, values and practices) become diffused through institutional fields. Firms are not completely bound by these norms, values and practices: they are free to resist, avoid or comply with them (Oliver 1991). However, the institutionalized elements figure prominently in the ways in which organizational field members make sense of their environments. Acting in a way contrary to these institutions a) may not occur to field members (because institutions may be taken for granted), b) may not feel 'right', or c) may make them subject to sanctions imposed by other organizational field members (DiMaggio and Powell 1983).

The firm itself will have institutional elements, including values, norms, routines and structures, that are shared by organization members. These may mimic the dominant institutions of the field or they may differ depending on the firm's leadership, its external dependencies and the heterogeneity of firm members (Oliver 1992; Kraatz and Moore 1998). Leaders both create these institutional elements and are in turn constrained by them (Selznick 1957).

Other social pressures on the firm are more coercive and direct than those normally considered under neo-institutional theory. Stakeholder theory considers direct pressure by people, groups or organizations on the firm. Stakeholders are "those groups or individuals that are in some mutually dependent relationship that, if not dealt with properly, may lower corporate performance" (Nasi et al. 1997:302). Using resource dependence arguments (Pfeffer and Salancik 1978), stakeholder theory predicts that issues are prioritized to reflect the importance of the stakeholder group that advances the issue, and that "an issue without a stakeholder group is really no issue at all" (Nasi, et al. 1997: 303). In the environmental context, stakeholder groups can include affected communities, the government, employees, customers, consumers, suppliers, competitors, shareholders and other investors, insurers, and environmental organizations which purport to speak for the natural environment.[4] Stakeholder theory implies that the existence of stakeholder groups with strong and persistent interests in environmental protection will promote environmental protection by firms, particularly when the firm is dependent on that group for resources or legitimacy.

The impacts of institutionalization are ubiquitous. Acceptance of environmental protection as a predominant value in society in general and as a predominant value by the organizational field is likely to be mirrored in internal institutions of the organization. Where there is value heterogeneity and conflict, stakeholder theory predicts which groups' values in the organizational field will be dominant. Persistence of a dominant group in promoting certain practices and values is likely to lead to institutionalization of these practices and values within the organization.

It is possible, however, that different individuals within the organization may be exposed to different groups (e.g., marketers to customers, financial managers to markets and banks), and that the pressures from economic environment elements and social groups will be conflicting (Oliver 1991). In such circumstances, the nature of leadership and power distribution within the organization will determine whether such pressures will lead to short-term reaction only, or will lead to convergence and institutionalization. Further, the firm will respond only to those pressures that it perceives and interprets as important.

[4] Starik (1995) issues an appeal to explicitly include non-human nature(s) as one or more stakeholders in the firm's stakeholder analysis, to ensure firms attend to the natural environment and consider the impact of their decisions on nature. Although we agree with the logic of this assertion, because there is no evidence that many firms are actually doing this, we do not consider nature as one of a firm's stakeholders.

Psychological explanations.

Individuals perceive, define, interpret, respond to and enact systems (Weick 1995). In doing so, they reflect their own values, attitudes and beliefs which influence both what they perceive, as well as their evaluations of those perceptions (Eagly and Chaiken 1993). Much of the psychologically-based literature in corporate greening focuses on the values, attitudes and beliefs of organizational leaders (typically CEOs) as key variables explaining interorganizational differences (e.g., Dunlap and Van Liere 1978; Flannery and May 1994). Employees other than the CEO may also act as environmental issues leaders, however top management commitment to environmental improvements results in faster and more comprehensive diffusion of policy changes and a greater impact on the organization as a whole (Winn 1995). Environmental issue leaders often work through the CEO or another top management team member to promote organizational greening.

Even more subtly, Kitayama et al. (1997) stress that the very way a situation is defined and understood by individuals depends on communication within the group. In any social situation, one member of the group (e.g., the leader) communicates a definition of the situation either by words or by actions, and the others understand and interpret the definition, confirming, modifying or challenging it by their responses. "Through this process, a shared definition of the situation emerges that serves as a common frame of reference" (Kitayama et al. 1997). These frames of reference then become part of individual psychological processes, shaping their very thoughts and behaviour. By examining leaders' cognitive frames, we can understand resource allocations within firms and the shared frames of reference that develop among employees.

Cognitive frames, cognitive maps, causal maps, schemata, and scripts all refer to conceptually similar constructs, but different terms and slight variations in focus are used by different researchers. We'll refer to them as cognitive frames. In general, these refer to the way knowledge is abstracted from examples and stored cognitively. Frames arise because repeated encounters with complex issues and conflicting pressures from the external environment to deal with such issues in certain ways results in both learning and the need to simplify complexities. A process of sensemaking is triggered, during which frames are constructed. The abstracted knowledge in frames can consist of facts, affective responses, behaviours, attitudes, beliefs and values, and the interrelationships among them. The interrelated material then comes together as a category allowing heuristic processing, and providing default values for missing information (Fiske and Linville 1980). Frames are used to make sense of stimuli from the natural, economic and social

environments (Weick 1995). They allow individuals to anticipate what they are likely to see, and thus guide their search and their perception. Frames thus not only represent individual realities, but also help to create them (Laszlo et al. 1996). We identify six cognitive frames that underlie environmental response and predict different environmental performance outcomes depending on how firm members frame environmental issues.

Cognitive Frames Underlying CER

Several authors have developed typologies of the fundamental approaches of business organization to environmental issues (e.g., Post and Altman 1992; Stead and Stead 1992; Gladwin 1993; Piasecki 1995; Welford 1995; Hoffman 1997). Welford (1995:19) defined a spectrum of greening of businesses where, at the one end, are firms for which the environmental issue is fundamentally about add-on pollution control. "These firms are motivated merely by the need for compliance and see pollution prevention as a necessity which adds to their costs." At the other end of the spectrum, there are businesses placing sustainability as their number one priority.

Most of the other authors developed similar typologies. Some added to the range firms who resisted greening. These typologies contain indicators of the cognitive frames which underlie each stage of greening: the level of commitment to environmental values, definitions of the scope of individual and corporate responsibilities with respect to the environment, the degree to which environmental objectives and practices are institutionalized in the organization and the degree to which the organization pro-actively and innovatively pursues its environmental objectives. Based on these indicators and on a number of case studies of firms' environmental performance (e.g., Post and Altman 1992; Dechant and Altman 1994; Winn 1995; Raizada 1998), we infer six prototypical cognitive frames which correspond to the observed spectrum of CER. Each frame represents a probable combination of characteristics that influences how environmental issues are perceived. Each frame is characterized by an interrelated attitude, value and belief set, a set of stimuli that the organization typically scans for information, and a set of typical responses towards the natural environment. Responses include communications, policies, practices, structures and resource commitments.

Specifically, environmental issues can be seen as 1) not the firm's responsibility, 2) threats, 3) technical issues, 4) opportunities, 5) societal duties, and 6) a personal commitment. Each of these frames has implications for the cues actors attend to and the typical actions those actors will take (Weick 1995). Below, we specify each frame in turn. Our analysis is summarized in Table 2.

Frame 1: The environment is not the firm's responsibility. Some leaders do not perceive the natural environment to be part of the firm's area of responsibility. Firms in cleaner industries may not identify themselves as part of the problem. Similarly, leaders of very small businesses may feel that the business' impact on the environment is minor, or they may not even think about the environment in connection with their business. Firms in nations with low awareness or concern for the environment may not see environmental action as their responsibility. In industrialized societies, however, it is unlikely that this frame can be held onto for very long: regulators and stakeholders will bring environmental issues into focus for the firm. Firms whose leaders do not consider environmental action to be part of the firm's responsibility are unlikely to attend to any signals for environmental action (though regular scanning of the business environment takes place), and they are unlikely to take any environmental actions while in this frame.

Proposition 1: When firm leaders perceive that environmental action is not the firm's responsibility, the firm will not attend to signals for environmental action regularly, and will not take environmental action.

Frame 2: The environment is a threat. Jackson and Dutton (1988) identified characteristics of issues that are consistent with a threat interpretation: decision makers feel a) they can lose but not gain, b) the situation is not controllable by them, c) they are underqualified, and/or d) the issue is personally aversive. Threats and opportunities both share the characteristics of having high stakes, high pressure, high difficulty, and high priority. Ambiguous information is more likely to be interpreted as threat (Jackson and Dutton 1988).

It is easy to understand how environmental issues can be constructed as threats. Environmental regulations and responses to environmental groups seem to involve costs with no possibility of gains (though Porter and van der Linde 1995, provide several examples of situations where costs were overestimated and were more than offset by unforeseen gains). Firms who face new regulatory requirements may feel both underqualified to address them and resentful at the constraints on their own control.

When individuals and groups view situations as threatening, they constrict information acquisition and processing and revert to over-learned behaviors and routines (Smart and Vertinsky

1977; Staw et al. 1981; Weick 1993). Firm leaders who see environmental protection as a threat will focus on external signals from those stakeholders on whom they perceive the firm's economic position or social legitimacy to depend most, often ignoring other sources. To maintain their environmental inaction, they may engage in resistance strategies such as defiance, avoidance, lobbying, bargaining or others (Oliver 1991). If the threat comes from regulation, firm leaders may not comply. Alternatively, they may engage in minimal compliance, committing to action publicly but purposely not allocating sufficient resources to meet compliance targets. They may undertake political, legal or public relations actions designed to reduce pressures for environmental response. If the threat comes from resource shortages, they may attempt to secure and hoard scarce resources instead of focusing on ways to cut back use. Sanchez (1997) notes that firms perceiving the environment to be a threat are less likely to engage in innovation to counteract the threat.

Proposition 2a: When the leader views demands for environmental protection as a threat, the firm will tend to invest in avoidance activities rather than take actions to protect the environment.

Proposition 2b: When the leader views demands for environmental protection as a threat, the firm will tend to place environmental responsibility within the legal or public relations function.

Frame 3: The environment is a technical issue. When environmental protection is seen by the leader as a technical issue, firms treat it as any other operational problem. Environmental stimuli are treated as relevant. Firms attempt to meet their goals (e.g., compliance with regulatory requirements, better resource utilization) in a least-cost manner. Leaders who see environmental action as a technical issue will attend to regulation, the firms' own technologies and the organizational field for the purpose of identifying least-cost environmental practices which can be adopted. They will delegate environmental responsibilities to a technical specialist function (e.g., an environmental unit), or an outside consultant. The unit will usually be isolated from other functional areas and will focus initially on just-in-time compliance with environmental regulations and end-of-pipe pollution prevention. Isolating the environmental unit from production and line management means that the knowledge required to generate environmental innovation is separated from the responsibility to do it (Porter and van der Linde 1995). While the formation of a specialized unit is likely to create some parochial objectives for environmental action, as long as the firm leader views environmental action

as a technical issue it is likely that the focus of environmental innovation will be on cost reduction/efficiency, and it will be only incremental in nature. As a result, technical efficiencies may be gained but radical innovations are unlikely to be generated because no one is looking for them.

Proposition 3a: When the leader views environmental protection as a technical issue, environmental responsibility will be isolated within a technical business function or outsourced.

Proposition 3b: Firms whose leaders view environmental protection as a technical issue will comply with legislation but will not significantly go beyond compliance requirements.

Proposition 3c: When the leader views environmental protection as a technical issue, innovation in environmental protection is likely to be incremental not radical, and efficiency-focused not sustainability- or market- focused.

Frame 4: The environment is an opportunity. When a leader sees environmental protection as an opportunity, he/she sees a) profitable market niches for environmentally-friendly products or services or b) opportunities to gain social legitimacy from environmental actions. In responding to market opportunities, the competencies, technologies and strategy of the firms are assessed in light of market signals to identify possible means of exploiting green opportunities. Efforts are focused on radical or incremental product or service innovations, with a view to increasing sales. Innovations in materials and processes are sought only if they are visible to consumers. Varadarajan (1992) labeled individuals who hold this frame 'enviropreneurs'. Menon and Menon (1997) suggest that enviropreneurial marketers attempt to create revenue while meeting their economic and social performance objectives. When the leader has this frame, environmental responsibility will be typically embedded first in marketing, R&D and strategic planning roles. Communication of the firm's environmental achievements will be directed primarily and extensively at customers. . In responding to legitimacy opportunities, firms may seek to show a proactive environmental face to the world to give them latitude and credibility with regulators, environmental groups and the public. Environmental leadership may be situated within the public relations department. For both, environmental performance will be excellent in areas that are easily visible to interested observers,

but may be spotty in other, more hidden areas. It is not necessary for leaders who use this frame to personally hold environmental values: they are capitalizing on business opportunities.

Nick Mayhew, Director of Oikus, identifies differences between the principles Shell espouses and its actions in stakeholder consultations and environmental protection. He asks "whether all this work represents an especially sophisticated way for Shell to repair its battered corporate reputation, justify the continuation of its core business-as-usual, and renew its 'license to operate'. He adds "the suspicion lingers that it is more interested in using stakeholder consultation for 'issue management' purposes than for genuinely understanding the impact of its activities and perhaps changing its priorities" (1998: 8).

Proposition 4a: Leaders who view environmental protection as a market opportunity will adopt radical and incremental innovations in products and services. Innovations in materials and processes will be adopted in areas of high salience to customers.

Firms with technological competencies may see regulatory changes as opportunities to develop process technologies that may reduce compliance costs. Such technologies may create immediate competitive advantage or be sold to others. When firms predict that regulatory demands are likely to increase, they may seek to develop technologies that lead to overcompliance so as to preempt rivals.

Proposition 4b: Firms with high technological capabilities and an opportunity frame may invest in technological innovation to meet new or impending regulations. If these firms predict that environmental demands are likely to increase, they may seek to develop technologies that overcomply and thus preempt their rivals.

Proposition 4c: Leaders who view environmental protection as a market or legitimacy opportunity may be inconsistent in their adoption of accepted environmental practices in areas of low salience to customers, regulators and social activists.

Proposition 4d: In firms where leaders view environmental protection as an opportunity, environmental responsibility will be embedded primarily in marketing, public relations, R&D and/or strategic planning roles.

Frame 5: The environment is a societal duty. Leaders who hold frame 5 see being a good environmental corporate citizen as part of their duty to society. The societal duty frame is a process frame: leaders who hold it will begin with good intentions and limited actions, but their cognitive commitment and its tangible result (firm environmental performance) will grow over time. The firm begins a process of questioning environmental values and forming linkages between the environmental unit and other functions within the company. The firm's mission statement and annual reports typically identify commitments to environmental protection. Firm members, including senior managers, may be involved in industry-government task forces on the environment, and in associations promoting environmental standards (e.g., ISO 14000). The environmental unit may be asked to assess the environmental impacts of potential capital investments in the strategic planning process. Environmental responsibility is embedded in most functions within the organization, though it may or may not be incorporated into every job description. As the leader's frame is embedded in the mission statement and enacted in strategy, organizational communications, SOPs and external linkages, environmental values will be diffused and institutionalized within the organization. "Organizations preserve knowledge, behaviors, mental maps, norms and values over time…a cognitive map is shared among managers who constitute the interpretation system" (Daft and Weick 1984:285). Senior managers synthesize and interpret information for the system as a whole.

Organization members' focus on environmental protection will sensitize them to environmental opportunities and improvements. Leaders who see the environment as a societal duty usually overcomply with environmental regulation, and regulation itself is not a principal signal for them. They attend to other members of the organizational field and society to identify the most legitimate environmental practices. Internal institutions are also important signals in determining the legitimacy of environmental programs and in improving the environmental performance of the firm.

Proposition 5a: Leaders who see environmental protection as a societal duty will seek to legitimize environmental values within the organization, explicitly incorporating environmental issues as part of the organizational strategic agenda.

Accepting that environmental issues are important socially leads to questioning environmental values, but not necessarily to adoption of appropriate practices and proactive search for solutions. The questioning process gives rise to the establishment of formal structures specializing in environmental issues within the organization.

Proposition 5b: When leaders see environmental values as a societal priority, they will establish structures within the organization to champion environmental issues.

Often the specific practices that are adopted reflect imitation of other firms or inputs from other stakeholders in the organizational field. Practices receive legitimacy when they are endorsed by industry associations and customers.

Proposition 5c: When leaders see the protection of the environment as a societal duty, they will explore alternative responses and seek legitimacy for their own responses through the organizational field.

Frame 6: The environment as a personal commitment. An entirely different paradigm underlies frame 6: an ecocentric rather than an anthropocentric paradigm (Jennings and Zandbergen 1995; Purser et al. 1995; Shrivastava 1995). Ecocentrism involves a qualitative difference in the way the natural environment with all its components is viewed. Concern for the environment becomes paramount, dominating other values. The leader sees the environment both as a personal and corporate responsibility. Typically, such a total commitment reflects a stage where environmental values are institutionalized. In this stage, proactive protection and enhancement of the environment is programmed into the organization's repertoire of standard operating procedures and behavioral programs. Underlying this cognitive frame is thorough knowledge of the environment and commitment to continuous learning and search for means to enhance the environment. In this

cognitive frame, environmental issues dominate any other. Decisions reflect the predominance of environmental values.

Such an organization will resist economic or other pressures that may hinder the pursuit of environmental goals. The organization will be characterized by constant search for new information about the environment and investment in generating new means to protect the environment.

Proposition 6: Where leaders are personally committed to environmental protection, and such commitment reflects internal organizational institutions, the organization will proactively search for innovative ways to protect and enhance the environment.

Exclusivity of Frames

We do not pretend that these frames are mutually exclusive. For example, firms may respond to new regulation as a threat while treating old regulation as a technical issue. Similarly, pressures from environmental groups for a particular issues may be seen as threatening while customer pressures on another environmental issue may be perceived as an opportunity. A number of variations in frames may well signal an impending frame change[5.] However, as prototypes with fuzzy boundaries, these frames are expected to represent the dominant way in which leaders and firms interpret environmental issues or respond to environmental stimuli. Characteristics of the stimulus or source itself may trigger variations in the evoked cognitive frame.

Frames and the Integrative Model

Returning to our static model of corporate environmental response, we note that the leader's interpretive frame will determine which variables he/she will attend to in making environmental decisions. In frame 1, where the focus is on business as usual, the leader will attend to market signals to identify impacts on profitability. Stimuli regarding environmental protection from the social domain are unlikely to be perceived, since the firm does not consider them relevant. In frame 2, the leader will attend to those stakeholders that control needed resources and are pressuring for environmental action. The firm will attempt to resist the pressures. If the threat is one of resource scarcity, the firm will attempt to compensate.

[5] Frame changes are discussed later in the paper.

In frame 3, the firm will attend to regulations and incentives, and scan the organizational field for practices, taking into consideration its own technologies, competencies and resources. In frame 4, the leader will attend to market opportunities, bearing in mind its strategy, resources, technologies and competencies. In frame 5, the leader will be focused on the societal field to identify what constitutes a normatively legitimate response to the environment. Internal institutions, including organizational norms, values and culture and employees' shared frames will also be considered. In frame 6, the leader scans his or her own personal values for legitimacy, with less concern about social and economic stimuli. Under each frame, political processes, organizational structures and standard operating procedures are both outputs of leaders' resource commitments, and act as constraints on leaders' future actions (Selznick 1957).

DYNAMICS OF GREENING

As we have already indicated, we are interested in fundamental behavioral change that reflects a long-term organizational commitment to protect the natural environment. This process of "greening" is reflected in changes in the institutionalized environmental cognitive frames of organizational leaders. Some of the change is gradual and represents shifts in societal institutions.

There are several long-term trends that suggest that environmental values are likely to receive an increasing priority in most societies. First, the evidence about the fragility of the natural environment is growing. Second, increasing segments of the population are aware of environmental risks and their consequences. Third, as populations are becoming more wealthy, there is a shift to post materialistic value systems which increase the utility derived from socially responsible behavior, as opposed to consumption (Dunlap and Van Liere 1978; Purser et al. 1995). A more abrupt change in organizational institutions can be induced from stakeholders' persistent pressures that result in organizational learning and behavioral change.

Frames are not static: because they are based on experience they are subject to regular updates (Fiske and Linville 1980). Frame-irrelevant information may not be perceived, or may be ignored (Weick 1995). For example, a firm which operates in Frame 1 ('the environment is not the firm's responsibility'), is unlikely to perceive environmental group claims because they are irrelevant. When these claims affect profitability (e.g., through boycotts or lawsuits), the for-

profit firm is more likely to notice. Frame-relevant information will be actively sought, thus sources scanned for information will be those that are relevant to the frame.

Once stimuli are perceived, those that are frame-incongruent will be most attended to (Fiske and Linville 1980). According to Starbuck and Milliken, the basic occasion for new efforts of sensemaking consists of incongruous events that violate perceptual frameworks (1988:52). Frame changes may result. Argyris and Schon (1978) similarly claim that organizational learning occurs when individuals detect mismatches in their environment that disconfirm their mental schemas. Actors will attempt to find the sources of mismatches and identify new strategies to reduce them. If mismatches are intense and negative (e.g., threaten important organizational or personal values and involve a high degree of stress) they may be interpreted as "crises".6 Whether positive or negative, intense interruptions will lead to changes in frames. If mismatches are mild, they may be discounted or ignored. Jackson and Dutton (1988) suggested that threats to an organization might take a long time to become noticed, often building up to crises. Laszlo, et al. noted that "adherence to the classical cognitive maps of the recent past is increasingly counter-productive…it produces shocks and surprises" (1996: 103). If repeated or made salient by others, mismatches can result in incremental frame changes.

Mismatches arise when the firm is misaligned with key elements in the social, economic and/or natural systems. If the investment in environmental protection of the firm results in threats of bankruptcy, the firm may be forced to change its values or exit. Loss of social legitimacy because of negative impacts on the natural environment may threaten the interests of important stakeholders and may result in pressures sufficient to shift the frame. Misalignment of organizational activities to the natural environment may result in resource scarcities (e.g., unsustainable forestry practices may result in wood famine and exit of forest products companies from the scene). Indirectly, natural disasters lead to political pressures for regulation (Shrivastava 1995). Regulatory and social pressures can force leaders to adjust their frames.

Yet leaders will not change the organization unless they notice these pressures. Daft and Weick (1984) suggested that organizational changes entail an ongoing three stage process of scanning, interpreting and learning, with interactions and reciprocal influences among the stages

[6] Crises are a special case for frame dynamics. Firms may revert to over-learned behaviors in a crisis (Staw et al. 1981). If these same behaviors contributed to the crisis initially, the firm may die, or the leader may be replaced. If firm's over-learned behaviors include environmental scanning or other activities supportive of organizational

(Thomas et al. 1993). If the firm is not scanning an area, it will be unable or unwilling to detect and interpret the signals received from that area. Learning does not take place.

Examination of our typology of cognitive frames suggests several likely pathways along which these frames may change over time as a result of external stimuli. These pathways consider the endogenous feedback mechanisms that each frame has. Some frames have built-in mechanisms that encourage movement to another frame; others require exogenous input to facilitate frame change. Below, we describe our expectations with respect to the greening process:

Transition from frame 1. Frame 1 represents a frame of minimal learning. Lack of attention to environmental events and information accompanied by few, if any, actions to protect the environment imply that no organizational learning takes place. Events which increase the salience of environmental issues are key to a shift in the cognitive frames of leaders who do not see the environment as an organizational issue.

Organizational attention may be focused on the environment if an important stakeholder can make the environment an issue. For example, new regulations that impact the organization may lead to shifts to frames 2 or 3. Similarly, significant market opportunities may lead to shifts to frame 4.

Proposition 7a: Negative information about environmental impact is filtered out through cognitive frame 1 and thus has no impact on frame revision.

Proposition 7b: Transition from frame 1 occurs if an important stakeholder introduces environmental issues as key items in the organizational agenda or as part of its negotiations with its environment.

Transition from frame 2 to frame 3 or 4. Firms moving from frame 2 to frame 3 or 4 face considerable coercive pressure from their economic environment. As regulation affecting them becomes more prominent and enforcement more likely, continued avoidance of compliance is less likely. The costs of non-compliance include fines, loss of opportunities to bid on government business, withdrawal of licenses, etc. With continued non-compliance, firms' very existence may be

---

learning, they may respond effectively to environmental crisis and emerge greener than before. In either case, crisis will trigger change.

threatened because of loss in social legitimacy (e.g., a firm may be outlawed or boycotted). If firms do not adjust their frames and consequently their actions, the firm could die, or the leader could be replaced. Pressures from internal stakeholders may induce a frame change. If environmental responsibility is delegated to an environmental unit, the transition to frame 3 begins. If organizational SOPs have built-in scanning mechanisms to prevent rigidities (Smart and Vertinsky 1977), a transition to frame 4 may be more likely. Thomas et al. (1993) suggest that an external scanning orientation is related to the perception of strategic issues as controllable and having the potential for positive gain, consistent with Dutton's (1992) description of opportunity interpretation. If threats become reinterpreted as opportunities, the firm will move to frame 4.

Once a frame change is induced, organizational routines (planning, auditing, budgeting, etc,), can be focused on the domain of environmental action. Adaptation to the environment may occur sooner if a new leader is chosen, since the leader will often be selected based on the compatibility of his/her frame with the demands of the business environment.

Proposition 8: A persistent exposure to environmental threats may lead to reexamination of the resistance stance of the organization (frame 2). If a unit specializing in environmental matters exists, the issue will be redefined as a technical issue (frame 3). If entrepreneurial values permeate the organizations, a move to frame 4 is likely.

Transition to frame 4. Often the development of technical abilities to comply with regulation provides the organization with new market opportunities. Entrepreneurially oriented organizations may discover the protection of the environment offers new business opportunities. Generally, strong market signals (the existence of high green premia or improved market access due to eco-labels) will encourage entrepreneurial environmental organizations to innovate. Alternatively, impending increases in regulation may encourage some firms to innovate quickly in order to gain negotiating leverage with regulators or advantage over competitors. The exploitation of environmental opportunities does not depend on value commitments, but may encourage the development of such commitment as the salience of environmental opportunities and issues increases. Shifts to frame 4 are most likely from frame 3, but could be realized also from frames 1 and 2.

Proposition 9a: Salient opportunities for gaining competitive advantage from innovation in environmental protection promote transition to frame 4.

Proposition 9b: Organizations that commit substantial resources to environmental protection are likely to adopt frame 5, i.e., a shift in values will reduce any gap between actions and values.

Transition from frame 3 to frame 5. As firms implement environmental activities in stage 3 to comply with regulation, a number of influences begin to build up which help to move firms incrementally to activities consistent with frame 5. These forces impact the salience of environmental issues, the mimetic and normative pressures that arise from the organizational field, the attitudes of firm members, and gradually, the internal institutional structures. A change in institutional structures exerts normative pressures on firm leaders and plays a significant role in facilitating implementation.

Compliance with environmental regulations usually requires firms to engage in ongoing measurement of their impacts on the environment. By measuring, the salience of environmental impacts is increased (Porter and van der Linde 1995). Measures become part of job descriptions and standard operating procedures. Those who measure will communicate measurements to other firm members either because they are required to, or to increase their own visibility within the organization. This communication raises the salience of environmental issues to others within the organization.

Taking actions to protect the environment has a number of effects. First, when individuals without pro-environmental attitudes have to enact pro-environmental behaviors, cognitive dissonance is created (Festinger 1957) and retrospective sensemaking may take place (Weick 1995). Individuals will feel pressure to adjust their attitudes to match their behavior, such that they may come to believe that dealing with environmental issues is a necessary and important part of doing business. Second, dealing with environmental issues becomes habitual and taken for granted. Once routines become institutionalized, incremental changes in those routines are more easily established, since individuals and resources are already committed to dealing with environmental issues. Learning curve effects improve the efficiencies of environmental protection, making it more attractive (Porter and van der Linde 1995). Third, the commitment of resources to environmental programs brings those programs into the mainstream of business activity as items to be budgeted for

and objectives to be met in strategic plans. If costs of compliance become large and maintaining compliance becomes increasingly complex, the strategic focus will shift to incorporate environmental protection issues (Dechant and Altman 1994; Douglas and Judge 1995). Pitney Bowes, for example, found compliance requirements were so complex and changing that they were never sure if they were fully compliant or not. To counter the complexity, they developed a pro-active, comprehensive approach to product design (Dechant and Altman 1994).

Fourth, as other firms in the organizational field also comply with legislation, they will generate externalities through their innovation. As these become observed, mimetic isomorphism is likely to take place as firms evaluate the efficiency of their response programs, and consultants and boundary spanners diffuse innovations. Fifth, members of the organizational field are likely to communicate and cooperate in the responses to regulation. As these are usually considered cost, not strategic items, firms will be more willing to share information. As regulations may be perceived as common threats, firms are more likely to band together to attempt to deal with these problems. This cooperation may take the form of joint R&D[7], joint lobbying or diffusion of innovations, and will lead to institutionalization of the organizational field over time as firms develop consensus around which innovations are acceptable, proper and right (Berger and Luckman 1967).

Proposition 10: Institutionalization of environmental protection in the organizational field increases the likelihood of transition to frame 5.

Transitions to frame 6. While movements to frame 3 can be coerced and movements to and within frame 5 can be subconscious and taken for granted, movements to frame 6 involve a paradigmatic shift. The shift may be gradual, representing the culmination of a prolonged questioning process, or it may reflect a sudden conversion of beliefs (enlightenment). Because it is a fundamental shift in view, it is more difficult to reverse.

Proposition 11: The total commitment involving inseparable personal and organizational commitments to the environment characterizing frame 6 makes transition to it almost irreversible.

[7] In fact, 36% of R&D consortia registered under the NCRA or NCRPA in the U.S. are formed for the purpose of environmental or safety compliance or improvement (Nakamura et al. 1997).

Pressures (economic or social) on the organization to violate its environmental commitment will result in exit (e.g., shift in product mix, exit of members or death of the firm).

While our discussion of shifts in frames focused on increasing organizational commitment to the environment, clearly some organizations may reverse this path some of the time. Recessions, international conflicts about environmental protection and equity of wealth distribution (such as those evident in the Rio Summit) and scientific public debates about environmental risks are but a few of the factors which may slow or even temporarily reverse the development of strong societal commitment to protect the environment. Firms may misinterpret signals because of a noisy economic and institutional environment and reduce instead of increase their commitment to environmental protection. Competition may eliminate green premia and weaken market signals of economic environmental opportunities. Deteriorating economic environments may lead to reversal of previous corporate commitments to protect the environment. We believe, however, that in the long run, a greening process is inevitable. Without it, our social and economic institutions could not be sustained.

DISCUSSION

We have synthesized economic, sociological and psychological theories to develop an integrative conceptual model of CER. The model describes interactions at three levels: individual, organizational and societal. The key concept that bridges system level interaction and individual to system interaction is the concept of cognitive frame. Commitment to environmental values is an important element of the frame. An increase in such commitment, and the evolution of an institutionalized frame reflecting it, is a key to long term corporate environmental performance.

The external environments in our model are described in terms of fast and slow effects. Economic and stakeholder pressures are variables with fast effects while those describing institutional processes have slow effects. This dynamic structure, underlying our model, permits us to describe how CER and corporate greening respond both to general changes in the business environment, to the particular histories and attributes of the firm and to the idiosyncratic characteristics of the leader. While we conclude that corporate greening is inevitable, we suggest that the path to it may not necessarily be monotonic.

Synthesizing the three disciplinary perspectives into an integrative model allows us to capture the advantages of the Kantian multi-paradigm approach (see e.g., Allison 1971), while offering at the same time a better picture of the interactions between variables across paradigms. Thus we can elaborate propositions that reflect interactions across levels and between economic and social variables. Because we constructed a process model, we can also identify levers for change, which would be useful to policy makers.

To the environmental literature, our analysis offers a way to simplify the complex relationships among corporate environmental response and its many determinants. Because one's reality depends on one's perception, there is no reason to believe that all decision-makers would be influenced by the same variables. We identify which variables will be attended to by whom and when. While valuing the interpretive tradition, we open the door for useful abstraction and empirical tractability via the cognitive frame concept. Because our frames are grounded in prior empirical findings, we have preliminary support for them.

In this paper we have taken the concept of cognitive frames into a strategy domain that is morally complex and value-laden. Of interest is the close parallel that exists (not by design) between our frames and Kohlberg's moral development theory (1984). Kohlberg identified three moral stages with two steps in each. Individuals operating in the preconventional stage attempt to avoid pain or get pleasure. In the conventional stage, individuals first go along with the group, and second, follow laws because they understand that laws are made by the group. In the final, postconventional stage, individuals first question laws and consider the principles behind them: morality takes on absolute standards. The most highly morally developed individuals in the postconventional stage make judgements on the basis of their own individual principles of conscience.

Our frame 1 does not take a moral stance with respect to the environment, and thus does not map onto Kohlberg's stages. However, frame 2 (threat) can be seen as a preconventional effort to 'avoid pain', and frame 4 (opportunity) can be seen as attempting to 'get pleasure'. Frame 3 (technical issue) has firms both adopting practices from the field and complying with regulations, (going along with the group and following laws). The societal duty frame (frame 5) corresponds to Kohlberg's postconventional absolute morality phase, while frame 6 (personal commitment) corresponds to Kohlberg's individual principles of conscience phase.

When a decision has a large moral/ethical component, perhaps one's overarching moral stage of development will figure prominently in the development of one's cognitive frame. In organizational behaviour, if the frame of the leader is paramount in creating the framework for the organization, leaders at a higher stage of moral development may shift, by degrees, the moral development of their employees. Of course, the opposite may also hold. Kohlberg believed that individuals experience moral growth when they interact with others at a higher level. Those at the higher level of moral development have the influential edge because they've already experienced and refuted for themselves the lower level arguments (as cited by Laszlo et al. 1996). However, in organizations with hierarchical structures, the influence edge is more likely to go the leader, who can interpret the stimuli, set the agenda, and allocate reinforcement.

Abstract moral development may be concretized in more issue-oriented cognitive frames. "Morality is the language in which social cognitive maps are expressed," Laszlo et al. (1996: 59) note. Frames are more open than morals to social re-construction through organizations, the media and interactions with others, yet one's moral development will change with changes in one's cognitive frame. Given that individuals exist daily in the context of organizations, organizations' cognitive frames should be subject to greater scrutiny in the environmental domain. Laszlo et al. (1996) suggest that overlapping individual cognitive maps project a collective map which can have a substantial effect on a culture as a whole. In the context of the natural environment, a collective projection could indeed affect the future of our world.

Empirical testing

The complexity and scope of our model imposes some special requirements on plans to test and refine it. The employment of multiple methodologies would be most effective. While the static aspects of the model could be assessed via questionnaires, the study of processes and dynamic elements would be better served by longitudinal case studies involving both intensive interview programs and surveys. Because managers' interpretations can be assessed through their talk (Clark and Jennings 1997), analysis of corporate documents and communications would also be a way to assess frames. The case studies provide the opportunity to refine the model to incorporate the effects of the specific context (geographical and organizational), while surveys of randomly selected populations of firms will allow the testing of general inferences derived from

the model. The complex pathways of the model suggest the use of structural equation modeling for testing it statistically.

There is a growing consensus that the path of development of the global economy is unsustainable. Governments and markets seem to be failing to bring about the radical change that is necessary to correct the path. The solution is a change in voluntary corporate behavior: i.e., a process of corporate greening[8]. This paper provides a framework for future theoretical and empirical research that will increase our understanding of the process of greening and help policy makers and civil society develop strategies to accelerate it.

[8] We are not advocating reductions in regulations or a failure to regulate. Porter and van der Linde (1995) emphasize the importance of regulation to overcome organizational inertia, but emphasize the importance of legislation that invites firm-level innovation instead of suppressing it. These authors make a number of suggestions about appropriate regulation.

REFERENCES

Allison, G. T. (1971). *Essence of decision: Explaining the Cuban missile crisis.* Boston: Little, Brown.

Andersson, L. (1998). Framing green issues as greenbacks. *In* S.J. Havlovic (ed.), *Academy of management best papers proceedings.* Academy of Management.

Argyris, C. and Schon, D. (1978). *Organizational learning: A theory of action perspective.* Reading, MA: Addison Wesley.

Arora, S. and Cason, T. N. (1996). Why do firms volunteer to exceed environmental regulations? Understanding participation in EPA's 33/50 program. *Land Economics,* 72: 413–432.

Ballantyne, R. and Gerber, R. (1994). Managerial conception of environmental responsibility. *The Environmentalist,* 14: 47–56.

Baumol, W. and Oates, W. (1988). *The theory of environmental policy*. Cambridge, U.K.: Cambridge University Press.

Berger, P. and Luckman, T. (1967). *Social construction of reality.* New York: Anchor Books.

Bowman, J.B. and Davis, C. (1989). Industry and the environment: Chief executive officer attitudes, 1976 and 1986. *Environmental Management,* 13: 243–249.

Clark, T., Varadarajan, P. R. and Pride, W. M. (1994). Environmental management: The construct and research propositions. *Journal of Business Research,* 29: 23–38.

Clark, V. and Jennings, P.D. (1997). Talking about the natural environment: A means for deinstitutionalization? *American Behavioral Scientist,* 40: 454–464.

Daft, R. and Weick, K. (1984). Toward a model of organizations as interpretation systems. *Academy of Management Review,* 9: 284–296.

DeCanio, S. J. (1994). Why do profitable energy-saving projects languish? *Journal of General Management,* 20: 62–71.

Dechant, K. and Altman, B. (1994). Environmental leadership: From compliance to competitive advantage. *Academy of Management Executive,* 8 (3): 7–27.

DiMaggio, P. and Powell, W. (1983). The iron cage revisited: institutional isomorphism, and collective rationality in organizational fields, *American Sociological Review,* 58: 147–160.

DiMaggio, P. and Powell, W. (1991). Introduction. pp. 1–38 *in* W. Powell and P. DiMaggio (eds.), *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press.

Douglas, T. J. and Judge, W. Q., Jr. (1995). Integrating the natural environment into the strategic planning process: An empirical assessment. *Academy of Management Journal,* 38: 475–479.

Dunlap, R. E. and van Liere, K. D. (1978). The new environmental paradigm. *Journal of Environmental Education,* 9: 10–19.

Dutton, J.E. (1992). The making of organizational opportunities: An interpretive pathway to organizational change. pp. 195–226 *in* B.M. Staw, and L.L. Cummings, (eds.), *Research in organizational behavior (15)*. Greenwich, CT: JAI Press.

Eagly, A. H., and Chaiken, S. (1993). *The psychology of attitudes.* Orlando, FL: Harcourt Brace Jovanovich.

Fiske, Susan T. and Linville, Patricia W. (1980). What does the schema concept buy us? *Personality and Social Pscyhology Bulletin,* 6: 543–557.

Festinger, L. (1957). *A theory of cognitive dissonance.* Stanford, CA: Stanford University Press.

Flannery, B. L. and May, D. R. (1994). Prominent factors influencing environmental activities: Application of the environmental leadership model. *Leadership Quarterly,* 5: 201–221.

Florida, R. (1996). The move to environmentally conscious manufacturing. *California Management Review,* 39(1): 80–105.

Gladwin, Thomas N. (1993). The meaning of greening: a plea for organizational theory. *In* Fischer K. and Johan Schot (eds.), *Environmental strategies for industry.* Washington, DC: Island Press.

Henriques, I. and Sadorsky, P. (1996). The determinants of an environmentally responsive firm: An empirical approach. *Journal of Environmental Economics and Management,* 30: 381–395.

Hoffman, A.J. (1997). *From heresy to dogma: An institutional history of corporate environmentalism.* San Francisco, CA: New Lexington Press.

Jackson, S.E. and Dutton, J.E. (1988). Discerning threats and opportunities. *Administrative Science Quarterly*, 33, 370–387.

Jennings, P. D. and Zandbergen, P. A. (1995). Ecologically sustainable organizations: An institutional approach. *Academy of Management Review,* 20: 1015–1052.

Jennings, P. D., Zandbergen, P A., and Martens, M.L. (1997). *The adoption of environmental practices by organizations in one ecobasin: Variations in local interpretation.* Paper presented at the annual meeting of the Academy of Management, Boston.

Kitayama, S., Markus, H.R., Matsumoto, H. and Norasukkunkit, V. (1997). Individual and collective processes as construction of the self: Self-enhancement in the United States and self-criticism in Japan. *Journal of Personality and Social Psychology*, 72: 1245–1267.

Kneese, A., and Schultz, C. (1975). *Pollution, prices, and public policy*. Washington, DC: The Brookings Institute.

Kohlberg, L. (1984). The Psychology of Moral Development. New York: Harper and Row.

Kraatz, M.S. and Moore, J.H. (1998). Executive migration and institutional change. *In* S.J. Havlovic (ed.), *Academy of Management Best Papers Proceedings.* Academy of Management.

Laszlo, E., Artigiani, R., Combs, A., Csanyi, V. (1996). *Human cognitive maps: Past, present and future.* Westport, CT: Praeger Publishers.

MacNaghten, P. and Urry, J. (1995). Towards a sociology of nature. *The Journal of the British Sociological Association,* 29: 203–20.

Mayhew, N. (1998). Trouble with the triple bottom line. *Financial Times,* August 10, 1998: 8.

McKinsey and Company (1991). *The corporate response to the environmental challenge.* London: McKinsey and Company.

Menon, A. and Menon, A. (1997). Enviropreneurial marketing strategy: The emergence of corporate environmentalism as market strategy. *Journal of Marketing,* 61: 51–67.

Meyer, J. and Rowan, B. (1977). Institutionalized organizations: formal structure as myth and ceremony. *American Journal of Sociology,* 83: 340–363.

Nakamura, M., Vertinsky, I.B. and Zietsma, C. (1997). Does culture matter in inter-firm cooperation? Research consortia in Japan and the US. *Managerial and Decision Economics,* 18, 153–175.

Nasi, J., Nasi, S., Phillips, N. and Zyglidopoulos, S. (1997). The evolution of corporate social responsiveness. *Business and Society,* 36: 296–321.

Oliver, C. (1991). Strategic responses to institutional process. *Academy of Management Review,* 16: 145–179.

Oliver, C. (1992). The antecedents of deinstitutionalization. *Organization Studies,* 13: 563–588.

Piasecki, B. (1995). *Corporate environmental strategy: The avalanche of change since Bhopal.* New York: John Wiley and Sons Inc.

Pfeffer, J. and Salancik, G. R. (1978). *The external control of organizations.* New York: Random House.

Porter, M.E. and van der Linde, C. (1995). Green and competitive: Ending the stalemate. *Harvard Business Review,* 5: 120–134.

Portugal, E. and Yukl, G. (1994). Perspectives on environmental leadership. *Leadership Quarterly,* 5: 271–276.

Post, M. E. and Altman, B. W. (1992). Models of corporate greening: How corporate social policy and organizational learning inform leading-edge environmental management. *Markets, Policies and Social Performance,* 13: 3–29.

Purser, R. E., Park, C. and Montuori, A. (1995). Limits to anthropocentrism: Toward an ecocentric organization paradigm? *Academy of Management Review,* 20: 1053–1089.

Raizada, R. (1998). *Corporate responses to government and environmental group actions designed to protect the environment.* Unpublished doctoral dissertation, University of British Columbia, Vancouver, B.C.

Roht-Arriaza, N. (1997). Environmental management systems and environmental protection: Can ISO 14001 be useful within the context of APEC. *Journal of Environment and Development,* 6 (3): 292–316.

Rugman, A.M., Kirton, J. and Soloway, J.A. (1997). NAFTA, environmental regulations and Canadian competitiveness. *Journal of World Trade,* 31(4): 129–144.

Rugman, A.M. and Verbeke, A. (1998). Corporate strategies and environmental regulations: An organizing framework. *Strategic Management Journal,* 19: 363–375.

Sanchez, C. M. (1997). Environmental regulation and firm-level innovation: The moderating effects of organizational and individual-level variables. *Business and Society,* 36 (2): 140–68.

Selznick, P. (1957). *Leadership in Administration.* Evanston, IL: Row, Peterson and Company.

Sharma, S., Pablo, A. and Vredenburg, H. (In Press). Corporate environmental responsiveness strategies: The role of issue interpretation and organizational context. *Journal of Applied Behavioral Science.*

Shrivastava, P. (1995). The role of corporations in achieving ecological sustainability. *Academy of Management Review,* 20: 936–960.

Smart, C. and Vertinsky, I. (1977). Designs for crisis decision units. *Administrative Science Quarterly,* 22: 640–657.

Stanbury, W.T. and Vertinsky, I.B. (1997). Boycotts in conflicts over forestry issues: the case of Clayoquot Sound. *Commonwealth Forestry Review,* 76 (1): 18–24.

Starbuck, W. H. and Milliken, F. J. (1988). Executive's perceptual filters: What they notice and how they make sense. pp. 35–65 *in* D.C. Hambrick (ed.), *The executive effect: Concepts and methods for studying top managers*. Greenwich, CT: JAI.

Starik, M. (1995). Should trees have managerial standing? Toward stakeholder status for non-human nature. *Journal of Business Ethics,* 14: 207–217.

Stafford, E. R. and Hartman, C. H. (1996). Green Alliances: Strategic Relations Between Businesses and Environmental Groups. *Business Horizons,* March–April, 50–59.

Staw, B., Sandelands, L., and Dutton, J. (1981). Threat rigidity effects in organizational behavior: A multilevel analysis. *Administrative Science Quarterly*, 26: 501–524.

Stead, W. E. and Stead, J.G. (1992). *Management for a Small Planet: Strategic Decision Making and the Environment*, Thousand Oaks, CA: Sage Publications.

Thomas, J.B., Clark, S.M., and Gioia, D. A. (1993). Strategic sensemaking and organizational performance: Linkages among scanning, interpretation, action and outcomes. *Academy of Management Journal,* 36, 239–270.

Tolbert, P. S. and Zucker, L. G. (1996). The institutionalization of institutional theory. pp. 175–90 *in* S. R. Clegg, C. Hardy, and W. R. Nord (eds.), *Handbook of organization studies*. London: Sage.

UNCTAD. (1993). *Environmental management in transnational corporations: Report on the benchmark corporate environmental survey*. New York: United Nations Conference on Trade and Development, Programme on Transnational Corporations.

van der Linde, C. (1993). The micro-economic implications of environmental regulation: A preliminary framework. In OECD, *Environmental policies and industrial competitiveness:* 69–77. Paris.

Varadarajan, P. R. (1992). Marketing's contribution to strategy: The view from a different looking glass. *Journal of the Academy of Marketing Science,* 20: 323–43.

Weick, K.E. (1995). *Sensemaking in organizations.* London: Sage Publications.

Weick, K.E. (1993). The collapse of sensemaking in organizations: The Mann Gulch disaster. *Administrative Science Quarterly,* 38: 628–652.

Welford, R. (1995). *Environmental strategy and sustainable development, the corporate challenge for the 21st century*. New York: Routledge.

Williams, H., Medhurst, J. and Drew, K. (1993). Corporate strategies for a sustainable future. pp. 117–147 *in* Fischer, K. and Schot, J. (eds.), *Environmental strategies for industry*. Washington, DC: Island Press.

Winn, M. (1995). Corporate leadership and politics for the natural environment. *In* D. Collins and M. Starik (eds.), *Sustaining the natural environment: Empirical studies on the interface between nature and organizations.* Greenwich, Connecticut and London, England: JAI Press, Inc.

Zhang, W. (1997). *Environmental policy and corporate greening in China.* Unpublished doctoral dissertation, University of British Columbia, Vancouver, B.C.