

# Achieving Sustainable Corporate Competitiveness

Strategic Link between Top Management's (Green) Commitment and Corporate Environmental Strategy

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Current prescriptions for organisational eco-change, which are often driven by a desire to show companies the 'right way forward', are often dominated by rhetoric and are reliant on the assumption that organisations will voluntarily become greener. There is little evidence to support any of these assumptions. Assuming that the primary motivating force for business corporations is the pursuit of organisational sustainability through the attainment of competitive advantage, corporate contributions to sustainability must stem from self-interest and survival instincts. This study seeks to develop a corporate understanding of emerging environmental concerns and their impacts on organisational survival and profitability. By focusing on the strategic assessment of change drivers—top management's commitment and strategic importance of green issues—this paper studies 15 companies in the Korean chemical industry and develops four strategic response models ranging from lagging to proactive catalyst. This study finds that top management's commitment has a direct and indirect impact on corporate environmental responses and strategy.

- Corporate environmental strategy
- Corporate responses
- Top management's commitment
- Cluster analysis
- Korean chemical industry

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**B**USINESS ACTIVITIES CANNOT AVOID EXERTING AN INFLUENCE ON CONDITIONS IN the natural environment in some way. During the past few decades, however, the environmental disaster in Bhopal and the *Exxon Valdez* oil spill in Alaska have contributed to an increasing awareness of the effect of business activities on the natural environment.

There has been considerable discussion about the relationship between businesses and the natural environment (Schmidheiny 1992; Hawken 1993; Hawken *et al.* 1999). Even though there are some pessimistic ideas concerning the potential for establishing environmentally friendly business activities (Walley and Whitehead 1994), a common theme is that businesses cause environmental problems but can also contribute to their solutions.

Corporate environmental management has been recently developed in order to assist companies in reducing, evaluating, monitoring and controlling their environmental impact. Implementation of this in business, however, presents a challenge to management, since it implies fundamental changes in some of the ways of operating a company (Hawken 1993).

Many academic researchers have explored the relationship between environmental and financial performance (Ingram and Frazier 1980; Jaffe *et al.* 1995; Edwards 1998; Stanwick and Stanwick 1998; Toms 2000; Wagner 2001; Edwards *et al.* 2002). Little attention, however, has been paid to other factors, such as top management or CEO's commitment, which influence corporate environmental and economic performance. Top managers' (green) commitment and understanding of corporate environmental management will influence the extent to which companies may take innovative and risk-taking strategies or defensive and risk-avoidance strategies.

This study applies Miles and Snow's 1978 typology to corporate environmental management in the Korean chemical industry. In particular, the study explores how top management's (green) commitment influences the formulation of different types of corporate environmental strategy and different environmental and financial performance.

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### The Miles and Snow 1978 typology in business strategy

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Business strategy has been a highly significant aspect of business research in the last two decades, and several typologies of business strategy have been developed, such as those of Miles and Snow (1978) and Porter (1980). Typologies are classification schemes which provide 'a means for ordering and comparing organisations and clustering them into categorical types' (Rich 1992: 758). One of the reasons why researchers commonly use typologies is 'to provide a parsimonious framework for describing complex organisational forms and for explaining outcomes' (Doty and Glick 1994: 230).

Miles and Snow (1978) propose that organisations develop distinctive and relatively enduring patterns of strategic behaviour to co-align the organisation with its environment. According to Miles and Snow, an organisation can be classified as a defender, prospector, analyser or reactor depending on the pattern of interaction between the organisation and its environment. Prospectors perceive a dynamic, uncertain environment and maintain flexibility to combat environmental change. The prospector seeks to identify and exploit new products and market opportunities. Prospectors' characteristics include a diverse product line; multiple technologies; a product or geographically divisionalised structure; skills in product research and development, market research and development engineering. In contrast, defenders perceive the environment to be stable and certain, and thus seek stability and control in their operations to achieve

maximum efficiency. The defender is characterised by a narrow and relatively stable product-market domain, single capital-intensive technology; a functional structure; and skills in production efficiency, process engineering and cost control.

Analysers stress both stability and flexibility and attempt to capitalise on the best of both of the preceding strategic types. According to Miles and Snow, the analyser operates in two differing types of product-market domain, one relatively stable, the other changing. Given different market demands, analysers enact a diversity of behaviours. Thus they are characterised by a limited product line; search for a small number of related product and market opportunities; cost-efficient technology for stable products and project technologies for new products; skills in production efficiency, process engineering and marketing. In reactor organisations, managers perceive change and uncertainty but are unable to respond effectively. Reactors, therefore, lack a consistent strategy and act only when the environment forces them to do so, thus performing poorly. Table 1 summarises these four strategic patterns.

<i>Strategic variable</i>	<i>Archetypes</i>	<i>Features</i>
Strategic pattern	Prospector	Turbulent domain, always seeking new product and market opportunities, uncertain environment, flexible structure
Strategic pattern	Defender	Stable domain, limited product range, competes through low cost or high quality, efficiency paramount, centralised structure
Strategic pattern	Analyser	Hybrid, core of traditional products, enters new markets after viability established, matrix structure
Strategy lacking	Reactor	Lacks coherent strategy, structure inappropriate to purpose, misses opportunities, unsuccessful

**Table 1** MILES AND SNOW'S 1978 TYPOLOGY OF BUSINESS STRATEGY

Source: adapted from Lee 2001

The strategic choice perspective of Miles and Snow (1978) suggests that a firm's competitive advantage can be sought through proactive strategies (prospector), conservative strategies (defender) or a hybrid alternative (analyser). A prospector strategy has innovative, future-oriented, risk-taking and proactive characteristics (Miller and Friesen 1983). Firms using this strategy concentrate on identifying and capitalising on emerging market opportunities. These firms maintain strategic flexibility and strive to gain competitive advantage with speed, surprise and sound execution (Tan 1996). Conversely, a defender strategy corresponds to a non-adaptive, defensive and risk-averse orientation (Banerjee 2001). Firms adopting this strategy tend to be rigid and conservative organisations that deliberately reduce costs and risks by selecting a stable, narrowly defined product or market domain (Wright *et al.* 1995). As a hybrid strategy between prospector and defender, an analyser strategy may be an appropriate choice for those firms seeking both risk-adjusted efficiency and emerging market opportunities (Miles and Snow 1978; Hambrick 1983). These firms defend existing product markets through efficiency-oriented strategies while cautiously penetrating new markets with intensified product/market innovations (Venkatraman and Prescott 1990).

Miles and Snow's (1978) typology has implications for proactive-reactive type corporate organisational responses regarding green issues. Proactive organisations (prospectors) would seek green market opportunities and develop green products even though their environment is uncertain and turbulent. In contrast, reactive organisations

(reactors) would ignore green opportunities or new markets because of lack of strategy and commitment. As Miles and Snow point out, managerial interpretations of the environment, particularly at board level, significantly influence whether organisations become proactive or reactive.

### Corporate responses to green issues: corporate greening models approach

As mentioned above, considerable attention has recently been paid to corporate environmental management. Corporate environmental management has focused in particular on the development of typologies of environmental management approaches (Arthur D. Little 1989; Hunt and Auster 1990; Roome 1992; Post and Altman 1992, 1994; Sadgrove 1992; Scallon and Sten 1996). Table 2 shows these eight different corporate greening models as mentioned above.

ADL 1989	Hunt and Auster 1990	Roome 1992	Post and Altman 1992, 1994	Sadgrove 1992	Scallon and Sten 1996	Brockhoff et al. 1999	Winn and Angell 2000
Problem-solving Compliance Assurance	Beginner Fire fighter Pragmatist Proactivist	Non-compliance Compliance Compliance plus Leading edge/excellence	Adjustment Adaptation/anticipation Innovation	Laggard Punished Conformer Leader	Compliance Alignment Expansion Integration	Defender Escapist Dormant Activist	Deliberate reactive Unrealised Emergent active Deliberate proactive

Table 2 CORPORATE GREENING RESPONSE MODELS

Most of these typologies suggest that companies' strategic responsiveness to environmental issues describes a continuum, which ranges from reactive compliance with legislation at the lower end to proactive practices at the upper end. To illustrate this we can elaborate on one of the best-known models. Roome (1992) categorises four different levels of corporate response. The lowest level, non-compliance, reflects a firm that fails to address the requirements of environmental regulation and other external pressures. Firms at this level are identified as having little strategic vision and a limited understanding of the environmental issues within their business activity. The second level, compliance, reflects a firm that has a more aware attitude. However, firms in this level are still reactive, pursuing a minimum level of environmental commitment to avoid legal action or loss of market share. The third level, compliance plus, reflects a firm that takes a more proactive stance. Firms at this level are becoming aware of the potential competitive advantage to be gained from environmental commitment and leadership. In addition, such firms often take actions beyond existing environmental legislation and requirements. The fourth level, leading edge/excellence, is that of the environmental champion. Roome (1992) sees firms at this final level achieving commercial and environmental excellence through innovative solutions to environmental problems.

## Environmental (green) commitment

It is very often claimed that top managers strongly influence the implementation of corporate environmental management (Ghobadian *et al.* 1998; Lee 2001). It would be useful to identify levels of commitment of decision-makers (and particularly top management on green issues).

Ghobadian *et al.* (1998) categorise environmental commitment as:

- ▶ Restrained commitment
- ▶ Speculative commitment
- ▶ Conditional commitment

Restrained commitment refers to companies that may want to make an environmental statement, but do not perceive any real need to follow up this statement with action. Thus, the category of restrained commitment can involve 'greenwashing', which, according to Hoffman (1997), reflects 'the symbolic activities taken by some companies to demonstrate their environmental commitment, while their underlying practices and values remain unchanged' (1997: 157). Ghobadian *et al.*'s second type, speculative commitment, reflects companies that become leaders in the environmental field because they identify business opportunities such as increased market share, increased profitability, or reduced cost structure leading to competitive advantage. Thus, speculative commitment can be categorised as 'opportunity seeking'. Conditional commitment is shown by companies that take different actions in different circumstances or countries. That is, companies' environmental commitment depends on the prevailing business conditions—in particular, operational factors. They may seek more proactive stances where their interests are best served by, for example, investing relatively heavily in environmental technology and pollution reduction systems. In contrast, they will take more reactive actions where their interests are best served by such actions. This commitment can be categorised as 'it all depends'.

## Environmental and financial performance

Corporate greening can impact on a company's environmental and financial performance. The relationship between environmental and financial performance remains unclear, although evidence is beginning to emerge that there can be a positive relationship between proactive greening behaviour and the firm's financial situation. Stead and Stead (1995) have found that enhanced greening activity results in reasonable financial returns and investment payback periods. Some scholars argue for the existence of an early-mover advantage in strategic management (Porter and van der Linde 1995a, 1995b; Shrivastava 1995). According to Porter and van der Linde (1995a, 1995b), stringent environmental regulation can improve firms' competitiveness and, as a result, will lead to a positive relationship between environmental and financial performance for the firm. This proposition is called the Porter hypothesis.

Klassen and McLaughlin (1996) report a positive relationship between the receipt of environmental awards and financial performance, with a corresponding negative relationship between environmental crises and financial performance. However, Jaffe *et al.* (1995) suggest that there is little evidence that environmental regulations impact on financial performance at all. Walley and Whitehead (1993) support the view of Jaffe *et al.* (1995). They argue that environmental investments are too costly to gain an



adequate return on investment within the short term, say within five to ten years. Unclear outcomes of environmental investments in future financial periods bring great uncertainty for decision-makers at board level. They also found that there are more executives who have a wait-and-see attitude instead of taking early steps towards environmental sustainability. More recently, Edwards (1998) carried out a European portfolio analysis on the relationship between environmental and financial performance. He found limited support for the Porter hypothesis. In 69% of the comparisons between portfolios of environmentally high-performing firms and other firms, the former demonstrate better performance. Thomas and Tonks (1999) examined the correlation between excess stock market returns and environmental activities and features of firms based on UK data. They found that the adoption of an environmental policy by firms with sound pollution records improves their stock market returns.

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### The Korean chemical industry: general background

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The chemical industry has one of the longest industrial histories in Korea. In 2001, total production in the chemical products industry, total sales and total profitability increased by 10%, 11.5% and 1.4%, respectively. In the same year, total exports amounted to US\$115.2 billion and imports amounted to US\$25.2 billion (Bank of Korea 2001). In addition to strengthened international competitiveness, the Korean chemical industry has rapidly increased its overseas direct investments since the 1990s. Overseas investments contributed to Korean firms' expanding share in the world market and acquisition of advanced technology in capital-intensive industries.

Since March 1998, however, excess capacity and international competitiveness have brought pressure from the government to restructure the industry. As a result of the government-initiated industrial restructuring drive, mainly aimed at eliminating overlapping businesses, the three national industrial complexes at Daesan in South Chungchong Province, Yeochon in South Cholla Province, and Ulsan in South Kyongsang Province were criticised for restructuring under a series of mergers and asset swaps among the top five *chaebols*. In addition, the government has a mandate to set environmental standards and to investigate environmental pollution. For example, environmental impact assessment (EIA) is a compulsory part of environmental management in the industry.

The industry has begun to be aware that pressure over green issues arises not only internationally but also domestically. Thus, investment in environmental technology and pollution reduction facilities has increased. However, the traditional strategy for environmental investment involves complying with minimum regulation standards. Historically, the major source of international competitiveness of the Korean chemical industry has been relatively cheap labour. Increasing environmental investment to meet stricter environmental regulation can be an obstacle to gaining competitiveness in international markets. However, executives of the industry seem to have reconsidered the importance of corporate environmental management. How environmental management can bring benefits to the industry was discussed at the annual meeting of the chemical industry association in 1998. The main outcome of the meeting was to promote high environmental standards and to take proactive steps in corporate environmental management.

## Research methodology

As discussed above, management plays a critically important role in handling green issues. Therefore, we decided to address the research question: 'How do executives perceive green issues and how and why do executives integrate given issues in strategic management?'

A case study approach was adopted in that it allowed for in-depth studies of individual companies and for comparisons between them to take place. Fifteen companies were used as case studies. Case study information consisted of written documents, responses to a written questionnaire and interviews with around five senior executives of each company. Each of the 15 companies represented a single case study. The main issues tackled in each case study are top-level commitment to strategic issues and business responses to environmental issues.

In top-level commitment, the following issues are included:

- ▶ Top-level responsibility
- ▶ Environmental policy
- ▶ Strategic planning
- ▶ Stakeholder involvement

In business responses to environmental issues, the following are included:

- ▶ Environmental performance
- ▶ Environmental report
- ▶ Environmental management system (EMS)
- ▶ Environmental standards
- ▶ Records of fines and penalties
- ▶ Environmental liability
- ▶ Eco-products

In order to evaluate companies' performance on these issues, an environmental sustainability evaluation sheet was developed. This consisted of indicators of performance in 19 sub-areas. These were consolidated into 11 main areas. Appendix 1 shows the performance of each of the 15 companies against each indicator.

The results obtained from this analysis were assessed by doing a conceptually clustered matrix analysis (Miles and Huberman 1994). According to Miles and Huberman, a conceptually clustered matrix is developed by bringing together items that 'belong together' (1994: 127).

Before carrying out the cluster analysis it was considered desirable to consolidate the evaluative indicators. This grouping process reduces the number of indicators and helps to identify common themes.

The authors found it possible to identify the following themes: top-management commitment, strategic importance of green issues and operational performance on green issues. Top-management commitment includes top-level responsibility and environmental policy. The rating score for top-management commitment can be calculated by adding the score for top-level responsibility and environmental policy. Strategic importance of green issues includes strategic planning and stakeholder involvement. The rating score for strategic importance of green issues can thus be calculated by adding the score for stakeholder involvement and strategic planning. Operational performance

on green issues includes environmental performance, environmental report, environmental management system, environmental standards, record of fines and penalties, environmental liability and eco-products. The rating score of operational performance of green issues can be calculated by adding the scores on these issues (see Appendix 2 for more details).

## Results of the study

Corporate greening is considered to be a complex and multi-dimensional process. Identifying the key elements in the study is not easy but from the case studies, three themes have been identified. As mentioned above, the cluster analysis method is used for identifying groups of strategic behaviour. The results for the cluster analysis of the 15 companies across the three dimensions of corporate greening are shown in Table 3 (see Appendices 1 and 2 for more details).

<i>Dimensions of corporate greening</i>				
Cluster	Company	Corporate greening themes		
		Top management's commitment	Strategic importance of green issues	Operational performance of green issues
1	3	M	VL	VL
2	9, 12, 13	M	H	H
3	4, 14, 15	H	H	H
4	1, 2, 5, 6, 7, 8, 10, 11	M	M	M

H = high, M = moderate, L = low, VL = very low

**Table 3** THE OUTPUT OF CLUSTER ANALYSIS: CORPORATE GREENING PATTERN

The results of the cluster analysis identify four patterns of corporate greening behaviour. Similarities and differences between the clusters are particularly important so that general patterns of greening behaviour can be identified and a more coherent descriptive profile of the clusters can be developed.

### Cluster 1

Company 3 has very low scores on strategic importance and operational performance on green issues. The dimension related to top management's commitment on green issues has a medium rating. Such low scores would indicate that the company is facing some difficult challenges both from within the organisation and from the outside. In addition, detailed case study data shows environmental performance was poorer in 2000 and 2001, the final two years of the study. Because of this, the company has had to pay a number of fines for exceeding their effluent consent levels. There were also demonstrations by local residents protesting against the air pollution and noise that result from the manufacturing process. In addition, environmental groups found suspicious pipelines from the company facilities on the banks of the local river. Environmental groups reported their findings to a local court, and investigators were sent to examine the issues.



Although the company has had to make substantial investments to comply with environmental legislation, there is a definite focus on regulation compliance only. The management is trying to implement some changes but the strategic consideration and operational performance are very weak and there is not much more than the expectation of compliance. Not surprisingly, there was no positive relationship between environmental performance and financial performance in the period 1997–2001.<sup>1</sup>

Cluster 1 characteristics can be summarised as follows:

- ▶ A reactive approach to environmental management with lack of top-management commitment and strategic consideration
- ▶ Lack of staff who hold responsibility for legal compliance and environmental issues
- ▶ Weak commitment on international environmental standards for new and existing operations
- ▶ Absence of linkage between financial performance and environmental performance

### Cluster 2

Companies 9, 12 and 13 have high scores in strategic importance of, and operational performance on, green issues with a medium score on top-management commitment. All three companies have no major waste problems and they are not dealing with products or processes that have high environmental risks. The major feature that these three companies have in common is that they are all voluntarily implementing changes in their companies that reduce their impact on the natural environment.

This group of companies maintains a good environmental performance record by reducing emissions from their facilities by investing in advanced process technology and strategically focusing their product range. At the same time, end-of-pipe environmental protection for the treatment of exhaust air and waste-water as well as waste disposal is becoming less necessary.

These companies have discovered that the investment in new technology can reduce environmentally hazardous emissions as well as reduce cost through adoption of increasingly efficient production methods. There are significant positive relationships between environmental performance and financial performance. For example, environmental investment has increased while turnover also increased. At the same time, environmental performance with respect to air has improved. Overall, environmental effectiveness and cost efficiency correlate well together. Thus, it is possible to conclude that there is a positive relationship between environmental and financial performance in this group.

The drivers for improved environmental consciousness were primarily external in nature arising from governmental regulations and market opportunities to tap the growing demand for environmentally compatible products.

Characteristics of this cluster are:

- ▶ Desirability of making early financial investment in environmental protection and technology development
- ▶ Top-management commitment to environmental issues is critical for success

<sup>1</sup> The indicators for environmental performance include air emissions (kg/day), water consumption and waste (kg/day). The indicators for financial performance include turnover, total investment and environmental investment.

- Effective decentralisation of environmental specialists in the different business units
- Environmental considerations should be viewed as an inseparable part of business performance. It is useful to set quantitative targets for different environmental performance measures.

### Cluster 3

Companies 4, 14 and 15 in Cluster 3 show high scores in the three different areas of top-management commitment, strategic importance and operational performance of green issues. These companies have very sound environmental performance records in the last five years. This group of companies has achieved superior environmental performance compared with companies in clusters 1 and 2. These companies consider their reputation and corporate image very seriously. The CEO at Company 4 said:

A weak or poor reputation can threaten goodwill, co-operation and ultimately the company's licence to operate. Such a threat now faces our company. Its reputation is mixed, with some areas of important strength. But it also has negative associations which, if left unchecked, are likely to undermine the company's ability to operate smoothly and efficiently—in other words, its ability to serve its stakeholders and, in particular, its shareholders.

All these companies are aware of green issues and regard them as business opportunities rather than threats. Thus, with top management's support, these companies have a proactive strategy in environmental investment and technology development. The CEO at company 14 said, 'There is growing awareness that addressing green concerns does not depend on a tremendous investment but more on a proactive approach, managerial ability and commitment tied to smart investment.'

The initial cost of incorporating green concerns is indeed an investment rather than an expense. It is an investment that has significant impact on the overall business. Those companies with the skills to manage these issues do so at a fraction of the cost, and far more effectively than those without an integrating approach. The companies manage to keep a certain level of environmental investment each year while showing very good environmental performance.

There are a number of important drivers leading to an emphasis on environmental issues. These are governmental regulations, increasing public awareness of environmental issues, corporate image and reputation, demands from customers and the media. The effect has been for both environmental and financial performance to show a positive increase.

The following are the characteristics of Cluster 3 companies:

- A proactive approach to environmental management; setting specific targets for future environmental performance for outcomes, inputs and processes is critical for success
- Benchmarking of their competitor companies in international and domestic markets
- Top-management understanding of green issues and support for these bring much more attention to operational performance
- Adopting their own environmental quality standards in cases where existing laws and regulations are not adequate

- ▶ Communicating their commitment to environmental quality to their employees, shareholders, suppliers, customers and the local communities in which they operate
- ▶ Recognising and responding to the community's questions about their operations
- ▶ Actively participating with government agencies and other appropriate groups to ensure that the development and implementation of environmental policies, laws, regulations and practices serve the public interest and are based on sound scientific judgement

#### Cluster 4

Companies 1, 2, 5, 6, 7, 8, 10 and 11 show a medium-level rating on top management's commitment, strategic importance and operational performance on green issues. All eight companies have been focusing on reducing their operating costs and have not focused on environmental issues more than is required by the regulations. Most investments made were primarily to reduce cost with environmental improvement a secondary consideration. More detailed case study data shows no clear sign of significant reduction in pollution levels or waste.

For example, company 8 is primarily focused on complying with regulations with regard to its operations, but is taking a much more aggressive approach with regard to its products. The company stays very well informed about the types of chemical included in its products and is attempting to reformulate any product that contains chemicals that require special permits. For example, when chlorofluorocarbons (CFCs) were banned, the company had to find replacements for the propellants in its aerosol spray paints. This strategy helps the company to keep its compliance costs down since the company avoids using certain chemicals, thus avoiding the costs of obtaining permits and disposing of hazardous wastes. The company has not faced any major environmental problems related to its business activities.

Cluster 4 companies have been identified as lacking the following characteristics:

- ▶ Providing ongoing education and training for employees to effectively deal with day-to-day environmental responsibilities as well as environmental emergencies
- ▶ Complying with and exceeding requirements of all applicable environment-related laws and regulations
- ▶ Adopting their own environmental quality standards in cases where existing laws and regulations are not adequate
- ▶ Communicating their commitment to environmental quality to their employees, shareholders, suppliers, customers and local communities in which they operate
- ▶ Recognising and responding to the community's questions about their operations
- ▶ Actively participating with government agencies and other appropriate groups to ensure that the development and implementation of environmental policies, laws, regulations and practices serve the public interest and are based on sound scientific judgement
- ▶ Regularly assessing and reporting to management and board of directors on the status of their compliance with this policy and with environmental laws and regulations

Based on the analysis of the four different clusters, the corporate greening response pattern shown in Table 4 is produced. Cluster analysis identified four different groups of companies. These are labelled as lagging, defensive compliance, environmentally sensitive and proactive catalyst. Lagging indicates a minimum level of corporate greening while proactive catalyst refers to a maximum level of corporate greening in given cases. Only one company is labelled as lagging while the majority of companies are positioned as defensive compliance. Some companies are situated in environmentally sensitive and proactive catalyst.

<i>Cluster</i>	<i>Label</i>	<i>Characteristics</i>
1	Lagging	<ul style="list-style-type: none"> <li>‣ Fines and penalty records are the company's experience with environmental issues.</li> <li>‣ Main focus is on compliance with regulations</li> <li>‣ Lack of top-management commitment</li> <li>‣ Environmental issues are a regulatory burden rather than strategic issues.</li> <li>‣ There is no potential benefit, only cost for environmental investment.</li> </ul>
4	Defensive compliance	<ul style="list-style-type: none"> <li>‣ To comply with requirements of all applicable environment-related laws and regulations</li> <li>‣ The company does not view green issues as strategically important.</li> <li>‣ Environmental investment is for cost-effectiveness.</li> </ul>
2	Environmentally sensitive	<ul style="list-style-type: none"> <li>‣ The company views environmental issues as strategically important.</li> <li>‣ All plant sites meet regulatory compliance. The company views early investment in environmental protection or improvement as cost-saving or even profit-making opportunities in the near future.</li> <li>‣ Full usage of environmental risk assessment for environmental investment</li> </ul>
3	Proactive catalyst	<ul style="list-style-type: none"> <li>‣ Green issues are viewed as strategically important.</li> <li>‣ There is high top-management commitment and support.</li> <li>‣ There is a belief that early investment saves costs and makes profits.</li> <li>‣ There is a direct link between green issues and corporate image and reputation.</li> <li>‣ Continuous investment in environmental protection and technology</li> </ul>

**Table 4** FOUR PATTERNS OF CORPORATE GREENING RESPONSE AND ITS CHARACTERISTICS

## Conclusion

This paper began with a criticism of mainstream management theory, which largely ignores environmental and ecological issues. In order to understand corporate environmental management, we studied top management's commitment and its impact on corporate environmental responses and strategies. Based on the findings from the study, the following conclusions can be drawn.

First, few companies are positioned in the 'lagging' type of corporate environmental management. The common characteristic of lagging companies is that top executives view 'green' issues as a serious regulatory burden or threat. Thus, companies in the 'lagging' category try to meet the minimum level of regulatory legislation.

Second, the majority of Korean chemical companies are situated in 'defensive compliance'. Since the characteristic of this category is complying with legislation while avoiding extra cost, many companies do still pay attention to regulations rather than identify new business or market opportunities. In this case, top executives do not consider green issues as new opportunities. Rather, they think of these issues as extra costs.

Third, some leading companies are positioned as 'environmentally sensitive' or 'proactive catalyst'. The main characteristic of these companies is looking for new business opportunities through corporate environmental management. In other words, achieving leadership and competitive edge in corporate greening will bring better environmental and financial performance. In addition, continuous commitment and improvement is another main characteristic in these two groups. The main difference between the two groups is dependent on explicit environmental goals as a main business goal. The 'environmentally sensitive' group has rather business-oriented goals while the 'proactive catalyst' group has more balanced environmental and financial goals.

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Appendix 1: evaluation indicators and company ratings

Evaluation indicator	Companies														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Top-level responsibility	2	2	1.5	2	1.5	2	2	2	1.5	2	2	2	2	2	2
2. Environmental policy	0.5	1	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	1
3. Stakeholder involvement	1	1	0.4	1.2	1	1.2	0.5	0.6	1.3	1.3	1.2	1.2	1.3	1.4	1.5
4. Strategic planning	0.25	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5
5. Environmental performance	0.35	0.35	0	0.35	0.1	0.35	0.1	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
6. Environmental report	0.2	0.2	0	0.2	0	0.2	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
7. Environmental management system	1.7	1.3	0.2	1.3	1.1	1.3	1.3	1.1	1.3	1.3	1.1	1.1	1.3	1.3	1.1
8. Environmental standard	1.1	1.3	0	1.3	1.1	1.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
9. Record of fine and penalty	1	1	0.25	1	1	1	1	1	1	1	1	1	1	1	1
10. Environmental liability	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11. Eco-product	0.5	0.5	0	2	0.5	1	0.5	0	2	0.5	0	2	2	2	2
<b>Total</b>	<b>8.6</b>	<b>9.15</b>	<b>3.1</b>	<b>10.6</b>	<b>7.05</b>	<b>9.1</b>	<b>7.25</b>	<b>7.1</b>	<b>9.5</b>	<b>8.5</b>	<b>7.7</b>	<b>9.7</b>	<b>10</b>	<b>10.6</b>	<b>10.75</b>

Evaluation indicator scale: 0 (low)–1 (high)

## Appendix 2: dimensions of corporate greening

<i>Dimensions of corporate greening</i>			
Company	Corporate greening themes		
	Top-management commitment	Strategic importance of green issues	Operational performance of green issues
1	2.5	1.25	4.85
2	3	1.5	4.65
3	2	0.65	0.45
4	3	1.45	6.15
5	2	1.25	3.8
6	2.5	1.45	5.15
7	2.5	0.75	4.0
8	2.5	0.85	3.75
9	2.5	1.55	5.95
10	2.5	1.55	4.45
11	2.5	1.45	3.75
12	2.5	1.45	5.75
13	2.5	1.55	5.95
14	3	1.65	5.95
15	3	2.0	5.75

