THE FORMATION OF GREEN STRATEGIES IN CHINESE FIRMS: MATCHING CORPORATE ENVIRONMENTAL RESPONSES AND INDIVIDUAL PRINCIPLES

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This study examines how Chinese firms began responding to worsening environmental concerns in the late 1990s. Combining predictions from control theory, escalation of commitment, and goal theory, we seek to explain how leaders' cognitions shape the formation of novel responses to the value-laden issue of corporate greening. We propose an iterative model that links leaders' principles with corporate actions and test it using survey data gathered from 360 firms. The model views strategy organically, as a set of adaptive goals and behaviors, and highlights the role of systemic and local feedback loops in strategy formation. We find that top executives who champion new strategic initiatives monitor early success or failure, and adjust their efforts to match early performance feedback. Perceptions of satisfactory performance strengthen leaders' efforts towards their initial target, while perceptions of unsatisfactory performance diminish them. This feedback relationship is invariant throughout favorable or unfavorable expectancies of success, contrary to the contingent prediction of control theory. The model also examines how top-down and bottom-up strategic initiatives combine to help firms maintain a positive momentum of change when champions' efforts decline in the face of premature failure signals. Copyright © 2004 John Wiley & Sons, Ltd.

INTRODUCTION

The cognitive-managerial model of strategic decision-making portrays top managers as limited information processors, who follow implicit theories distilled from prior experience (Abelson and Black, 1986; Nisbett and Ross, 1980). These collections of naïve assumptions and personal principles provide simplified but 'workable versions of reality' (Gioia and Sims, 1986; Weick, 1979) which guide scanning and interpretation of new information (Thomas and McDaniel, 1990; White and Carlston, 1983), help structure and retrieve accumulated knowledge (Fiske and Taylor, 1984), influence decision-making processes (Hitt and Tyler, 1991; Melone, 1994; Walsh, 1995), and shape the direction, pace, and effectiveness of strategic responses (Chaganti and Sambharya, 1987; Dutton and Duncan, 1987; Dutton, Fahey, and Narayanan, 1983; Thomas, Clark, and Gioia, 1993; Ginsberg and Venkatraman, 1992).

Managerial cognitions grow deeper and more refined as managers cope with various environmental stimuli (Chattopadhyay *et al.*, 1999). Unexpected problems encourage simulations of alternative solutions, improvisation, and experimentation (Lurigio and Carroll, 1985; Taylor and Pham, 1996). Frequent exposure to new strategic challenges strengthens the link between choice and action (Barr, Stimpert, and Huff, 1992). Iterations between goal articulation and resource allocation decisions foster incremental changes in top management's cognitions (Noda and Bower, 1996). Feedback consistent with prior cognitive frames enforces the status quo and escalates commitment to the chosen strategic path. However, divergent feedback often propels firms onto new strategic trajectories by signaling more promising avenues for change, refreshing leaders' cognitive frames, and de-escalating resource allocations to prior decisions (Noda and Bower, 1996).

Feedback molds strategic responses, guides corporate actions, and accelerates organizational renewal (Barr *et al.*, 1992:34; Noda and Bower, 1996). However, despite their importance, performance feedback processes remain largely understudied (Ashford and Tsui, 1991; Vaara, 2002). Seeking, absorbing, and reacting to feedback is particularly critical during strategy formation, when organizations struggle with new, ambiguous issues, with uncertain consequences (Thomas *et al.*, 1993). Under these circumstances, searches for effective solutions often require '*output-based* rather than *behavior-based* control' (Sharma, 2000: 685, emphases added). This study fills an important gap in the strategic process literature by investigating how the feedback loops between action and cognition across organizational levels influence strategy formation in response to new, value-laden strategic issues (Chakravarthy and Doz, 1992; Papadakis, Lioukas, and Chambers, 1998; Rajagopalan, Rasheed, and Data, 1997). It combines the predictions of control theory, research on escalation of commitment (Staw, 1981; Staw and Ross, 1978, 1987), and goal theory (Kruglanski, 1996) to model how feedback from early strategic decisions influences subsequent goal pursuit. The study also examines how leaders' personal beliefs and goals trickle down through organizational layers, inspiring increasingly specific actions, and how organizational initiatives stream back up to shape future responses. We examine how green strategies were launched in

late 1990s' China despite abysmal environmental records, conflicting regulatory pressures, extremely scarce resources, and insufficient technical capabilities (Zhang *et al.*, 1999; World Bank, 1997). We show that precocious strategic moves were inspired by top managers with strong ecological stewardship. They formulated new environmental strategies and then coped with performance discrepancies. We also investigate to what extent the emergence, implementation, sustenance, and renewal of green strategies proved sensitive to several internal constituencies and external events.

THEORY

The study starts by modeling the formation of new strategies according to the main precepts of control theory (Carver and Scheier, 1982). It specifies how champions sequentially translate their personal beliefs and goals into increasingly specific corporate responses. Next, we discuss how the perceived success or failure of newly adopted environmental strategies remolds champions' efforts towards the initial goals. Control theory predicts an 'expectancy watershed'—champions intensify efforts to cope with unsatisfactory performance as long as their expectancy of success remains favorable, but withdraw effort when their expectancy of success turns unfavorable. However, it makes few predictions regarding the origin, sign, or strength of this expectancy.

Two other lines of research—escalation of commitment (Staw and Ross, 1987; Whyte, 1986, 1991) and goal theory (Kruglanski, 1996; Kruglanski and Jaffe, 1988)—inform the issue, but take opposite sides. The former suggests that managers maintain positive expectancies of success, even in the face of failure, and escalate commitment to a prior course of action (Moon, 2001). The latter suggests that expectancies are highly sensitive to performance signals and co-vary with perceived success or failure. Success entices stronger efforts and raises the initial targets, whereas failure triggers withdrawal of effort toward the initial goals or motivates easier goals. We combine and extend the predictions of these three theories to articulate alternative levers through which early performance feedback may modify strategic choices. Last, we examine the role of different hierarchical levels in strategy formation, and discuss how individual leaders, the upper echelons, and organizational

members can accelerate, sustain, or inhibit the adoption of new strategic responses.

Control theory

Control theory describes a self-regulation process. Initial goals are translated into increasingly specific corporate responses and adjust gradually by incorporating performance feedback (Carver, 1979; Carver and Scheier, 1981a, 1981b, 1982; Powers, 1973a; Schank and Abelson, 1977). Decisions cascade off a general target (a 'standard reference value', Carver and Scheier, 1981a, 1981b). This target guides the formulation of subgoals and concrete behavioral acts at successive hierarchical levels. A series of nested feedback loops help match goals and actions across neighboring hierarchical levels. Local discrepancies can be identified and corrected by comparing how closely behaviors have met the goals set at the immediately superior level in the hierarchy (Powers, 1973a, 1973b). Undetected or uncorrected mismatches trickle down and create a discrepancy between the intended and achieved outcomes. This systematic discrepancy can be assessed and resolved after each complete iteration.

Figure 1 customizes the predictions of control theory to the formation of new strategic responses. Descending through the model discussed by Carver and Scheier (1982), we suggest that personal values and principles inspire early moves by issue champions (Dutton *et al.*, 1983; Ramus and Steger, 2000). Their initiatives are endorsed, detailed, or modified at successive hierarchical levels. Champions monitor overall performance and correct system-level mismatches between initial targets and feasible outcomes. Upper echelons, functional specialists, and organizational members gradually refine strategic responses by matching goals and actions against their immediately neighboring levels in the organizational hierarchy.

Systematic feedback

The 'expectancy watershed'

Control theory makes a contingent prediction regarding systematic adjustments between initial goals and overall performance (Carver and Scheier, 1982). Perceived discrepancies activate two distinct types of adjustments, depending on the expectancy of success. If the expectancy of success for the initial target remains high after a complete

iteration, it triggers a disturbance-reducing process. The original target is maintained. Behaviors adjust to remedy unsatisfactory performance. Failure reinforces efforts to achieve the initial target. In short, favorable expectancy of success triggers a negative performance feedback loop. Alternatively, if the iteration significantly diminishes the expectancy of success, it elicits a goal assessment process (Carver and Scheier, 1981a, 1981b, 1982). The original target is revised to reflect more accurately the range of feasible outcomes (Simon, 1976). Failure discourages effort towards the initial target. Thus, unfavorable expectancy of success triggers a positive performance feedback loop.

In control theory, the expectancy of success moderates the influence of performance feedback on the initial target. This expectancy acts 'as a "watershed", separating further efforts from the abandonment of effort' (Carver and Scheier, 1981b: 122). Favorable expectancies motivate renewed pushes towards the initial target, whereas unfavorable expectancies lead to downward revisions in the initial target or early withdrawal. Whyte, Saks, and Hook (1997: 416) suggest that 'discrepancies between goals and achievements are either motivating or deflating depending upon people's perceived capabilities to attain their objectives'. High self-efficacy inflates the expected probability of success in subsequent decisions and escalates commitment to a chosen course of action. Low self-efficacy deflates the expectancy of success and de-escalates pursuit of prior goals.

> *Hypothesis 1a: The expectancy of success moderates the association between perceived performance and leader's commitment to environmental initiatives.*

Two distinct theories further inform the role of expectancy in shaping reactions to performance feedback. On the one hand, escalation of commitment argues that champions maintain a favorable expectancy of success regardless of performance feedback. When confronted with negative feedback, efforts increase to meet their initial target (Staw and Ross, 1987; Whyte, 1986, 1991; Moon, 2001). On the other hand, goal theory suggests that success and failure signals reset champions' expectations in future trials—failure reduces and success amplifies initial expectancy. Feasible outcomes anchor future choices, and initial targets
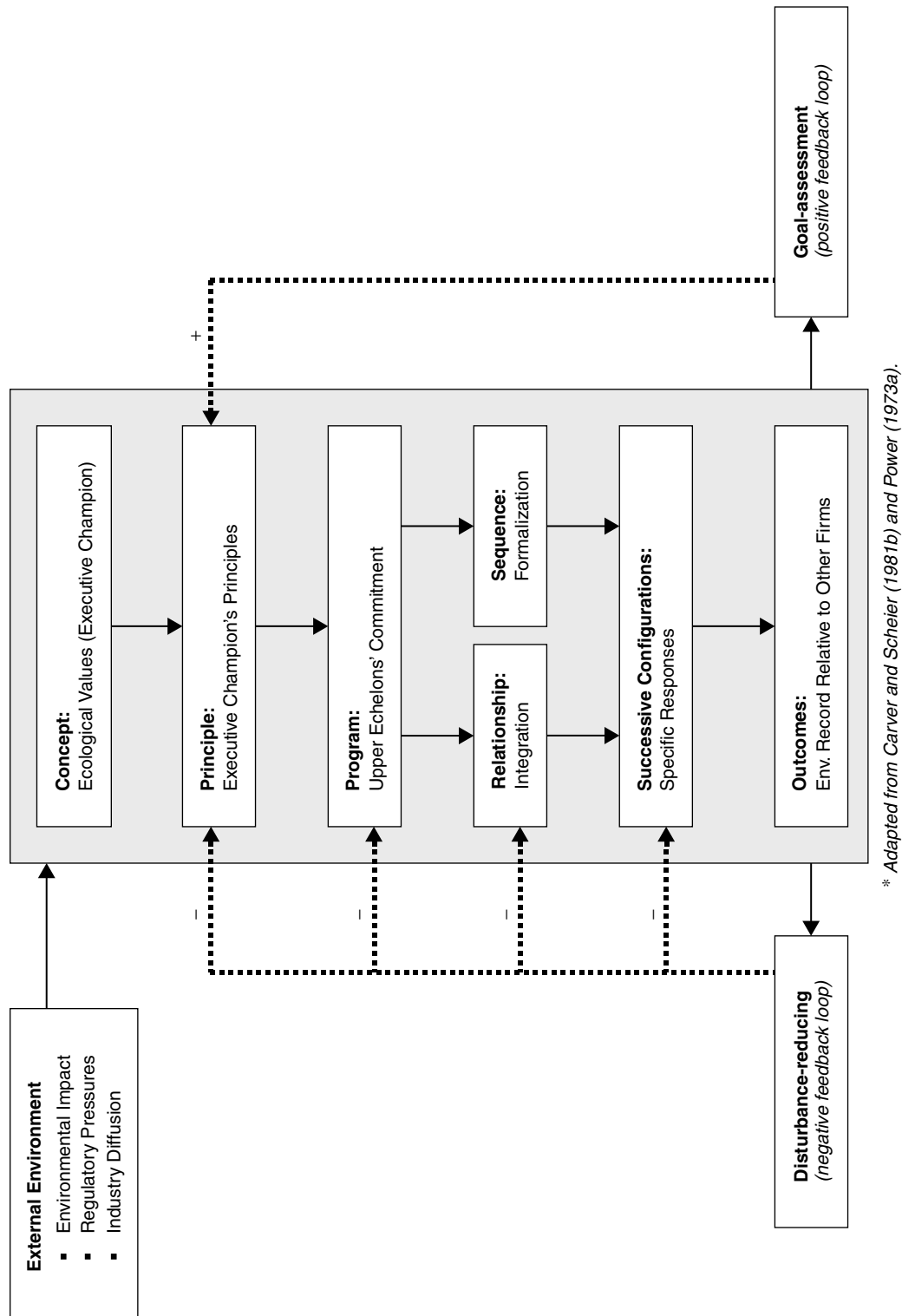
Figure 1.   Theoretical model (Adapted from Carver and Scheier, 1981b, and Power, 1973a

* *Adapted from Carver and Scheier (1981b) and Power (1973a).*

adjust upwards or downwards in response to performance feedback (Kruglanski, 1996). We review these two predictions below.

Escalation of commitment

Individual decision-makers often maintain a positive outlook on their ability to achieve the desired outcome and stick to their choice despite negative performance feedback. They may derive psychological utility from self-justification (Staw, 1981; Staw and Ross, 1978). They could also be blinded by sunk costs—'too much invested to quit' (Moon, 2001; Whyte *et al.*, 1997) or lured by the illusion of imminent project completion (Moon, 2001). Whyte (1986: 319) has also suggested that, even without a direct 'culpability on the part of the decision maker for the initial failed outcomes,' new decisions bear their mark. A stream of prior failures can frame the decision at hand as a choice among losses, stimulating further risk-taking and leading to suboptimal decisions. Bateman and Zeithaml (1989) have found that failure feedback triggers higher levels of effort and greater resource allocations than success feedback. Empirical evidence also suggests that leaders are more likely to increase their commitment to prior decisions when chosen strategies did not achieve the intended results (Kahneman, Slovic, and Tversky, 1982; Nisbett and Ross, 1980; Fiske and Taylor, 1984) than when these strategies proved successful (Staw, 1981).

> *Hypothesis 1b: There is a negative association between perceived unsatisfactory performance and leaders' level of commitment to environmental initiatives.*

Goal theory

According to goal theory, decision-makers rely on performance signals to predict how well they can perform on similar tasks in the future (Kruglanski, 1996). Perceived performance gaps trigger revisions of the initial decisions (Lant, 1992; Lant, Milliken, and Batra, 1992). Positive feedback reinforces the pursuit of the initial goal (Kruglanski, 1996), increases goal commitment, and motivates more difficult goals (Carson and Carson, 1993; Phillips, Hellenbeck, and Ilgen, 1996; Simon, 1976). Negative feedback lowers goal commitment, motivates easier goals ('goal

shift'—Kruglanski and Jaffe, 1988; Vance and Colella, 1990), or abandonment of effort towards the initial goal (Dweck and Leggett, 1988). In the environmental domain, Cordano and Frieze (2000) have shown that inadequate past performance lowers leaders' preferences for environmental initiatives, while past successes stimulate further trials. A prolonged record of poor performance is particularly discouraging to champions, as it signals high levels of strategic inertia or organizational resistance to change (Ashford, 1993; Cordano and Frieze, 2000).

> *Hypothesis 1c: There is a positive association between perceived performance gaps and leaders' level of commitment to environmental initiatives.*

Local feedback

In addition to systemic adjustments between initial targets and performance signals, control theory describes a series of nested feedback loops, which provide guidance and local feedback to decision-makers at multiple hierarchical levels—individual champions, upper echelons, and organizational members. We describe next how initial responses trickle down through organizational layers. Then we turn our attention to bottom-up influences.

Top-down sequence

Individual champions. Executives with strong values and principles are more likely to label environmental issues as opportunities (Sharma, 2000), inspire collective commitment (Egri and Herman, 2000), and advocate action (Bansal and Roth, 2000). For novel, ambiguous issues, individual decision-makers often adopt a threat or opportunity framework (Dutton *et al.*, 1983). This framework is shaped by personal values and prior experience (Chattopadhyay *et al.*, 1999). For green strategies, champions with stronger ecological stewardship are more likely to frame environmental issues as opportunities. They provide dominant interpretations which inform the goals of the upper echelons (Seijts, Latham, and Whyte, 2000). The upper echelons tend to amplify this initially prominent point of view (Whyte, 1991). When group members label a new issue as an opportunity for gain or success, 'collective overoptimism' ensues (Hart, 1990).

Hypothesis 2: Greater commitment to environmental initiatives by the organizational leader is associated with a higher level of perceived strategic commitment by the upper echelons.

Upper-echelons. Corporate strategic responses typically mirror the crude strategic intentions of the upper echelons (Noda and Bower, 1996). The upper echelons serve as a collective repository of organizational knowledge and norms for action. They formulate new strategic directions and translate emergent strategic responses into specific behavioral templates at responsible operating levels (Lant *et al.*, 1992; Miller, Burke, and Glick, 1998; Walsh and Fahey, 1986). Through a combination of strategic orientation and structural changes, top management can drive almost identical organizations in opposite strategic directions (Noda and Bower, 1996). Upper echelons directly shape the beliefs, goals, and actions of other organizational members by 'articulating an appealing vision with environmental elements, changing perceptions about environmental issues, and taking symbolic actions to demonstrate personal commitment to environmental issues' (Portugal and Yukl, 1994: 274). They 'mobilize and sustain cultural and political support within the firm' for new strategic decisions (Oliver, 1997: 706) and nurture a sense of purpose and direction that becomes 'part of the mindset of every member of the organization who is responsible for making or helping to make decisions of any consequence' (Simon, 1993: 138). The upper echelons also indirectly influence strategy formation, by shaping the structural context in which the organizational decisions and actions take place (Burgelman, 1983). Studies of corporate greening have shown that, by adjusting organizational structures (e.g., organizational and administrative architecture, information and measurement systems, reward systems), top management facilitates the emergence and accelerates the adoption of new strategic responses (Ashford, 1993).

Hypothesis 3: Higher strategic commitment to environmental initiatives by the upper echelons is associated with (a) greater diffusion and integration of environmental responsibilities among organizational members and (b) greater structural formalization of environmental responsibilities.

Greater formalization of environmental responsibilities triggers innovative solutions and improves performance at multiple levels (Wooldridge and Floyd, 1990). Even when formalization was originally intended as a buffer for current practices rather than as an explicit mechanism for change, King (1999) has shown that the creation of a new department to oversee waste management and/or the appointment of specialized technical personnel stimulated path-breaking strategic decisions. The benefits stemming from formalization were tied to improved information gathering, new patterns of coordination across departments, and mutually advantageous problem solving (King, 1999; Zietsma *et al.*, 2002).

Hypothesis 4: Greater structural formalization of environmental responsibilities is associated with improved environmental performance.

Bottom-up effects

Organizational members. Bottom-up initiatives provide valuable feedback to the upper echelons. They are especially important when the upper management faces issues which require substantial reinterpretation, but resists or delays changes in their mental frames (Barr *et al.*, 1992). Local initiatives often sprout in the front lines of operations, where organizational members can directly observe the consequences of alternate actions (King, 1999). These initiatives may emerge in spite of managerial intentions. 'When faced with threatening new conditions, managers often attempt to preserve the status-quo by creating a buffer between the organization and the outside world' (King, 2000: 224). However, these buffers do not block bottom-up changes. Instead, they create organizational greenhouses where radically new experiments can be tested and validated (King, 2000; Zietsma *et al.*, 2002). These experiments lead to sequences of incremental changes and occasional path-breaking innovations—'better environmental protection, more efficient production, and in a few cases, entirely new product and production strategies' (King, 2000: 224). As these local initiatives take hold, they gradually alter entrenched organizational rules and routines, reconstruct firms' collective memory (Walsh and Ungson, 1991), and may trigger important qualitative jolts

in the way upper management frames and responds to new issues (Zietsma, 2003).

> *Hypothesis 5: Greater integration of environmental responsibilities among organizational members stimulates bottom-up initiatives which inform the strategic views of the upper echelons.*

METHOD

Late 1990s' China offered an ideal setting for studying the formation of green strategies. Its rapid growth[1] relied on 'extensive' expansion of production, with high consumption of energy and natural resources. This pace of growth resulted in rapidly increasing waste levels and worsening water and air pollution, especially in urban areas. Environmental protection standards were emerging in response to national and international outcries. In 1996 alone, China's State Council introduced 347 national standards and 28 sector-specific standards. Forty-six municipalities adopted urban indicator systems. Sixty thousand heavily polluting small firms were banned and closed down (State of the Environment, China, 1997). Still, many Chinese firms had abysmal environmental performance records. Scarce resources severely limited voluntary changes in corporate practices, and regulatory changes did not seem to provide actionable templates for solving China's environmental crisis. Pollution levels varied significantly among Chinese firms, and provinces differed in the levels of environmental damage, regulation, and enforcement. To ensure comparability among respondents and facilitate the interpretation of the findings, we limited the scope of the study to China's largest city: Shanghai. At the time of the study, Shanghai was the major industrial and financial center of the country, contributing about 5 percent of China's GDP and 12 percent of the national tax revenues. It ranked first in the production of steel and second in the production of automobiles. Its registered resident population topped 15 million (Shanghai Statistical Bureau, 2001).

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[1] China's GDP had increased at 11 percent annually between 1993 and 1997, 8.8 percent above the average of developed countries, and 4.7 percent above the average of developing countries, making China one of largest and fastest-growing economies in the world.

Data and analyses

Sample and respondents

The data were collected in 1996 from Chinese firms located in Shanghai. The total sample included a random subsample of 300 companies drawn from the 'List of Large and Medium Shanghai Enterprises' and a geographical subsample of 600 Shanghai smaller businesses located in residential communities. We received complete, company-validated responses from 360 firms, including 156 randomly drawn firms (52% response rate) and 204 geographically sampled firms (34% response rate). The overall response rate for the study was 40 percent, which is considered very good for the surveyed population (Friedman and Singh, 1989). As expected, firms included in the random sample were larger and operated mainly in high pollution sectors (steel, chemical, and energy). Firms included in the geographical sample had, on the average, smaller annual sales, and tended to be concentrated in low and medium pollution sectors (such as textiles). We surveyed one key respondent per firm. Only senior managers were included since they represent the primary interpreters of new issues (Thomas and McDaniel, 1990; Thomas *et al.*, 1993), have discretion over and responsibility for early decisions (Hambrick and Finkelstein, 1987), and typically possess significantly more information than boards of directors or mid-level management (Provan, 1991). Respondent's titles included: CEO/president/director, executive vice-president, or vice-president of production/operations/environmental protection/environment, health and safety.

Analyses

Hypothesis 1a was tested by examining whether positive expectancies of success moderated the effect of a firm's environmental record on champions' initial responses (Baron and Kenny, 1986). Separate regressions were also run for respondents with favorable expectancy of success vs. respondents with unfavorable expectancy of success. We used structural equation modeling to simultaneously test the remaining hypotheses. The reported findings were robust to alternate methods of analyses—the sign, magnitude, and significance of the path coefficients were replicated using hierarchical analyses (results are available from the authors).

We also verified the sensitivity of each hypothesized relationship to several important control variables by splitting the sample in two and running separate regression analyses on each subsample.[2] The results of subsample analyses are reported and interpreted in the discussion section, to shed additional light on the main effects.

Design and measures

Respondents' expectancy to achieve their initial goal was obtained as the geometric mean of respondents' scores on two 5-point Likert scale statements: 'My organization cannot act on its own to improve environmental performance because we have insufficient resources', and 'My organization cannot act on its own to improve environmental performance because we must remain competitive' (the internal reliability for the two-item scale was 0.75). We used one or two 'best indicators' for each latent construct in the structural equations model (Hayduk, 1987). Table 1 summarizes their operationalizations. In addition to the predictor and criterion variables, the model includes controls for four individual-level variables (hierarchical position, economic priorities, age, and level of environmental training) and four firm-level variables (perceived regulatory pressures, perceived industry influences, perceived environmental impact, and firm size). All items reflect respondents' opinions on a 5-point, Likert-type scale, with verbal anchors from 1 (strongly disagree) to 5 (strongly agree), with the exception of age, environmental training, and firm size, which are captured as categorical variables. We also include a dummy variable to control for any other differences attributable to the sampling method. All questions were formulated in English by a joint team of Chinese and Canadian researchers, and then translated into Chinese following the back-translation method (Brislin, 1983). The survey instrument was pilot tested with 20 senior managers enrolled in a leading training program in the Management School of Shanghai Jiao Tong University. Personal interviews were conducted with each participant, immediately following the pilot run. Qualitative findings lent preliminary support to the proposed relationships.

Model specification

The hypotheses were tested using structural equation modeling techniques (SEM), which permit simultaneous estimation of the latent variables and their causal linkages with one set of observed variables. The structural equation model is shown in Figure 2. It includes 15 different concepts. Thirteen were assessed using single indicators. Their measurement scale was set by specifying measurement error variances and fixing each Λ at 1.0 (Hayduk, 1987).[3] Two concepts were assessed with double indicators. The scale of measurement was determined by setting both Λs at 1.0, with freed error variances.

Estimation and fit

We followed Anderson and Gerbing's (1988: 418) two-stage approach, which considers measurement issues separately from the goodness-of-fit issues. We estimated and compared the fit of five nested models (Table 2). The theoretical model presented the most parsimonious model that fit the data well ($\chi^2 = 87.96$, d.f. $= 68$, $p = 0.06$, GFI $= 0.973$, AGFI $= 0.939$, RMSEA $= 0.028$ with a 90% confidence interval including 0; Hayduk, 1987; Steiger, 1991).[4]

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[2] The cut-off values for sample splits were the mid-points of the 5-point Likert-type scales for the underlying variables. Values equal to or greater than 3 on the respective scales identified respondents with strong ecological values, firms with severe environmental impact, and organizations subject to stringent regulatory pressures. Values lower than 3 identified respondents with weak ecological values, firms with low environmental impact, and organizations subject to lenient regulatory pressures.

[3] These error variances were computed by multiplying each indicator's variance by the expected percentage of measurement error. The measurement errors for respondents' age, hierarchical position, and firm size were set at 5 percent of the corresponding indicator variances. The measurement errors for respondents' level of environmental training, firms' environmental impact, and level of regulatory pressures were set at 7 percent. The measurement errors for respondents' economic priorities, ecological values, and perceived industry influence were set at 10 percent. The measurement errors for respondents' perceptions of formalization, environmental performance relative to competitors, and strategic commitment were set at 15 percent, 20 percent, and 25 percent. A sensitivity analysis was also conducted for the measurement error specifications by reducing (-50%) and increasing ($+50\%$) each fixed error term, one error term at a time. There were no differences in model fit for each of these modifications, and there were no major changes in the reported effects.

[4] Separate hierarchical regression analyses for each hypothesis were used to confirm the robustness of the findings. These results are available from the authors.
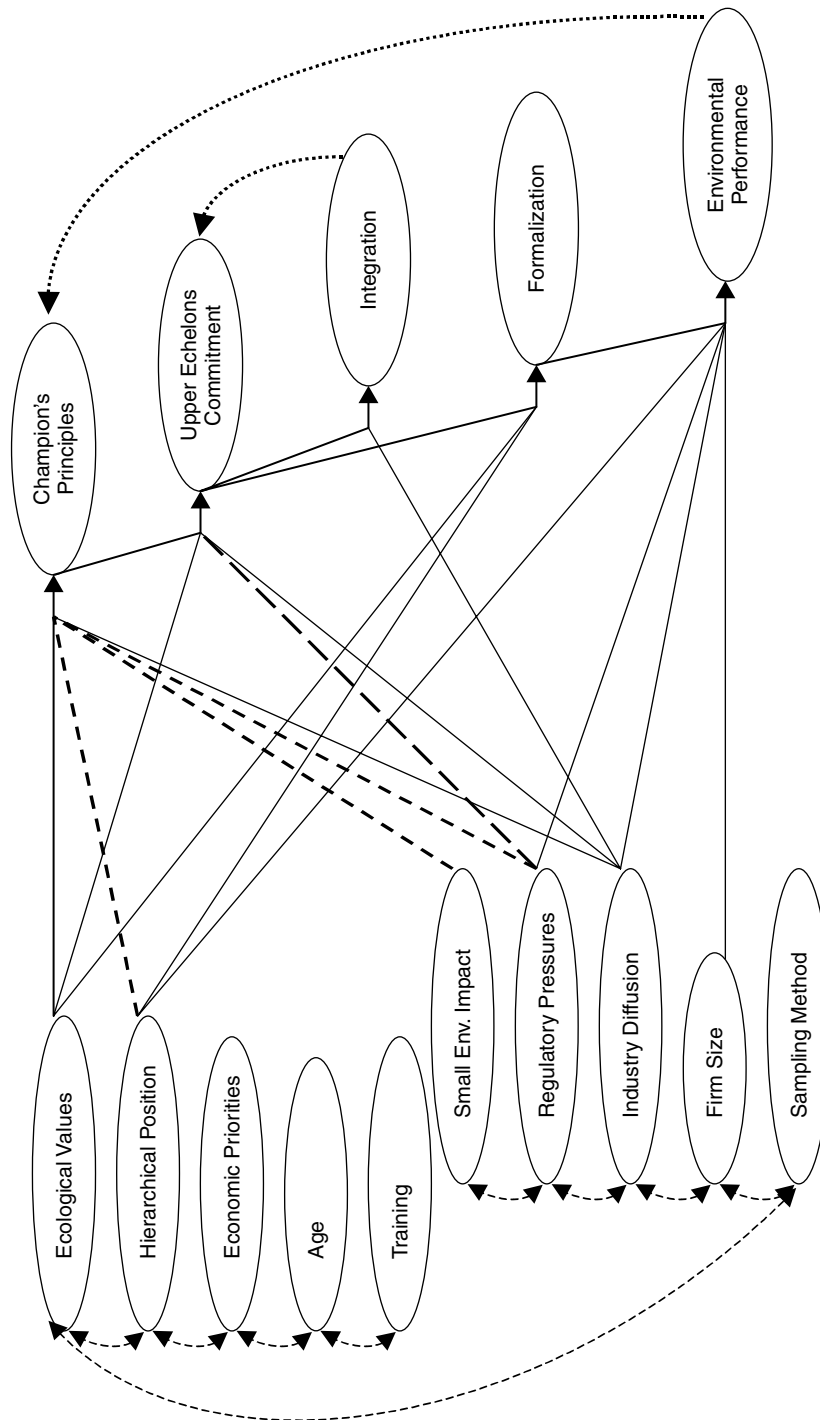
Figure 2. Structural equations model

Table 1. Indicator variables

Latent constructs	Survey questions
Ecological values	*Mankind should live in harmony with nature rather than modify it for its own needs.*
Hierarchical position	Dummy variable: 1 for CEOs/Presidents, 0 for senior managers
Economic priorities	*In a developing country like ours, economic growth is necessary even if there are environmental risks associated with it.*
Age	Respondents' age categories: 1 (20–39), 2 (40–49), 3 (over 50)
Training	Level of environmental training: 1 little/insufficient, 2 adequate
Small environmental impact	*My organization's contribution to environmental damage is small and hardly makes a difference.*
Regulatory pressures	Geometric mean of Government Standards (*Government has set some pollution/production standards, so we have to make sure that we do not violate them.*) and Environmental Regulation (*My organization is subject to a lot of environmental regulation regarding environmental matters.*)
Industry diffusion	*My organization's trade associations have influenced our environmental practices.*
Firm size	Total employment categories: 1 (less than 500), 2 (500–2000), 3 (over 2000)
Sampling method	Dummy variable: 1 for random sampling, 0 for geographical sampling
Champion's principles	(a) Personal Responsibility (*I feel it is my personal responsibility to ensure that my organization improves its environmental performance.*)
	(b) Role of Each Individual (*It is the role of each individual, no matter what his or her position, to see to it that the environment is protected.*)
Upper echelons' commitment	*Many top-level managers in my organization are personally and actively involved in developing environmental protection policies and monitoring their implementation.*
Integration	(a) Communication (*Ideas on pollution management are shared freely among lower, middle, and upper levels within my organization.*)
	(b) Awareness (*Most people in my organization are very aware of the need to protect the environment and are well informed about our environmental policy.*)
Formalization	Geometric mean of Formal Representation (*My organization has an environmental officer at the senior management level.*) and Formal Authority (*Environmental managers or those chiefly responsible for environmental management in my organization have adequate authority over capital investment decisions.*)
Environmental performance	*The record of my organization on environmental protection is significantly better than other organizations in our industry sector.*

RESULTS AND DISCUSSION

The means, standard deviations, and zero-order correlations are shown in Table 3. Less than half of the zero-order correlations between the exogenous and endogenous variables were significant. The correlations indicate low to moderate effects (0.106 to 0.276), ruling out issues of multicollinearity. This pattern of correlations also suggests that respondents neither followed a consistent line in their answers, nor gave indiscriminately high reports on all variables.[5] However, since the

[5] If present, social desirability biases would restrict the variance on most of the measures used in our model, resulting in a more conservative test of the hypotheses. However, the distribution of responses shows little evidence of social desirability biases. For example, three-quarters of the respondents (205 out of 360) considered that their firm had a large negative impact on the

Table 2.   Nested models and model comparisons[a]

Models	χ^2	d.f.	p	GFI	AGFI	NFI	CFI	RMSEA	Lower bound	Upper bound
Null (M_n)	909.92	134	$p < 0.001$	0.724	0.685	0.192	0.217	0.127	0.119	0.135
Constrained (M_c)	92.19	69	0.033	0.971	0.937	0.918	0.977	0.031	0.009	0.046
Theoretical model (M_t)[b]	87.96	68	0.060	0.973	0.939	0.923	0.981	0.028	0.000	0.044
Unconstrained (M_u)	86.891	67	0.052	0.973	0.938	0.923	0.980	0.029	0.000	0.045
Saturated (M_s)	54.49	30	0.005	0.915	0.983	0.953	0.976	0.047	0.025	0.067
Model comparisons	$\Delta\chi^2$	Δ d.f.	p							
Pseudo χ^2 tests[c]	54.49	134	$p > 0.995$							
$M_u - M_s$	32.401	37	$p > 0.10$							
$M_t - M_s$	33.47	38	$p > 0.10$							
$M_c - M_s$	37.7	39	$p > 0.10$							
$M_t - M_u$	1.069	1	$p > 0.10$							
$M_c - M_t$	4.23	1	$p < 0.05$							

[a] M_t is accepted, since all the following conditions are met: $m_t - m_s$, n.s.; $m_c - m_t$, significant; $m_t - m_u$, n.s. (Anderson and Gerbing, 1988).
[b] We report the fit and path coefficients from the theoretical structural equation model (M_t).
[c] The pseudo-χ^2 tests use the χ^2 for M_s and the d.f. for M_n (Anderson and Gerbing, 1988).

study relied on self-reported data, we used Harman's one-factor test to alleviate the concerns that common-method biases might have inflated the reported relationships (Podsakoff and Organ, 1986). Common-method variance represents a serious concern if a single factor emerges from an unrotated factor analysis, or if one general factor accounts for the majority of the covariance of the independent and dependent variables. Using all the 17 variables we obtained seven different factors, which together explained 65 percent of the total variance. The first factor accounted for only 20 percent of this variance, suggesting that common-method variance did not have a substantial effect on the findings.

Performance feedback

Hypothesis 1a predicted that performance feedback would be contingent upon respondents' expectancy of achieving the initial goal. It proposed a negative association between perceived performance and leader's commitment under favorable expectancy, and a positive association under unfavorable expectancy. Results indicate that the strength of performance feedback was slightly stronger when the expectancy was favorable ($R^2 =$

0.072, $F_{1,174} = 13.39$, beta $= 0.274$, $p < 0.001$) than when the expectancy was unfavorable ($R^2 = 0.022$, $F_{1,184} = 4.08$, beta $= 0.142$, $p = 0.045$). However, contrary to the predictions of control theory, expectancy of success did not moderate the effect of environmental performance on champions' individual commitment. The association between performance and subsequent goals remained positive and significant in both cases: leaders of overperforming firms refreshed their commitment to environmental protection, while leaders of underperforming firms withdrew effort. These findings corroborate prior empirical studies which found that poor prior performance lowers leaders' preferences for environmental initiatives, while past successes stimulate further trials (Cordano and Hanson-Frieze, 2000; Sharma, 2000).

To clarify the role of success expectancy in shaping performance feedback, we contrasted the predictions of escalation of commitment theory (Hypothesis 1b) and goal theory (Hypothesis 1c). Hypothesis 1b suggested a negative performance feedback loop, specifying that decision-makers tend to escalate commitment to environmental protection in the face of unsatisfactory performance. Hypothesis 1c proposed a positive performance feedback loop, arguing that goals adjust in response to performance signals—success stimulates more difficult goals whereas failure triggers downward adjustments in goals or withdrawal

environment, and only slightly more than half (202 out of 360) considered that they had managed to achieve a better record of environmental protection compared to other organizations in their industrial sector.

of effort. The model lends support to Hypothesis 1b (beta $= 0.228$, $p = 0.005$), confirming a goal adjustment process and contradicting an escalation of commitment argument.

We further investigated whether managers' interpretation of early success and failure signals is sensitive to personal values and to subjective norms promoted by external referents. The theory of planned behavior (Ajzen, 1991) stipulates that the amount of effort exerted towards a goal (i.e., champions' behavioral intention) increases when the goal fulfills personal beliefs and when important external referents endorse their target. Several studies showed that ecological values, perceived environmental impact, and regulatory pressures motivate the adoption of new environmental strategies (Ashford, 1993; Cordano and Frieze, 2000). We focused on the extent these factors moderate the strength of the performance feedback loop. We expected that strong personal values temper performance feedback, deflating success signals and overruling failure signals because champions' environmental stewardship serves as an anchor for strategic decisions. When there is dissonance between personal values and performance outcomes, decision-makers gravitate towards values and cognitively distort outcomes, thus weakening their signaling power. We found that, indeed, the effect of performance feedback on leaders' commitment was only half as strong when they had stronger ecological values ($R^2 = 0.026$, $F_{1,272} = 7.41$, beta $= 0.143$, $p = 0.007$) as when they had weaker ecological values ($R^2 = 0.092$, $F_{1,84} = 8.48$, beta $= 0.360$, $p = 0.005$). Decision-makers with stronger ecological values were significantly more likely to persist in their initiatives regardless of perceived success or failure, whereas leaders with weaker ecological values were more likely to take performance feedback to heart ($\Delta R^2 = 0.013$, $F_{2,357} = 10.44$, beta$_{\text{Moderation}} = 0.058$, $p = 0.028$). Prior laboratory evidence also showed that, on challenging tasks, personally meaningful goals sustain effort over time and thus can lead to higher performance (Seijts, Meerters, and Kok, 1997).

We also expected that leaders who act due to necessity or external pressures are more sensitive to performance signals, and show greater flexibility in adjusting their targets to better match achievable results (Clapham and Schwenk, 1991; Vaara, 2002). Performance feedback was slightly more salient to leaders under stringent governmental regulation ($R^2 = 0.047$, $F_{1,310} = 15.55$, beta $= 0.206$, $p < 0.001$) than under lenient regulation ($R^2 = 0.018$, $F_{1,46} = 0.88$, beta $= 0.161$, $p = 0.354$). The moderation effect of perceived governmental pressures was marginally significant ($\Delta R^2 = 0.007$, $F_{2,357} = 9.32$, beta$_{\text{Moderation}} = 0.054$, $p = 0.10$). The strength of the performance feedback effect was also stronger when firms had a severe negative impact on the environment ($R^2 = 0.043$, $F_{1,314} = 14.14$, beta $= 0.191$, $p < 0.001$) and weaker when they had a small impact ($R^2 = 0.006$, $F_{1,42} = 0.25$, beta $= 0.096$, $p = 0.616$). Perceived environmental impact moderated the effect of performance feedback ($\Delta R^2 = 0.035$, $F_{2,357} = 15$, beta$_{\text{Moderation}} = 0.133$, $p < 0.001$). These results suggest that poor performance is particularly discouraging to leaders when it signals failure to meet important standards set by external referents, and success becomes more meaningful when it satisfies these external standards.

Local feedback

Individual influences

Hypothesis 2 proposed that executive champions represent important reference points in interpreting and responding to new issues. They inspire and motivate the other top executives and serve as a model around which group-level commitment solidifies. Our results show a positive association between champions' environmental commitment and strategic commitment to environmental protection by the upper echelons (beta $= 0.190$, $p = 0.007$), providing support for Hypothesis 2. While we cannot completely rule out the possibility that highly committed champions simply overestimate the similarity between their own principles and those of the upper echelons (Farjoun and Lai, 1996), several contingencies influenced the strength of this effect in the expected direction, increasing our confidence in the reported results. The association is twice as strong under lenient governmental regulations ($R^2 = 0.214$, $F_{1,46} = 12.53$, beta $= 0.449$, $p = 0.001$) as under strong perceived regulatory pressures ($R^2 = 0.042$, $F_{1,310} = 13.61$, beta $= 0.241$, $p < 0.001$). While the moderation test is not significant ($\Delta R^2 = 0.02$, $F_{2,357} = 11.91$, beta$_{\text{Moderation}} = 0.029$, $p = 0.388$), the size of the effects suggests that champions may have

Table 3. Means, standard deviations and zero-order correlations[a]

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Ecological Values	3.622	1.204																
2. Hierarchical Position	0.692	0.462	0.040															
3. Economic Priorities	2.286	1.060	−0.083	−0.024														
4. Age	1.981	0.784	0.039	**0.183**	−0.033													
5. Training	1.414	0.493	0.025	−0.013	−0.067	−0.015												
6. Small Env. Impact	2.284	0.778	−0.053	−0.034	**0.306**	−0.018	**−0.182**											
7. Regulatory Pressures	3.870	0.693	**0.110**	0.025	0.044	0.082	0.083	**−0.121**										
8. Industry Diffusion	3.533	0.796	0.103	0.009	0.050	−0.064	0.068	−0.080	**0.197**									
9. Firm Size	2.142	0.712	0.030	0.040	−0.035	**0.115**	**0.285**	**−0.146**	0.083	0.102								
10. Sampling Method	0.436	0.497	**0.127**	**−0.153**	**−0.105**	−0.057	**0.250**	**−0.130**	0.075	0.023	**0.172**							
11. Champion's Commitment (a)	4.128	0.902	**0.145**	0.021	−0.088	0.039	**0.131**	**−0.145**	**0.153**	**0.134**	0.085	**0.130**						
12. Champion's Commitment (b)	4.264	0.867	**0.106**	−0.081	−0.049	0.044	0.004	**−0.124**	**0.150**	0.046	0.048	0.075	**0.495**					
13. Upper Echelons' Commitment	3.522	0.917	−0.018	0.085	−0.002	**0.115**	0.057	**−0.108**	**0.262**	**0.201**	0.036	−0.031	**0.263**	**0.177**				
14. Integration (a)	3.481	0.886	0.006	**0.138**	0.043	**0.122**	−0.004	−0.056	**0.276**	**0.185**	−0.029	−0.028	**0.285**	**0.157**	**0.602**			
15. Integration (b)	3.389	0.943	0.024	**0.110**	0.072	0.055	0.060	−0.057	**0.140**	**0.268**	0.021	−0.048	**0.298**	**0.147**	**0.563**	**0.526**		
16. Formalization	3.491	0.849	**0.131**	0.087	0.043	0.088	0.055	**−0.132**	**0.246**	**0.202**	0.066	0.058	**0.372**	**0.247**	**0.630**	**0.548**	**0.511**	
17. Env. Performance	3.569	0.821	0.015	**0.185**	−0.012	0.035	0.084	−0.084	**0.201**	**0.199**	**0.157**	−0.030	**0.138**	**0.238**	**0.262**	**0.220**	**0.174**	**0.279**

[a] Correlations appearing in bold are significant at $p < 0.05$.

greater leverage when their actions are voluntary and lower leverage when their actions simply respond to external pressures. The association between champions' commitment and the strategic commitment of the upper echelons is also one and a half times stronger when the firm has a severe negative environmental impact ($R^2 = 0.045$, $F_{1,42} = 6.78$, beta = 0.349, $p = 0.013$) than when its negative environmental impact is considered less severe ($R^2 = 0.139$, $F_{1,314} = 14.61$, beta = 0.253, $p < 0.001$). The moderation test is non-significant ($\Delta R^2 = 0.02$, $F_{2,357} = 11.97$, $\text{beta}_{\text{Moderation}} = 0.031$, $p = 0.398$). These results suggest a heightened cohesion among the top management ranks in face of adversity. Moreover, we find that strategic buy-in among the upper echelons is only marginally influenced by champions' hierarchical position ($\Delta R^2 = 0.027$, $F_{2,357} = 13.33$, $\text{beta}_{\text{Moderation}} = -0.043$, $p = 0.071$). CEOs ($R^2 = 0.059$, $F_{1,109} = 6.8$, beta = 0.290, $p < 0.001$) and any other senior executive ($R^2 = 0.065$, $F_{1,247} = 17.19$, beta = 0.284, $p = 0.010$) are influential champions of environmental issues. Both are motivated by stronger ecological values (beta = 0.163, $p = 0.013$), and their commitment is strengthened by exposure to dramatic, vivid, recent events, e.g., ecological accidents and crises (beta = -0.158, $p = 0.013$; Papadakis *et al.*, 1998; Schwenk, 1988; UNCTAD, 1993).

Group influences

The structural equation model supports Hypothesis 3. It shows that stronger strategic commitment of the upper echelons results in faster diffusion and tighter integration of environmental values (beta = 0.870, $p < 0.001$) and leads to a higher degree of formalization of environmental responsibilities within the organization (beta = 0.813, $p < 0.001$). We further show that the relationship between the strategic commitment of the upper echelons and formalization is moderated by the perceived severity of the firms' environmental impact ($\Delta R^2 = 0.007$, $F_{2,357} = 121.35$, $\text{beta}_{\text{Moderation}} = 0.065$, $p = 0.035$), but does not change depending on the perceived stringency of governmental pressures ($\Delta R^2 = 0.001$, $F_{2,357} = 117.81$, $\text{beta}_{\text{Moderation}} = 0.013$, $p = 0.641$). Thus, the observed positive relationships between upper echelons' strategic commitment and formalization

may be accentuated by necessity, but are not driven by external standards.

Greater formalization of environmental responsibilities improves environmental performance, lending support to Hypothesis 4. We also find that the effects of formalization are sensitive neither to the stringency of the regulatory framework ($\Delta R^2 = 0.0001$, $F_{2,357} = 15.03$, $\text{beta}_{\text{Moderation}} = 0.0065$, $p = 0.853$), nor to the severity of firms' negative environmental impact ($\Delta R^2 = 0.006$, $F_{2,357} = 16.17$, $\text{beta}_{\text{Moderation}} = 0.056$, $p = 0.145$). King (2000) has suggested that upper echelons alter the odds of success of new environmental initiatives by recruiting and empowering specialists to design and implement new strategies. Our model confirms that the positive leverage of upper echelons is fully mediated by the degree of formalization of environmental responsibilities within the organization.[6] Moderation analyses also show that this indirect influence is robust to external triggers.

Organizational influences

When organizational members become concerned about environmental problems and champion new environmental initiatives, they actively shape the strategic views held by the upper echelons. Our results lend support to Hypothesis 5. They also suggest that the effect of organizational initiatives on upper echelons' commitment are sensitive neither to the stringency of the regulatory framework ($\Delta R^2 = 0$, $F_{2,357} = 143.64$, $\text{beta}_{\text{Moderation}} = 0.025$, $p = 0.412$), nor to the severity of firms' negative environmental impact ($\Delta R^2 = 0.001$, $F_{2,357} = 143.66$, $\text{beta}_{\text{Moderation}} = 0.028$, $p = 0.404$).

Top-down vs. bottom-up effects

Our findings show that, for Chinese firms, top-down influences were stronger than the bottom-up effects in the early stages of green strategy formation. The interpretations held by executive champions and endorsed by the upper echelons shaped the direction, pace, and fervor of early

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[6] We verified the mediation effect by estimating the magnitude of the direct effect of perceived leadership commitment on perceived performance (the unconstrained model, Table 3). This direct effect was not significantly different from zero, and it did not improve the overall model ($\Delta \chi^2 = 1.069$, d.f. = 1, $p > 0.10$). Thus, the full mediation effect identified in the theoretical model was validated.)

organizational responses (Thomas *et al.*, 1993; Sharma, 2000). Several studies that examined the emergence of strategic responses to environmental issues in North American firms similarly identified top management as the essential driver of early environmental responses (Hart, 1992; Roome, 1992; Portugal and Yukl, 1994; Winn, 1995). Even when top management attempts to preserve the status quo, rather than catalyze change, top-down actions modify organizational values, routines, or structures, and thus create the premises for deeper-seated changes, which in time allow organizations 'to gradually evolve to different structures and behaviors' (King, 2000: 236; Zietsma *et al.*, 2002). As environmental issues gain legitimacy among different internal and external constituencies, become more complex and more multifaceted, and thus overwhelm top management's scanning and interpretation capacity, bottom-up approaches become more important. Incremental bottom-up processes eventually gain sufficient momentum to introduce radical innovations and jolt corporate frames (King, 2000; Zietsma, 2003), shifting the rationale and the direction of strategic change (Noda and Bower, 1996). While the data limit our ability to track the interplay between organization-wide incentives and the strategic views of the upper echelons over time, the results suggest that, even in the incipient stage of strategy formation, organizational feedback matters. Admittedly, the observed top-down effects may be amplified by Chinese cultural norms. Higher levels of power distance and ascription of status to top executives are likely to sharpen Chinese employees' propensity to model the values espoused by top management and abate their eagerness to undertake initiatives which may contradict upper-level directives (Zhang *et al.*, 1999). We were not able to assess explicitly to what extent cultural norms may affect the balance of top-down and bottom-up influences in the formation of new strategic responses. However, future comparative research can elucidate the issue.

Strategy formation and feedback patterns

The model suggests that executive champions trigger the formation of green strategy in Chinese enterprises. The upper echelons guide corporate responses by creating formal functions and departments to address environmental issues (King, 2000). This formalization helps generate new, valuable information and fosters innovative, collaborative approaches to solve previously 'unsolvable' problems (King, 1999), improving firms' environmental performance. The model also shows that champions actively contrast their initial targets against success or failure signals and constantly update their targets through a goal-assessment process (Carver and Scheier, 1982). Satisfactory performance sustains a virtuous circle of environmental stewardship, in which good results motivate higher targets. Unsatisfactory performance discourages the champion and triggers a vicious cycle. Champions adjust targets downward, and diminish their individual efforts. Second, upper echelons create a cushion between the individual executives who champion new initiatives and the organizational members who carry them out. This cushion serves two constructive purposes. On the one hand, greater involvement by the upper echelons diminishes champions' responsibility and blame for past failures. Upper echelons' involvement 'reduces, but does not eliminate, feelings of personal responsibility for an initial failed decision' (Whyte, 1991: 413). They may attenuate the discouraging effect of early failure signals while inhibiting the arousal of self-justification motives, and preventing escalation of commitment to bad strategic choices. On the other hand, once champions initiate strategic responses, upper echelons maintain strategic momentum and allow emergent initiatives to develop and mature at each organizational level. They arbitrate between the top-down and bottom-up influences, creating local conditions for experimentation, testing, gradual improvement, and even radical modifications of the initial strategic responses (King, 2000; Zietsma *et al.*, 2002). By blending and balancing feedback from individual champions and organizational members who test and modify early strategic responses, upper echelons help sustain and renew a virtuous green circle.

Managerial implications

The findings offer several important insights into the formulation of strategic responses to novel, challenging, and controversial issues, when few effective solutions or action guidelines are available. First, performance feedback provides important but different information to decision-makers

at different organizational levels. It helps executive champions calibrate early initiatives to success or failure signals. Our findings suggest that leaders are unlikely to escalate commitment to losing courses of action, but rather adjust their goals to incorporate performance feedback. Their propensity to take success and failure signals to heart is not influenced by the expectancy of success, contrary to the contingent prediction of control theory. Under both favorable and unfavorable expectancies of success, satisfactory performance lifts their aspiration levels and unsatisfactory performance dampens them. These results highlight the importance of providing champions with supportive feedback during the early stages of strategy performance. While firms' poor environmental performance should be neither disguised nor hidden from executives, policy-makers can acknowledge that desired improvements may take longer than expected and provide leaders with alternative process indicators that can validate and sustain their efforts and prevent premature discouragement. For economic strategies, success and failure signals may be beneficial as they allow leaders to gear courses of action in response to market forces. However, incipient greening approaches may not have immediate pay-offs for the firms, and champions may be discouraged by the high costs and low impact of early investments. The adoption of green strategies is often beneficial for the firm, but initiatives take time to develop and mature (King, 1999, 2000) and early results may not necessarily predict later outcomes. Our findings suggest that alleviating the downward pull of early failure signals offers policy-makers an important lever for sustaining early environmental initiatives, thus allowing the necessary time to bear fruit. We believe that celebration of effort and long-term pay-offs instead of short-term outcomes is essential. Development of standards that allow leaders to calibrate their goals and their efforts against those of their peers, but cut off negative signals, may be particularly beneficial during the early stages of green strategy formation. Second, the model presented in this study acknowledges that leaders' personal values and principles play an undisputable role in catalyzing strategy formation by framing new issues as opportunities for change (Sharma, 2000). They are more likely to entice championing efforts when external constituencies underscore a significant discrepancy between leaders' beliefs and the

consequences of their decisions and when champions act voluntarily, rather than in response to governmental pressures. Policy-makers may indirectly catalyze the emergence of green initiatives by highlighting each firm's specific environmental impact and by commending voluntary initiatives. Third, the upper echelons imprint the direction and pace of early strategic responses, shelter them from external stimuli, and facilitate gradual refinement and repositioning of early responses through trial-and-error learning across different organizational levels (Zietsma *et al.*, 2002). Policy-makers may not be able to directly encroach on upper echelons' decisions. Indeed, our findings show that, during the early stages of greening, more stringent regulatory pressures did not stimulate the formalization of environmental responsibilities, environmental performance, or organizational initiatives. However, policy-makers may indirectly support firms with positive strategic momentum by providing external validation for emergent solutions, at all organizational levels, and by creating multiple guideposts against which initiators can assess the effectiveness of these solutions.

Limitations

These findings are subject to several limitations. First, the analyses rely on self-reports from single respondents, which may raise concerns of common-method variance. Our confidence that the reported effects reflect systematic relationships among the variables is strengthened by Harman's test results, the invariance of the main relationships across alternative methods of analysis, and their sensitivity to several different moderators. While we cannot completely rule out the concern of inflated responses on socially desirable questions, such an effect would restrict the range over which relevant variables were observed, resulting in a more conservative test of the hypotheses. Second, due to the cross-sectional nature of the data, we could not make assertions of causality. However, the hypotheses were based on preliminary qualitative findings from interviews conducted with Chinese senior executives and regulators at different governmental levels, and their directionality has been supported by findings of prior laboratory or field studies conducted in different contexts. Moreover, structural equation models allow us to empirically verify the hypothesized directionality by testing reciprocal relationships and comparing

their relative strengths. Third, we advise caution in generalizing these results beyond emergent, value-laden issues, to mainstream or mature strategic issues. We examine the formation of new strategic responses when issues are novel, ambiguous, and controversial, attract significant external scrutiny yet cannot follow any industry recipes. Such issues fall within leaders' discretion, and often remain peripheral to the main economic mission of the organization. Our discussion of the emergence of greening initiatives in late 1990s' China have been supported by qualitative and quantitative evidence from other countries—Canada (Zietsma, 2003) and the United States (Cordano and Frieze, 2000; King, 2000). However, it is important to acknowledge that the roles of executive champions, upper echelons, and organizational members may shift as issues gain legitimacy and effective templates for action diffuse among industry participants through regulatory, normative, or mimetic processes (Hoffman, 1997; Zietsma, 2003). We believe that, as strategic issues mature, the cascade of values, principles, and actions loses some of its initial energy, while success and failure receive stronger scrutiny at all organizational levels.

Suggestions for future research

The results highlight several fruitful avenues for future exploration. First, longitudinal studies are needed to understand which types of feedback influence the interpretation of strategic issues at different points in time (Thomas *et al.*, 1993; Noda and Bower, 1996). By triangulating multiple sources of information, researchers can obtain subjective, issue-specific perceptions of corporate leaders, indicators of collective perceptions among the upper echelons, and factual information about strategic initiatives. This approach would help disentangle the specific roles played by multiple constituencies at different stages of the issue life-cycle. It could also elucidate the relative prominence of top-down vs. bottom-up initiatives at different stages of strategy formation. One important ramification of this line of research is clarifying how inertia hampers adjustment at different organizational levels. Inertia may prevent or delay cognitive adjustment, thus reducing firms' ability to adapt to changes in their environment (Barr *et al.*, 1992). However, inertia at one level may also create temporary buffers which stimulate learning opportunities at different organizational levels by

providing local greenhouses where radically new initiatives are seeded, pruned, crossbred, tested, and validated (King, 2000; Zietsma *et al.*, 2002). Our results suggest that upper echelons cushion early strategic responses from premature feedback, allowing unripe ideas to mature. Another important ramification may address more explicitly the role of intentionality in strategy formation. King (2000) has suggested that top management does not always *intend* to shift firms' strategic direction and may not even anticipate the resulting changes. Instead, their initial objective may be to preserve the status quo. However, when top managers alter existing structures and recombine resources to accommodate external demands, they involuntarily alter the context in which subsequent decisions are made. We believe that it may be worthwhile to investigate to what extent executives spread the seed of change intentionally, by formulating new strategic approaches, and to what extent new initiatives emerge accidentally, causing unintended alterations in firms' life courses.

A second line of future research may consider extending the studies of performance feedback in aligning top managers' mental templates with reality (Barr *et al.*, 1992; Noda and Bower, 1996; Weick, 1995). We would like to encourage research efforts in two directions: (a) how environmental influences shape managerial attention to feedback by changing the context in which decisions are made (Eisenhardt and Zbaracki, 1992; Papadakis *et al.*, 1998), and (b) how cultural norms affect feedback seeking and interpretation (Ashford and Tsui, 1991) at different organizational levels (Thomas *et al.*, 1993). Our results suggest that personal values temper the signaling effect of success or failure while necessity and regulatory pressures intensify it. The available data limit our ability to investigate how other external factors may influence performance feedback—e.g., internal and external stakeholder influences, technological constraints, or new information. However, we believe that these factors mediate the effectiveness of performance feedback on strategy formation. Last, future studies which separate the impact of cultural norms on feedback seeking and feedback interpretation would be timely and worthwhile. We expect that in different cultures issue champions, upper echelons, and organizational members may indiscriminately follow feedback from certain constituencies while blocking advice from others. Since our study is bound to the Chinese

context, we are not able to assess the extent to which individual or collective views may be under- or overvalued, or discuss their relative weights in strategy formation. Cultural norms often shift decision-making responsibility towards either individual leaders or groups. Future research is needed to elucidate how different cultural norms (e.g., individualism, power distance, ascription of status, specificity; Hofstede, 1980; Trompenaars, 1993) shape feedback-seeking and interpretation at different hierarchical levels during strategy formation.

CONCLUSION

This study takes an organic perspective on strategy (Farjoun, 2002). It analyzes to what extent different types of feedback shape the strategy formation process. It also describes how nested feedback loops enable adaptive coordination of goals and actions across organizational levels (Thomas *et al.*, 1993). The findings suggest that upper echelons seek and balance feedback from leaders and organizational members. Executives champion new initiatives following personal values and principles and monitor their success or failure. Success raises the bar for future endeavors. Failure de-escalates commitment to losing courses of action. Upper echelons cushion early top-down initiatives from performance signals, allowing them to trickle through organizational layers. Organizational members test the effectiveness of strategic responses, modify them, and develop new solutions. Creative bottom-up initiatives become more influential over time, and may completely redirect firms' strategic course (King, 2000). As strategies develop, the combination of individual and organizational feedback helps the upper echelons adjust their visions to reality (Weick, 1995).

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