PUBLIC DISCLOSURE OF CORPORATE ENVIRONMENTAL PERFORMANCE:
IMPACT ON CONSUMER BEHAVIOR AND CORPORATE
POLLUTION REDUCTION IN KOREA

By

Jongyeul Moon

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ABSTRACT

PUBLIC DISCLOSURE OF CORPORATE ENVIRONMENTAL PERFORMANCE: IMPACT ON CONSUMER BEHAVIOR AND CORPORATE POLLUTION REDUCTION IN KOREA

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The purpose of this dissertation is to investigate the effectiveness of Public Information Disclosure (PID) as a pollution control tool. The main research question is, "Whether disclosure of corporate environmental performance information (CEPI) sufficiently affects consumer behavior to influence market share and consequently corporate interest in pollution reduction?" In order to predict consumers' purchase behavior change, this study tested hypotheses about three dependent variables: 1) attitude toward corporation, 2) corporate credibility and 3) purchase intention toward products of the corresponding corporations. This study also performed tests about hypotheses concerning three moderator variables: 1) environmental attitude toward pollution, 2) familiarity with corporation, and 3) information credibility.

Three hundred six Korean undergraduate students participated in the experiment designed as a two-group random assignment combined with pre and post-tests, between May and early June2001. Four currently existing Korean corporations and their four new unnamed products with positive and negative CEPI were presented as stimuli in the classroom setting of the post-test. "Within Subject Analysis" with Confidence Interval, Inference Probability, and Significance Test was employed as a major statistical tool.

Data revealed that CEPI disclosure changes 1) consumers' attitudes toward specific corporations, 2) perceptions of credibility of the corporation and 3) purchase

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intention toward products of the corresponding corporations in the positive direction for non-polluting corporations and in the negative directions for polluting corporations. This study also found 4) that positive correlation between consumer's environmental attitude about pollution and effect of CEPI and 5) a strong positive correlation between information credibility and effect of CEPI exists. This study did not find a correlation between corporate familiarity and effect of CEPI.

Based on these findings, this study predicts 1) that CEPI disclosure influences consumers to change their purchase behavior in the negative direction for polluting corporations and in the positive direction for non-polluting corporations, 2) CEPI disclosure can generate market pressures or incentives for corporations to reduce pollution voluntarily, 3) that PID can be an effective approach for pollution control, 4) that consumers' environmental attitudes and CEPI credibility are critical elements that influence the degree of the effectiveness of PID, and 5) PID could be workable for even less known brands or corporations.

Although most studies about effectiveness of PID have focused on financial market reaction to CEPI, this study focuses on product market reaction and consumers' sensitivity to CEPI. This study provides empirical evidence supporting the assertion that PID can be a cost-effective pollution control tool, substituting for or complementing both traditional command-and-control approaches and market-based instruments, especially in developing countries.

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CHAPTER I

INTRODUCTION

Introduction to the Research

Pollution control policy based on traditional command-and-control and market-based approaches has not been completely successful. A new approach for achieving greater pollution control is emerging.[1] It could be a powerful supplement or complement to the traditional command-and-control approach and market-based approach to pollution control policy. A group from the World Bank named NIPR (New Ideas in Pollution Regulation) introduced this idea as "Multiple Agents, Multiple Incentives: A New View of Regulation" (Afsah, Laplante & Wheeler, 1996, p. 7). The new idea is grounded on the principle that "one size no longer fits all for regulatory policy design: Optimal combinations of regulatory tools will depend on country-specific social, economic and institutional conditions" (Afsah, Laplante & Wheeler, 1996, p. 7). It is called the Information Oriented Approach or Public Information Disclosure (PID) for pollution control.

This public information disclosure strategy was adopted for pollution control in Indonesia in 1995. Faced with growing industry and rapidly deteriorating environment, Indonesia's National Pollution Control Agency (BAPEDAL) and the NIPR of the World Bank initiated the Program for Pollution Control, Evaluation and Rating (PROPER) for rating and publicly disclosing the environmental performance of Indonesian factories. PROPER assigned participating plants color-coded grades indicating their compliance

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[1] Tietenberg (1998) stated that legal regulation is the first wave in pollution control policy, market-based instruments are the second wave, and the third wave is information strategies. He defined that information strategies involve public and/ or private attempts to increase the availability of information on pollution.

with pollution regulations. "Gold" meant that the plant was a world-class performer, while "Black" signified regulatory violations causing serious damage to the environment and human health. Disclosure of this color-rated information functioned in the same way as credible threats of real punishment to the worst polluters (i.e., corporations with "Black"). Afsah, Laplante and Wheeler (1997) reported considerable improvements in compliance status both before and following the public announcement.[2]

The idea behind PROPER was to provide reliable and easily understood information about pollution to the public because reliable and well understood information about corporate environmental performance can create strong new reputational incentives for corporations to voluntarily abate their pollution (Wheeler, 1997).

Our societies need a new approach for pollution control to supplement or complement the current pollution control tools because the current tools, the command-and-control (CAC) regulation and market-based instruments (MBI), were revealed to be very costly in some circumstances and incapable of achieving the defined goals in others. The pollution policy designers determine the 'optimal pollution' at the point where marginal social damage is equivalent to marginal abatement cost. CAC mandates factories not to pollute above the optimal pollution level. The pollution charge of MBI sets pollution price at the optimal pollution level and the tradable pollution permit of MBI allows factories to trade pollution permits within the limit of the optimal pollution. Both CAC and MBI have the following assumptions: 1) full information availability and 2) no transaction costs. However, transaction costs are not zero and full information is almost

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[2] As a PROPER-type programs, the Philippines launched EcoWatch in 1997, Mexico is developing PEPI (Public Environmental Performance Indicators), and Colombia also started a public disclosure program to complement its pollution charge system.

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never available in the real world (Afsah, Laplante & Wheeler, 1997). In other words, CAC and MBI can be effective pollution control instruments under the right conditions but it is unfeasible to achieve the right conditions in the pollution control practices. In this situation, it appears that the information-oriented approach could be a supplementary or complementary pollution control tool to both traditional CAC and MBI.

The idea of information disclosure to control pollution is highly attractive to pollution control policy makers and designers, especially in developing countries where government enforcement resources are limited. Because of the ineffectiveness and the high cost of CAC (Tietenberg, 1985; 1990; 1995)[3], MBI have been much more prevalent in the practice of pollution control in the United States (Tietenberg, 1998, October). However, in the developing countries the regulatory infrastructure for implementing MBI is insufficiently developed. In developing countries such as Korea, Taiwan, Thailand, and Indonesia, the monitoring problem is compounded by weak enforcement (O'Connor, 1994). Formal regulation in developing countries also has been greatly hindered by the absence of clear and legally binding regulations, limited institutional capacity, lack of appropriate equipment and trained personnel, and inadequate information on emissions (Hettige, Hug, Pargal & Wheeler, 1996). In the case of either traditional regulatory approaches or market-based approaches, developing countries are incapable of handling adequately the burden of designing, implementing, monitoring, and enforcing an effective pollution control system (Tietenburg, 1998). In this respect, PID advocates argue that PID would be a new cost-effective pollution control strategies for the developing countries.

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[3] Tietenberg (1990) found that the CAC costs from twice to 22 times the least-cost alternative for given degrees of control.

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Korea is a developing country similar to the Philippines, Colombia, Mexico[4] and Indonesia which launched PID programs for pollution control. Korea has had some experience with information disclosure programs in the public policy area, even though they were not related to the topic of environmental protection. The Act of Disclosing Property Information of House of Representatives and High Ranking Government Officials was promulgated in 1993 in Korea. The Military Service Bureau disclosed the list of people who had evaded obligatory military service. Similarly, in the national parliamentary election held in 2000, tax information of candidates was disclosed by the Central Election Management Agency. Korean government released lists of those related to the crime of adolescent prostitution in public in 2001 and 2002. However, limited empirical data has actually been developed on the topic of the effectiveness of information disclosures. Hence, more research is needed to examine the effectiveness of disclosing corporate environmental information and its possible impact on pollution control policy in Korea.

Even though PID was effective in Indonesia and applications of PID have been increasing recently in both OECD (Organization for Economic Cooperation and Development) and developing countries, these facts do not assure the effectiveness of PID in different social contexts such as in the context of Korea. Korea is barely familiar with the concept of information disclosure strategies in pollution control. Measures to enforce disclosing information to the public, such as the Community Right to Know Act directing the release of Toxic Release Inventory (TRI) data to the public in the United States, or pollution control program such as Indonesia's PROPER, have never been

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[4] The success of PROPER in Indonesia has inspired a similar program in the Philippines, EcoWatch and evoked serious interests in Colombia and Mexico. Refer to the website of NIPR at http://www.worldbank.org/nipr/.

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conducted in Korea. Korea has not experienced a voluntary compliance and incentive program like the "33 /50" program initiated by the U.S. Environmental Protection Agency (EPA). Most pollution control policies in Korea are based on the CAC. Even though a few MBI such as pollution charges or deposit refund systems have been employed, both the Korean government and polluters are unfamiliar with the idea of a MBI such as a tradable pollution permit.

The power of capital markets and community action for pollution control in Korea is assumed to be considerably weaker than in the United States because the Korean community activists do not seem to have been organized sufficiently with the result that they have not developed enough power to provide a credible threat of adverse consequences for polluters in Korea. The various information disclosure programs hosted by the government and NGOs (Non-Government Organizations) in the Korean political and social arena have rapidly increased. However, it is inferred from the lessons of the previous information disclosure programs that much strong and well-organized resistance from the comprehensive coalitions of Korean industry and the political majority will occur. Even though the environmental consciousness has continuously risen because of severe environmental conditions, top national priorities in Korea are still the issues of economic growth and national defense. Koreans might be lenient toward polluting behavior of industry because of the strong desires for economic growth. People's desires for affluent consumption seem to be prevalent in Korea.

Thus, even though PID is asserted to be a new cost-effective pollution control strategy for the developing countries, it is questionable whether corporate environmental performance information (CEPI) disclosure would be effective for pollution abatement in

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Korea's unique context.[5] Hence, this study is designed to investigate the effectiveness of PID by testing the PID theory that disclosure of CEPI (Corporate Environmental Performance Information) generates market pressure or incentives for corporations to reduce pollution in Korea.

A theoretical base of PID has not been well developed because PID is an emerging approach. Hence, more empirical studies are needed to understand the effect of existing public disclosure programs on the corporate environmental performance. Most of the empirical studies and theoretical assertions for PID focus on reactions of the stock market and the community to the release of information. Few researchers have made efforts to analyze the conceptual framework of PID. Little empirical research has focused on the reaction of consumer and product market to the disclosure of CEPI. As Cohen (1998) mentioned, before PID is more frequently implemented as a regulatory mechanism, we need to understand how the theory works and what effect PID has on corporate behavior. Thus, this study investigates the influences of CEPI disclosure on consumer purchasing behavior, product market share, and corporate pollution performance. It is based on the conceptual framework of PID, which suggests that CEPI will change consumer attitude and sense of credibility about corporations, and interest in purchasing products from polluting corporations. As a result, these changes in consumer behavior generate market pressure or incentives that will encourage voluntary corporate pollution abatement.

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[5] Even though Jeon (1998) asserted that disclosure of corporate violation had negative impact on the Korea stock market, this study does not rely much on his conclusion. For details, refer to Chapter II, pp. 54-55.

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Many empirical studies have focused on the stock market's reaction to the disclosure of Corporate Environmental Performance Information (CEPI). For example, Hamilton (1995) studied the reaction of stockholders and journalists to the Toxic Release Inventory (TRI) in the U. S. and found that statistically significant negative abnormal market returns occurred when TRI releases were first reported for publicly traded corporations in 1989. Laplante and Lanoie (1995) investigated the reaction of the financial market to the announcement of environmental incidents and lawsuits in Canada and found abnormal losses of stock value of Canadian-owned corporations ranging between 1.65% and 2% when the firms were found guilty (and fines are imposed) on the day the settlements of lawsuits were announced. Lanoie, Laplante and Roy (1997) observed the reaction of the capital market to the release of information such as penalties or fines imposed by the courts or regulators and announcements of lawsuits or suit settlements in British Colombia and provided evidence indicating that stock markets react to the release of information based on American and Canadian data. Konar and Cohen (1997) studied the reaction of the capital market to the disclosure of Toxic Release Inventory (TRI) and found that corporations with the largest negative stock price effects following the announcement of their TRI emissions were found, subsequently, to reduce their emissions more than other firms in their industry and also to make other significant attempts to improve their environmental performance by reducing the number and severity of oil and chemical spills. Dasgupta, Laplante and Mamingi (1998) studied the reaction of the capital market in Argentina, Chile, Mexico, and the Philippines to environmental news such as the violation of permits, spills, court actions, citizen

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complaints and protests, agreement between government and companies, investment in

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government black list of polluters, and government actions such as warnings, fines,

penalties, complaints, and company shutdowns. Jeon (1998) examined the affect on the

firm's value in the Korean stock market from both bad news about corporate

environmental performance (e.g., the government publicizing environmental violations)

and good news about corporate environmental performance that is released voluntarily by

firms.[6]

Wheeler (1999), Afsah, Laplante and Wheeler (1997), Wheeler (1997), Afsah and

Vincent (1997), and Wheeler and Afsah (1996) provided empirical evidence suggesting

that community influence increased as a result of the public announcement of

environmental information. Improvement in compliance status both before the initial

public announcement and following the public announcement, based on data from the

PROPER program in Indonesia was noticed. The research about the effectiveness of

disclosing corporate environmental performance information (CEPI) to the public for

pollution control is currently taking place in Argentina, Chile, Mexico, and the

Philippines[7].

However, we need to understand how the theory works and what effect PID has

on corporate behavior before PID is used more extensively as a pollution control tool, as

Cohen (1998) mentioned. "From an empirical perspective, the impact of existing public

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[6] For the findings of previous studies related to stock market reaction by CEPI disclosure, go to Chapter II, pp. 49-53.
[7] PROPER-type programs began in Philippines, Mexico, and Colombia. The results from those programs have not appeared yet (Wheeler, 1999).

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disclosure programs on the environmental performance of the plants largely remains to be tested" (Foulon, Lanoie & Laplante, 1999, p. 13).

PID could be a very cost-effective pollution control tool, especially in developing countries where institutional capacity and resources for pollution control are limited. However, except the studies from the case of PROPER and Jeon's study, few studies of PID in developing countries were conducted. Little empirical work has been done on the product market changes and reaction of the consumers to the disclosure of CEPI. The idea of PID is conceptually framed with two constructs: 1) CEPI creates public's negative attitude and behavior toward polluting corporations, and 2) the public's negative behavior causes corporate pollution reduction. However, few researchers formulated a theory of PID. Thus, it is necessary to conduct an empirical study focusing on the reaction of consumers and product market to the disclosure of CEPI in the context of developing countries such as Korea.

If a study focusing on the reaction of products and consumers to the disclosure of CEPI in Korea is conducted, the study will become the first empirical study about the reaction of the product market to disclosure of CEPI and it will contribute to the construction of the theoretical base of the information oriented approach to pollution control.

The outcome of this study provides evidence to confirm or reject the assertion that PID works effectively as a pollution control tool in developing and developed countries. The results of this study supply primary data and scientific evidence for predetermining the possibility that a PID program for pollution control in Korea could be effective. This research will provide basic data and evidence that strengthen the theoretical content and

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causal structure of the idea of the information-oriented approach for pollution control. The study gives present pollution policy makers and pollution program designers more detailed knowledge for designing a better information-oriented policy and program. The results of this study are expected to facilitate the development of legislation for a "right-to-know act" and to initiate public information disclosure programs elsewhere in the world. The outcomes and data from this study can also be used in environmental studies and practices related to public involvement or community participation for environmental protection in areas such as environmental labeling, environmental advertising, green certification, green consumerisms, environmental justice, environmental journalism, the environmental movement, environmental education, and environmental attitude studies.

Purpose of Research

This study has three purposes. The most important purpose is to examine the effect of CEPI disclosure on the product market. That is, it is to investigate whether negative information disclosure of corporate environmental performance is likely to reduce consumer demand for products of polluting corporations, and consequently shrink the market shares of polluting corporations.

The second purpose is to examine the conceptual framework and viability of public information disclosure (i.e., information-oriented approach) for pollution control. This purpose can be achieved by examining the causational relationship between CEPI disclosure and the changes of consumer's attitude or behavior toward polluting or green corporations. The results of the test for the second purpose will serve as a direct answer for achieving the first purpose.

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The third purpose is to investigate the effectiveness of PID as a pollution control tool in Korea. Even though PID was effective in Indonesia, this fact does not assure the effectiveness of PID in different social, economic, political and environmental contexts such as Korea. Hence, it is necessary to examine the effectiveness of PID in a different social context. The third purpose also can be achieved from the results of the first tested purpose.

In summary, the primary purposes of this study are 1) to investigate the influence of CEPI disclosure on product market share and consumers' response to CEPI, 2) to examine the conceptual framework of the idea of PID, and 3) to find supporting evidence for potential effectiveness of PID for pollution control, especially in Korea.

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CHAPTER II
LITERATURE REVIEW

Background of Environmental Policies

Environmental policy for pollution control can be classified into four categories: command-and-control approach, market-based instruments, voluntary incentive programs, and information-oriented approach. The command-and-control approach is a traditional legal remedy dictating environmental standards to industry, while market-based instruments is appealing to corporate profit-maximizing motivation using market principles. Voluntary incentive programs seek voluntary cooperative partnerships among regulatory authorities, environmental NGOs, and industry on the basis of social norms of industrial responsibility. The information-oriented approach seeks to impose embarrassment or shame on polluting corporations, undermining their reputations, and diminishing corporate sales and profits (Hoffman, 2000 a).

Traditional Environmental Policy: Command-and-Control Approach

Command-and-control (CAC) is a top-down legislative and administrative pollution control regulation. It sets the target for the total quantity of pollution emitted by all sources collectively and prescribes the best available technology that corporations should use for their pollution reduction. Thus, CAC is called "technology-based regulation" and the standards set for pollution control are called "technology-based standards." The uniform emission standards as targets and a specific technology requirement are supported by effective pollution monitoring systems and by sufficiently harsh penalties for non-compliance.

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The strength of CAC lies in its simplicity, clarity, and ability to command broad political support. The CAC system is easy to administer and very effective in the sense of achieving large reductions in emissions quickly (Beardsley, Davies, & Hersh, 1997). Thus, CAC has been the most widely used pollution control instrument in environmental policy.

CAC is a less effective pollution control instrument than desired, however, because it has revealed problems that include a high enforcement cost and imperfect compliance (Tietenberg, 1985; 1990; 1995). For example, CAC has not perfectly achieved industry compliance with emission standards. The intensity and rate of corporate non-compliance with national air pollution standards is continuously increasing in some areas.

The ineffectiveness of CAC is caused by its inflexibility and inefficiency, which is systemically found in CAC. CAC removes the incentive for polluters to discharge fewer pollutants than the regulatory standards require. Under certain circumstances, corporations have no incentive to devise new technologies to decrease the pollutant level below environmental standards.

Corporations respond to incentives because corporate managers make decisions for their environmental performance by comparing costs and benefits for pollution abatement. Corporate behavior may change when the costs or benefits change. However, CAC does not provide any incentives for corporate behavior changes in terms of cost and benefit because CAC is not flexible. In the scheme of CAC, corporations have no freedom to choose the least expensive and the most effective technology, because the law

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decides the technology. The requirement for specific technology thwarts the use of less expensive and more innovative methods of achieving environmental goals.

As a result, this inflexibility of CAC imposed high cost of pollution reduction on the corporations, and that causes the inefficiency of CAC. An empirical study conducted by Tietenberg (1990) found that the CAC costs from twice to 22 times the least-cost alternative for given degrees of control.

The inefficiency of CAC is promoted by asymmetric information (Perman, Ma & McGilvray, 1996). While corporations may know their cost functions of pollution control, they have strong incentives not to disclose the functions of their marginal costs and benefits for pollution reduction to regulators, thus corporations may provide misleading information to regulators (Perman, Ma & McGilvray, 1996). As a result, the standards set by the pollution regulatory authority may not be the socially acceptable level of pollution, so corporations tend to attain the required level of pollution reduction at a greater cost than is necessary in the scheme of CAC. Thus, the inability to know the corporate cost function because of the insufficient information and the high cost of collecting information weaken the efficiency of CAC.

In sum, where serious public and environmental health issues exist, the best way to control pollution would be dictating environmental standard to polluters, which is CAC. CAC is quick and effective to achieve low level of pollution abatement because the cost for a small amount of pollution reduction is small. However, CAC will be inefficient at the higher level of pollution reduction because as the pollution reduction is getting larger, the marginal cost of reduction is also sharply larger. The imposed technology choice and arbitrary target setting for emission, that characterizes the inflexibility of

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CAC, also leads to the increase of pollution reduction cost. In conclusion, CAC does not work cost-effectively because of the high cost of pollution reduction caused by inflexibility and insufficient information.

Market-based Instruments

Most economists assert that the market-based instruments (MBI) can overcome the CAC limitations of inflexibility, inefficiency and ineffectiveness for pollution control. Tietenberg (1990) argued that MBI is a cost-saving tool for pollution control compared to CAC. MBI makes polluting corporations aware of the opportunity cost of environmental non-compliance or of pollution reduction, and leads to the internalization of environmental damage costs. Thus, it is asserted that MBI tends to result in pollution control being undertaken where the control is least costly in real terms. MBI includes practices such as pollution charges or pollution taxes, tradable pollution permits, deposit refund systems.

Pollution Charge. Pollution charge (PC) has been used as a supplemental tool to CAC. Pollution charges are fees levied for exceeding standards (e.g., taxes on unleaded gasoline, heavy vehicles, etc.). Such taxes create incentives as every unit of pollution reduction is rewarded by a tax saving. Thus, PC achieves more efficient outcomes by internalizing pollution costs at the socially efficient pollution level through the modification of product prices.

In the PC system, the pollution charge rate will affect the amount of abatement by working on price. The magnitude of the economically efficient charge rate should be equal to the magnitude of the marginal external damage of the pollution at the socially

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optimal level of pollution. However, it seems to be mostly infeasible to determine the efficient charge rate, because of uncertain abatement cost. If the abatement cost function is known, the control authority can determine what emission charge rate is needed to achieve any given level of abatement. If the abatement cost function is unknown, the amount of abatement that results from this charge will not be known. Therefore, in practice, it is infeasible to determine the economically efficient charge rate that can achieve the socially efficient optimal level of pollution and the quantity of pollution abatement achieved by the PC.

Policy makers sometimes propose to raise the rate of pollution charge up to the level of a socially efficient pollution level because the costs for non-compliance is less costly than the cost for pollution reduction at high levels of pollution abatement (O'Connor, 1995). However, political feasibility is an essential constraint for setting an adequate pollution charge. The raised charge will be a burden on the economy and people's economic activities, and as a result it will generate strong political resistance. Thus, it is not practical to raise the tax to achieve a socially optimal pollution level.

Tradable Pollution Permit. Tradable pollution permit (TPP) predetermines the level of "acceptable" effluent emissions or ambient concentrations, rather than acting directly on prices like PC. The pollution permits allocate this acceptable amount among polluters. TPP allows trading the pollution permits for money with others. Because the corporations have the responsibility to calculate the costs and benefits of pollution reduction, TPP induces corporations to develop least-cost strategies.

In the TPP, the price of a pollution permit that is traded in the market is not fixed. The price is determined by the seller and the buyer so that regardless of the price of the

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pollution permit, the target of pollution reduction will be theoretically achieved at the pollution level that is an acceptable effluent emission level pre-set by pollution control authorities. In the pollution charge system regulators decide the price of pollution as a pollution charge per unit of pollution, but in TPP, regulators decide the total amount of pollution (i.e. target for pollution control) and the market (i.e., buyers of pollution permits) decides the price of pollution because the price is changing to achieve the target for pollution control. As a result, it is asserted that the system of TPP generates more flexible incentives for pollution reduction than pollution charges.

An advantage of TPP is its use as a cost-saving instrument. In order to supplement the inefficiency and inflexibility of CAC, TPP was introduced in the area of pollution control. The empirical studies of air pollution conducted by Tietenberg (1990) found that TPP is least costly compared to CAC and PC.

However, TPP also possesses several weaknesses. Disadvantages of TPP are summarized as follows: the absence of the market including externality and public goods, asymmetric information, the moral problem of pollution permits, market failure, and inappropriateness of complete reliance on markets and market instruments (Perman, Ma, & McGilvray, 1996). In particular, the large transaction costs for information discovery in the system of TPP hinders trading (Batie & Ervin, 1997).

The difficulty of designing and implementing TPP is another disadvantage. The more flexible and complex the instrument is, the more it costs in terms of designing and implementing it. Tietenberg (1998) stated that developing countries are incapable of handling adequately the burden of designing, implementing, monitoring, and enforcing an effective pollution control system. People, industry, and government in most

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developing countries have also little experience with the market for pollution control. Establishing a market culture and constructing the market system for trading the pollution permits in developing countries would take a long time and be very costly.

Deposit-Refund Systems. Deposit-refund systems provide incentives for consumers to recycle or properly dispose potential pollutants or reusable resources (Batie & Ervin, 1997). Under these systems, consumers pay a deposit when they buy an item such as beer or bottled beverages and then receive a refund when they return the empty beer containers or bottles. Bottle-bill programs as deposit-refund systems are prevalent in the U.S. Some examples of deposit-refund systems include automobile tires, lead-acid batteries, and used motor oil. Buyers of pesticides pay an additional fee that is refunded on the return of the container to a designated disposal or recycling site. The deposit-refund systems in Japan require consumers to return household appliances including television sets, refrigerators, washing machines and air conditioners for recycling.

Voluntary Incentive Program

Voluntary incentive program (VIP) is a business-led environmental self-regulation, driven by existing or anticipated legislation and consumer demand (Batie, 1997). The 33/50 program is the first voluntary "Industrial Toxics Emissions Reduction Program" initiated by the U.S. EPA in 1991. Under this program, participating corporations agreed to reduce emissions of seventeen priority chemicals by 33 percent through mid-1992 and to achieve a further 50 percent reduction by 1995. The Green Lights Program was launched in January 1991 to encourage corporations to install energy-efficient lighting. The Common Sense Initiative (CSI) was started in 1994 as an

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attempt to obtain industry participation in developing standards for the industry as a whole rather than continuing a pollutant-by-pollutant approach to protecting the environment (EPA, 1997). Project XL (Environmental Excellence and Leadership) was established to give exemplary individual corporations greater flexibility in achieving environmental goals. Project XL focuses on a facility and community, and it encouraged corporations to voluntarily design their own best ways for compliance with environmental standards (Batie, 1997; Hoffman, 2000 a).

VIP specifies the quantity of pollution but not a certain technology as the method by which to reach the standard. It usually does not dictate how the environmental objective is to be achieved so that VIP generates the flexible incentives for corporations. A prominent voluntary incentive program is "Responsible Care," which has numerous member companies that account for the basic chemical production in the U.S and Canada. Its member companies agreed voluntarily to the guiding principles that require a commitment to the public's right to know, process safety, pollution prevention, employee health and safety, and product stewardship because voluntary compliances to pollution standards and environmentally safe practices for environmental protection provide competitive incentives for their businesses such as good image or reputation, less penalties and less regulatory sanctions, less attacks from environmental NGOs, and mass media.

VIP is implemented on the basis of the cooperation and partnerships among various levels of government, environmental advocates, community and corporations. The target for pollution control is determined by government while the compliance

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A disadvantage of VIP is that it requires a capability for implementation. That is, high levels of institutional capacity and human resource are required to implement flexible systems in an effective and low cost manner (Batie & Ervin, 1997). Successful implementation depends upon clear performance objectives (e.g., standards), a clear negotiation process and the credibility of participants such as credibility of government agencies and environmental advocates because administrative discretionary power sometimes leaves to negativity among cooperating participants in negotiation processes (Batie & Ervin, 1997; Hoffman, 2000 a).

Information Oriented Approach to Pollution Control

The idea of an information disclosure approach to pollution control is simple. Environmental regulatory authority, such as governments, only provides reliable and easily understood information of corporate environmental performance to social actors who influence corporate environmental practices. Then, social actors such as environmental NGOs, the media, the court, community or grassroots organizations, and the market start to press corporations to adopt environmentally safe practices and to change their traditional business norms and strategies, which are based on profit maximizing and unlimited resource use.

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Drivers of Corporate Environmental Performance

Governments and social organizations are two primary constituents that have historically driven corporate environmental performance. Governments have regulated corporate environmental practices through environmental laws. Social organizations, especially environmental non-governmental organizations (NGOs) have mobilized diverse forms of social protests that can have a negative impact on a corporate reputation and performance.

Environmental NGOs have used social sanctions such as protests and negative press in order to pressure corporations to adopt more environmentally friendly technology and to reduce pollution emission. Governments have done it by using legal sanctions such as civil, administrative, and criminal penalties. In terms of business management, environmental issues are structured as fundamentally external to corporate interests. Corporations do not need to initiate environmentally safe performances voluntarily unless the governments force them or environmental organizations damage their image or reputation. However, these legal and social sanctions gradually force corporations to change their dominant business norms (i.e., individualistic self-interested profit seeking and resource utilizing beliefs) and to transform environmentalism from something external to the market system into something that is central to the core objectives of corporate business (i.e., internalizing environmental costs) (Hoffman, 2000 b).

Hoffman (2000 a) breaks down these governmental and social drivers into five categories influencing corporate behavior and managerial decisions related to environmental protection: regulatory, international, resource, market, and social drivers.

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Regulatory Drivers. A regulatory driver is the governmental environmental

actions that require corporations to adopt environmentally safe practices. These actions

are authorized by law on the assumption that without regulatory enforcement,

corporations would not voluntarily pursue environmental protection. Regulatory

government actions evolved into several environmental policy formats in the U.S.: 1)

Command-and-control regulation that dictates the environmental standards on corporate

performance; 2) Market-based instruments that appeal to corporate profit-maximizing

motivation; 3) Voluntary incentive programs that seek cooperative partnership among

government, corporations, and environmental organizations; 4) Criminal enforcement

that threatens corporations by extreme penalties; and 5) Forcing disclosure of

environmental information to the public such as the Emergency Planning and Community

Right-to-Know Act in 1986 and the Toxic Release Inventory (Hoffman, 2000 a).

International Drivers. International drivers are defined as international

environmental agreements and international environmental standards related to products

and international trade agreements (Hoffman, 2000 a). As the globalization of

environmental issues has considerable implications for corporate management, the

influence of international drivers on corporate environmental performance is increasing.

International environmental concerns have primarily evolved into international

environmental agreements such as the Convention on International Trade in Endangered

Species of Wild Fauna and Flora (1973), the Montreal Protocol on Substances That

Deplete the Ozone Layer (1987), the Basel Convention on the Control of Trans-boundary

Movements of Hazardous Wastes and Their Disposal (1989), the International Tropical

Agreement (1983), the International Code of Conduct on the Distribution and Use of

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Pesticides (1985), and the Kyoto Protocol to the United Nations Framework Convention on Climate Change (1997).

International environmental standards for products such as ISO 14000 have driven corporate environmental performance at the international level. ISO 14000 is a private code or a set of voluntary standards to provide a common approach to environmental management and eco-labeling of products and to integrate environmental responsibility into corporate management procedures. The ISO 14000 program addresses a corporation's entire range of activities, from product design, planning or training, and operations. Corporations are required to adopt the international environmental standards and to obtain ISO certification in order to do business in certain multinational markets, such as the European Union (Batie, 1997).

International trade agreements also influence corporate environmental performance. The General Agreement on Tariffs and Trade (GATT) is the oldest example of the governing institutions for most international trade. Others include the World Trade Organization (WTO) that replaced GATT, the European Union (EU) that has explicit power to enforce environmental regulations throughout the entire European Union, and the North American Free Trade Agreement (NAFTA) that was constructed to facilitate free trade between Mexico, Canada, and the United States. These agreements adopted environmental clauses that restricte corporate polluting behaviors to promote international environmental protection.[1]

Resource Drivers. Buyers, suppliers, shareholders, banks, insurance companies and investors are defined as resource drivers for corporate environmental practice

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[1] There is a strong assertion that environmental protection is incompatible with tree trade in global free trade market (Soros, 1998; Mellor, 1993). According to this assertion, international trade agreements do not drive corporations to do environmentally safe performance.

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(Hoffman, 2000 a). Buyers control the consumption of products while suppliers control the acquisition of raw materials. Institutions or groups that control the acquisition of raw materials and the consumption of products can be highly influential in the way a corporation performs its operation. Shareholders, banks, insurance companies and investors started to apply environmental criteria to minimize risk in their investments. As environmentalism is translated into a core business concern of resource acquisition, processing, and sales, the influence of these resource drivers on corporate environmental performance is increasing (Hoffman, 2000 a).

Some buyers and suppliers have developed their own environmental principles and started to require their contractors to meet the environmental principles. For example, Levi Strauss & Company has developed strict sourcing guidelines for selecting contractors that are different than the traditional guidelines about price, quality, and delivery time (Hoffman, 2000 b). It offered generous timetables, loans, and volume guarantees for contractors who met Levi Strauss & Company's environmental principles. Most contractors believed that meeting these requirements and having Levi Strauss as one of their clients was helpful for their business (Katz, 1994). In 1998, Nike required all its supplier corporations to comply with U.S. air pollution standards even if the U.S. standards were more stringent than their domestic air pollution standards (Goodman & Streeter, 1999).

Insurance companies equate corporate environmentally risky operations with increased cost of financial risk. Approximately forty-five tons of methyl isocyanate (MIC) gas escaped from two underground storage tanks at a Union Carbide Corporation pesticide plant in Bhopal India in 1989. Two thousand people died and another 300,000

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had been injured by escaped MIC gas. "The scope of the accident and the exposure of Union Carbide's insurance underwriters served to alter the structure of insurance liability coverage" (Hoffman, 2000 a, p. 74). UNI Storebrand, a large Norwegian insurance company, refused coverage to companies that failed to assume environmental responsibilities (Deutsch, 1998). In November 1995, the insurance industry developed a UNEP-supported Statement of Environmental Commitment with 78 official signatories to include the environment as one of the value-drivers in their under writing decisions (Hoffman, 2000 b).

Banks are beginning to consider corporate environmental performance in their lending decisions to reduce the environmental liability risk. The environmental consideration of banks has been triggered by increasing court cases in which banks have been held liable for environmental performance of their borrowers. According to Hoffman (2000 a), the Exxon Valdez Oil Spill disaster which occurred in 1989 altered notions about the limits of corporate financial liability for environmental accidents. Some banks such as Salomon Inc., the Bank of America Corporations, the Royal Bank of Canada and the European Bank for Reconstruction and Development (EBRD) developed a set of environmental operating principles and are beginning to examine the practices of the applicant and to consider poor environmental performance as a financial risk (Hoffman, 2000 a).

Shareholders and investors are also beginning to make decisions for their financial investment based on the data or studies about corporate environmental performance since the late 1980s because they know that there is a positive correlation

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between environmental and economic performance.[2] Shareholders and investors used their power through shareholder voting or by directing capital investment. For example, in June, 1988 the Social Investment Forum, a collection of socially oriented investment groups, developed criteria by which investors could assess the sufficiency of a corporate environmental practices in order to direct capital and resources toward those that behaved responsibly (Hoffman, 1996). The Council for Environmentally Responsible Economics (CERES) was also formed in 1989 as a coalition between socially responsible investors (SRIs) and representatives of several prominent environmental organizations in order to provide a set of ten guidelines for environmentally responsible behaviors to shareholders or investors. According to an early CERES mission statement, "SRIs advisers are concerned that environmentally unsound practices will undermine the economic health of corporations and therefore reduce the risk-adjusted return of investments in that firm" (Hoffman, 1996, p. 53). The CERES have solicited corporations to endorse the principles (Nash, 1996). Even without such outside pressures, shareholders have exerted environmental pressures on the companies in which they own stock. For example, in June 1999 the Sinsinawa Dominican Sisters (a religious order with operatives in the United States, Bolivia, Guatemala, and Trinidad) used their 100 shares of stock to force the Occidental Petroleum Corporation to reconsider its oil exploration program (Waldman,

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[2] "Research by Innovest identified a number of industries in which companies that rate higher on its scale of environmental performance produced better returns for stock holders than did less environmentally conscious competitors" (Deutsch, 1998, BU 7). ICF Kaiser International, Inc. found that companies with high scores on environmental criteria were considered as being less risky for investments and would thus enjoy a lower cost of capital and ultimately a higher stock price (Feldman, Soyka & Ameer, 1996 in Hoffman, 2000 a, p. 79). Cohen, Fenn and Naimon (1995) found that good environmental performers also tend to be good financial performers. Dasgupta, Laplante and Mamingi (1998) claimed that a high level of pollution intensity may be a signal to investors the inefficiency of the firm's production process.

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1999). Thus, shareholders and investors appear as powerful forces for environmentally safe performance of corporations since the late 1980s (Hoffman, 2000 b).

Market Drivers. Consumers include environmental concerns in their purchasing decisions. The environmental behavior of consumerism has been termed "green consumerism." Green consumerism is an outcome of public awareness of environmental problems and of support for environmental protection. The advocates for green consumerism believe that products should be more environmentally accountable in use. According to Rosendahl's (1990) findings from a 1989 survey, 77 percent of Americans said that a company's environmental reputation affected what they bought, 89 percent said they were concerned about the environmental impact of products purchased, and 78 percent said they were willing to pay more for recyclable or biodegradable packaging. In response to a July 1989 survey, 77 percent of Americans answered that they consider a company's environmental reputation when they made purchases (Krupp, 1990).

The demand for green products is continuously growing. One example of such green products is organic foods that are free from artificial preservatives, coloring, irradiation, synthetic pesticides, fungicides, ripening agents, fumigants, and growth hormones. Sales of organic foods doubled in the five years period from 1989 ($ 3.9 billion) to 1994 (7.6 billion). Sales of bottled water tripled from 1984 (933 million gallons) to 1995 (2.87 billion gallons). Health-food supermarkets across the U.S. increased from 195 stores in 1991 to 650 stores in 1994 (Burros, 1996).

Organizational expression of green consumerism is a boycott to reject the purchase of particular corporations' products. For example, consumers boycotted Burger King in order to pressure the company to modify its purchase of imported beef from

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Central America, claiming that foreign production of beef for fast-food burgers was leading to deforestation practices in countries such as Costa Rica. In another example, Exxon received over 20,000 cut up Exxon credit cards after the Alaskan Valdez oil spill incidence which occurred in 1989 (Batie, 1997).

Consumers also influence corporate environmental performance by participating as shareholders or investors in corporations and actively forcing the corporations to change their business practices. For example, following the Valdez oil spill, environmental resolutions appeared on many stockholders' ballots and were introduced at corporate annual meetings (Batie, 1997).

Corporations have responded to attacks or demands from green consumers by obtaining eco-labeling or green certification, which several organizations established to inform consumers of which products passed their environmental product standards. Eco-label are "seals of approval" certified by either public or private organizations. They provide chances for businesses to advertise their existence to consumers. Most the European countries have adopted eco-labeling programs. The oldest program is Germany's Blue Angel seal that was established in 1988, and now is applied to over 3,500 products (Batie, 1997). Some of the more prominent certification programs include the Green Seal program in the United States (1990), the European Union Eco-label program (1992), Taiwan's Green Mark program (1992), the Korean Environmental Labelling Association's Eco-Mark program (1992), the Eco-Market Program of the Japan Environment Association (1989), Environmental Choice New Zealand (1992), and so forth (Hoffman, 2000 a). Although these programs are designed to encourage existing

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green markets, corporations have attempted to use green certification to create new markets.

Social Drivers. Social drivers influencing corporate environmental performance include environmental NGOs, the community, the press, courts, academia and religious institutions. These social drivers that are constituents in the social system can mobilize public sentiment, alter accepted social norms, attitudes, and beliefs, and consequently change the way of thinking about the role of corporations related to environmental protection (Hoffman, 2000 a).

Environmental NGOs are the most prominent actors pressing corporations to adopt environmentally safe practices. They have employed diverse methods, strategies and channels to press corporations to reduce pollution emissions. They undertake scientific research and conduct public protests such as the boycott of Mitsubishi Motor Sales of America, Inc. by the Rainforest Action Network in 1993 (McCoy, 1998). Environmental NGOs engage in alliances between business leaders and NGO activists in order to work together cooperatively to find solutions that make both economic and environmental sense. Environmental NGOs have funded technological and market innovation projects. They also influence press coverage, public opinion, and politics. Environmental NGOs initiated environmental lawsuits as plaintiff against both the U.S. Environmental Protection Agency (EPA) and industry.

Local communities were aware of the negative impact of local pollution and began pressing local industry to adopt environmentally safe practices. Some communities have participated in the process of assessment, identifying problems, planning, and implementing corrective programs related to local industry pollution. They also

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conducted negotiations for pollution reduction among local corporations, community

representatives and government. A form of community pressure on local industrial

pollution is the environmental movement of grassroots organizations such as the

"Environmental Justice[3]" movement in the U.S.

The news media have played a critical role in raising environmental concern in

both the public and industry. One study found that media coverage has a strong effect on

the agenda setting of the public and attitude of policy makers about toxic waste issues

(Protess, Cook, Curtin, Gordon, Leff, McCombs & Miller, 1987). The radical

environmental movement group, Green Peace has developed diverse media strategies to

appeal to news editors and thereby attract public attention and sway public opinion

(Wapner, 1995). For another example, the media were strongly influential in placing the

Love Canal disaster (i.e., toxic waste dumps near residential areas in Love Canal, New

York in 1978) on the national agenda (Hoffman, 1993).

Court decisions have forced corporations to change traditional business attributes

that are individualistic, self-interested, profit seeking, and resource utilizing, and to adopt

more environmentally friendly business strategies and product procedures. A person who

has been injured by environmentally hazardous substances can pursue common-law

remedies through four types of legal action: trespass, nuisance, negligence, and liability.

Environmental lawsuit cases have been growing continuously in the U.S. since 1982.

When the Exxon Valdez oil tanker spilled 10.8 million gallons of crude oil in Alaska in

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[3] Environmental injustice is defined as an unfair distribution or discriminatory allocation of environmental hazards on minorities in terms of race and class such as African Americans, Native Americans, and Latinos who are mostly poor as well as poor white people. The disproportionately concentrated pollutants on minority classes and races raised the issue of environmental justice and the corrective activities are called the environmental justice movement (Bryant, 1995; Bullard, 1993; Hofrichter, 1993).

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1989, the court forced the Exxon Corporation to pay more than $ 5 billion in legal settlements. After this court's decision, most oil companies started to look carefully at the safety records of their oil transport procedures and invested greater attention to the prevention of environmental incidents (Hoffman, 2000 a). Therefore, the court is also a powerful actor driving corporate environmental performances.

Academia is an indirect actor driving corporate environmental performances. Academic study on environmental issues and concern for environmental education are growing (Hoffman, 2000 a). Academia has provided basic and fundamental ideas, knowledge, technologies, methods, human resources, and education needed for effective corporate environmental management (Hoffman, 2000 a).

Religious institutions change the values and norms of business and corporate managers or workers related to environmental protection because religious institutions help alter values, beliefs and morals at both individual and societal levels (Hoffman, 2000 a). Christianity is changing its religious context from humankinds' superiority over nature to humankinds' stewardship for nature. Christian maltreatment of the environment comes from an interpretation of the Bible[4] that has resulted in a relationship to nature called "Christian arrogance" (White, 1967). Giving up Christian arrogance, religious institutions begin to acknowledge the intrinsic value of nature and to adopt more environmentally friendly doctrines. For example, the Presbyterian Church placed environmental concerns directly into the church canon in 1991 (Associated Press, 1991). In 1994, the Roman Catholic Church equated environmental degradation with the theft from future generations (Woodward & Nordland, 1992). His All Holiness Ecumenical Patriarch

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[4] "Fill the earth and subdue it. Rule over the fish of the sea and the birds of the air and over every living creature that moves on the ground" (Genesis, 1:28).

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Bartholomew I, spiritual leader of the world's 300 million Orthodox Christians, linked specific ecological problems with sinful behavior in 1997 (Stammer, 1997). The religious institutions' adoption of environmentally friendly context changes societal attitudes, values and morals about nature, changes beliefs and worldviews about the relationship between human beings and nature, and consequently alters corporate business morals and behaviors, and pressures corporations to take responsibility for protecting the environment. Therefore, religious institutions are indirect social actors driving corporate environmental performance.

Critical Players of Public Information Disclosure[5]

Different from the command-and-control approach and the market-based instruments for pollution control, the information oriented approach emphasizes the importance of the roles of the community and the market as pollution regulatory agents, in addition to the traditional role of government. The government has played its traditional roles of setting and enforcing rules of environmental behavior. However, the idea of the information oriented approach focuses on the links of interaction among four agents as sources of pressure on polluters to improve their environmental performance: plants, government, community and the market (Afsah, Laplante & Wheeler, 1996).

The local community is a key force influencing corporate environmental performances. A study examining plant pollution in four Asian countries revealed that community pressure played an important role in some factories having high levels of

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[5] Public Information Disclosure is defined as a idea for pollution control that seeks to disclose information of corporate environmental performance to the public in terms of pollution control tool or strategies. In this paper, the public information disclosure is also referred to the Information Oriented Approach.

abatement (Hettige, Hug, Pargal & Wheeler, 1996).[6] Recent evidence from Asia, Latin

America and North America suggests that neighboring communities can have a powerful

influence on factories' environmental performance.[7] "Factories negotiate directly with

local communities, responding to social norms and /or explicit or implicit threats of

social, political or physical sanctions if they fail to reduce the damages caused by their

emissions" (Afsah, Laplante & Wheeler, 1996, p. 6). Thus, the community appears to be

an informal regulator for pollution control because it forces local corporations to

voluntarily reduce their pollution emissions. The community pressures concerning

corporate pollution reduction are produced by activities of environmental NGOs,

religious institutions, social organizations, community leaders, the news media, the

courts, academia or politicians (Hoffman, 2000 a).

The market is another key force affecting corporate environmental performance,

in addition to the government and the community. Several studies exploring the

relationship between capital market and plant environmental behavior in the U.S provide

evidence to support the argument that financial markets provide strong incentives for

corporations to reduce voluntarily their pollution.[8] A study examining the relationship

between pollution and capital markets in developing countries found that capital markets

responded positively (e.g., increase in the corporate values) to the announcement of good

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[6] Additional evidence from Asia can be found in the following papers: Pargal & Wheeler, 1996; Huq & Wheeler, 1993.

[7] Refer to Huq & Wheeler, 1993; Hettige, Hug, Pargal & Wheeler, 1996; Pargal & Wheeler, 1996; Hartman, Huq & Wheeler, 1997; Dasgupta, Lucas & Wheeler, 1997.

[8] Evidence related to market power for pollution management can be found in the following papers: Muoghalu & Robison , 1990; Lanoie & Laplante, 1994; Hamilton, 1995; Arora & Cason, 1996; Badrinath & Bolster, 1996; Khanna & Quimio, 1997; Konar & Cohen, 1997; Dasgupta, Laplante & Mamingi, 1998; Lanoie, Laplante & Roy, 1997; Fouloan, Lanoi & Laplante, 1999; Hoffman, 2000 a; Hoffman, 2000 b. For example, Konar & Cohen (1997)'s study found that corporations that received the largest stock price declined immediately following the release of the Toxic Release Inventory to the public, and subsequently reduced their emissions more than their industry peers.

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conduct awards and negatively (e.g., decrease in the corporate value) to citizens' complaints (Dasgupta, Laplante & Mamingi, 1998).[9] Thus, it appears that markets can pressure corporations to voluntarily reduce pollution.

The role of a regulatory authority in the scheme of the information approach for pollution control is to provide information of corporate environmental performance to the public (i.e., the international, resource, market, and social drivers of corporate environmental performance). Information is a critical actor in the context of the public information disclosure strategy. Information empowers communities to participate in the process of local industry pollution control and provides markets with reliable environmental data or knowledge related to corporations. Negative information about corporate environmental performance embarrasses polluting corporations and hurts corporate reputations. Thus, regulators could manage pollution more cost-effectively once they have 1) high-quality information, 2) more integrated information systems, 3) more internal capacity for priority-setting, and 4) especially stronger public participation (Wheeler, 1997). Thus, the idea of disclosing environmental information for pollution control adds a new role for government in addition to the traditional role of establishing and enforcing pollution standards or charges.

Limitations and Advantages of Public Information Disclosure

Public Information Disclosure (PID) offers strong advantages for pollution control, however, PID also has some limitations for pollution control even though shortcomings of PID have not been formally reported.

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[9] See Wheeler, 1999, P 62. It summarizes the findings related to stock value changes caused by environmental information.

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<u>Limitations of PID</u>

PID would not be workable in under-developed countries. For PID to work effectively, at least three conditions need to be satisfied. First, governments should have an internal capacity for collecting credible and high-quality information about corporate environmental performance, an integrated information system, a capacity for priority-setting and a capacity for translating raw information into easily readable information (Wheeler, 1997). Especially, pollution control authorities of government, which disclose environmental information of corporations, should retain credibility. If the authorities are perceived as 'not credible,' the public will not accept the information so that the information will not work for pollution control. Second, publics must have a sufficient level of environmental attitude or consciousness that leads to public participation in environmental protection because PID requires strong public participation for its success (Wheeler, 1997). Even though a well-developed stock or product market system affecting corporate environmental performances does not exist, PID could work effectively because where formal regulators were absent or ineffective, the informed communities with CEPI directly pressured neighborhood corporations to reduce pollution (Pargal & Wheeler, 1996; Blackman & Bannister, 1998). That is, PID requires strong public participation for its success. Third, social organizations and media need to be well-developed for disseminating information to the public. However, all three conditions would not be easily satisfied in the under-developed countries. No PID advocates have asserted that PID could be effective for pollution control in under-developed counties, even though they asserted that PID could be effective in both developing countries and developed countries.

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Without the consent of policy makers and industry, it is impossible for government to adopt PID strategy for pollution control. Industry or businesses continuously lobby policy makers to lower national environmental standards or to weaken environmental law enforcement. Basically, polluting corporations have strong incentives not to disclosure their environmental performance information because the information will damage their image or reputations. Even though it is not an example of PID, Korean government's attempts to release lists of those related to the crime of adolescent prostitution failed due to strong opposition from political leaders, then, the first release was administrated in 2001 and the second was conducted on March 19, 2002. Thus, PID requires, even at the minimal level, the consent for information disclosure.

PID could be a supplementary or complementary tool to CAC, while it could not be a major pollution control tool. Different from CAC, PID is a voluntary pollution control tool, not an enforcing tool for pollution reduction. Different from voluntary incentive programs such as the 33/50 program and the Response Care program, pollution regulatory authorities (i.e. government) can not predict the quantity and time schedule of corporate pollution reduction in the system of PID. The effectiveness of CEPI disclosure could be temporary because a great deal of anecdotal cases showed that public environmental activities such as a consumers' avoidance of buying products of polluting corporation is mostly temporary.   Thus, PID will be an ineffective and unreliable pollution control tool in the situation where serious public and environmental health issues exist and in the situation where pollution reduction should be rapidly achieved. In other words, CAC will be a more reliable and better pollution control tool rather PID in an emergency situation of environmental problems.

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PID would not be effective for corporations that do not care about maintaining

their image or reputation. It is asserted that PID could work well for reputationally

sensitive companies (Wheeler & Afsah, 1996). Large corporations seem to be more

sensitive to their images or reputation for their businesses. However, it seems that some

small corporations do not care about maintaining their reputation. These small

corporations seem to have less sense of social responsibility for a clean environment.

That is, a voluntary pollution control program such as PID will not be effective for

pollution reduction of the reputationallly insensitive corporations.

Advantages of PID

   Cost-Effectiveness. The first advantage of PID is cost-effectiveness, especially in

developing countries. Tietenberg (1985; 1990; 1995 b) asserted that command-and-

control (CAC) regulation is an inefficient and expensive pollution control tool. Tradable

pollution permit (TPP) has also been revealed as an expensive tool. There are large

transaction costs for information discovery in the system of TPP, and this hinders trading

(Batie & Ervin, 1997). The difficulty of designing and implementing TPP is another cost.

In the developing countries, the regulatory infrastructure for implementing Market-based

Instruments (MBI) is insufficiently developed. As a result, developing countries are

incapable of handling adequately the burden of designing, implementing, monitoring, and

enforcing an effective pollution control system (Tietenberg, 1998). Formal regulation in

developing countries also has been greatly hindered by the absence of clear and legally

binding regulations, limited institutional capacity, lack of appropriate equipment and

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trained personnel, and inadequate information on emissions (Hettige, Hug, Pargal & Wheeler, 1996).

A study of the cost and effectiveness of PID has not yet been conducted. As a result, the supporting data or evidence for cost-effectiveness of PID is not available. However, it is assumed that costs for designing, implementing, and monitoring PID would be smaller than CAC and MBI. PID simply consists of disclosing high-quality information about corporate environmental performance. It leaves everything to social drivers (i.e., community and market) to control polluting behaviors. With respect to PROPER, several teams of BAPEDAL (Indonesia's National Pollution Control Agency) and NIPR (World Bank's New Ideas in Pollution Regulation) designed, implemented, monitored and assessed PROPER with the cooperation of mass media. Cost for high-quality information in terms of credibility, presentation, and integrated information system are considered. Data for CEPI is mostly already available from the database of pollution regulatory authority. The cost for information collection, aggregation and dissemination is also decreasing (Tietenberg & Wheeler, 1998). All social drivers (e.g., mass media, grassroots organizations, NGOs, financial markets, products markets, courts, etc.) are also freely available for PID implementation. Thus, PID would be a less expensive and more easily implemented pollution control approach, compared to both CAC and MBI.

System Stability. PID is a systematically more stable pollution control tool than CAC and MBI because it is a multi-agent pollution control tool. The primary agent of CAC is the government environmental agency such as the U.S. EPA (Environmental Protection Agency). The result is that effectiveness of CAC relies entirely on

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players in the MBI approach are government and market. For example, the U.S. EPA and

the trading market for Pollution Permits play a key role in the system of TPP. Thus,

effectiveness of MBI relies on the government and market. If the government or the

market fails to play their role well, pollution control will not be achieved. In contrast, PID

relies on multi-agents: government, corporations, financial industry and stock market

(e.g., banks, insurance companies, share holders, investors), product market (e.g.,

consumer, big corporations of buyer and supplier), community (e.g., grassroots

organizations), mass media, NGOs, courts, and others. Thus, when government plays its

role well (i.e., providing a credible and easily understood information to the public), even

though some of key agents fail to play their roles, a variety of agents are motivated to act.

As Wheeler (2000) emphasized, where formal regulators (i.e., government's

environmental officials) are ineffective, informed NGOs and community groups (e.g.,

religious institutions, social organizations, citizens' movements, and politicians) may

pursue informal regulation based on convincing polluters or negotiating with them

polluters to conform to social norms. In other words, it is assumed that PID operates with

relative stability in any situation in the system of industry pollution control tools.

Public Participation. PID is a public participation-based approach and is highly

appropriate in the current trend of academic involvement and practice in public policy.

CAC employs a power-based pollution control procedures. Power is the force of

coercion. Power is defined as the ability to make others do something they are not

otherwise willing to do. CAC imposes some type of regulatory action and associated

costs upon polluters. As a public participation-based approach, PID is a tool or strategy

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for pollution control using power of public, rather than relying solely on governments' power. For the public to participate in the pollution control arena and to generate power against polluters, people need to be informed (Spano, 2001). Community involvement or public participation often starts by informing and educating people about a proposed decision or action through press releases and public meetings because knowing is the beginning of attitude and behavior change (McKinney, 2000). According to McKinney, collaborative action begins on the basis of common understanding that pollution places them at risk and in danger. A common understanding builds consensus among people. Consensus facilitates voluntary engagement of public. Information ignites the process of clarifying, discussing, and seeking a common understanding of environmental issues which community faces. Thus, disclosure of information about corporate environmental performance is assumed to ignite public's voluntary engagement in the pollution control.

A concern about public participation in the public policy process such as environmental or community development policy has been rising in the academic and practical arenas. Advocates for public participation assert that the public and communities should participate in the process of identifying and assessing problems, planning and implementing public policies, and advocating pollution reduction among corporations, community representatives and government. Community and public participation can be effective in achieving sustainable improvements in environmental conditions and health (Yaccob, 1995). In conclusion, PID is a pollution control strategy based on public participation.

Information Society. PID is an information-based approach for pollution control, and thus it has the advantage of using the infrastructure of a modern information society.

We are living in the information and technology era and a salient feature of this era is far greater capacity to collect, process, and disseminate information (Afsah, Laplante & Wheeler, 1997). The role of mass media and the Internet is increasing rapidly as modern technology progresses. Information moves through the Internet at the speed of light and is easily transmitted to the public by mass media. The cost for information collection, aggregation and dissemination continuously falls in this era (Tietenberg & Wheeler, 1998). Thus, disclosing and transmitting CEPI can be easy, inexpensive, and fast. PID can fully use all the resources of this information and technology era and employ them to help further reduce the cost of PID and increase its effectiveness. Afsah, Laplante and Wheeler (1997) assert that regulation should change fundamentally in the new information age and they suggest that governments should allocate fewer resources to setting rules imposing standards of behavior, and more effort in collecting and disseminating appropriate information. In this respect, PID is very appropriate to the trend of our modern information society.

Ethics and Right to Know. PID would avoid an ethical criticism, that Pollution Permit (TPP) might face it. Environmentalists associated with deep ecology criticize utilitarian moral principles (Perman, Ma & McGilvray, 1996). The moral position of the deep ecology is likely to be that polluting is a basically bad behavior and government should not allow corporations to purchase permits to pollute. With TPP, government allows undesired behaviors that can have severely negative impacts on human health and the ecosystem. Thus, PID would be relatively more ethical than TPP, even from the perspective of deep ecologists.

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Communities and people have a right to know the conditions that affect them and have a right to defend themselves against it. They have a right to participate in decisions that affect the fundamental conditions of their lives. Thus, government should provide the information about the conditions that affect peoples negatively. PID fulfills the ethical responsibility for "people's right to know."

Enhancing Transparency of Government Environmental Protection Activities. PID promotes transparency of government data collection or evaluation of corporate environmental performance (Afsah, Laplante and Wheeler, 1996; Afsah, 2002) because PID allows corporate feedback related to their data released. Disclosing CEPI opens governments' data to the public. When released information about corporate environmental information is incorrect, the corresponding corporations can counter the information because it damages their image or reputation. When corporations are polluting, but government evaluates them as non-polluting corporations and the evaluative information is released to the public, competing corporations, environmental NGOs, or mass media can disclose the facts regarding polluting corporations. Thus, PID allows assessment and feedback from various social groups to oversee and monitor government environmental activities related to data collection and evaluation of corporate environmental performance. That is, when CEPI is released to the public, the informed public can assess and monitor government's oversight activities. As a result, PID can prevent corruption of public environmental officials and enhance transparency of a government's environmental protection activities.

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Previous Cases of Public Information Disclosure for Pollution Control

To obtain a clearer understanding about PID, this section introduces previous studies that implemented the idea of PID to the practice of pollution control.

Program for Pollution Control, Evaluation and Rating (PROPER)[10]

A pilot program using a strategy of public information disclosure for pollution abatement was performed in Indonesia in 1995. Faced with industrial expansion and a rapidly deteriorating environment, BAPEDAL (Indonesia's National Pollution Control Agency) and NIPR (New Ideas in Pollution Regulation in the World Bank) initiated an innovative program called PROPER for rating and publicly disclosing the environmental performance of Indonesian factories. PROPER evaluated participating plants with five color-coded "grades" indicating their compliance with pollution regulations as follows:

1. Black: Factories or business activities that apply no environmental management effort and whose activities cause environmental degradation and serious damage to nature and human beings.

2. Red: Factories or business activities that apply some environmental management effort but not sufficiently to comply with the national standards for air, water, solid and toxic wastes.

3. Blue: Factories or business activities that apply effort sufficient only to meet the national standards for air, water, solid and toxic wastes.

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[10] For details of PROPER, refer to Afsah, Laplante & Wheeler, 1996; Afsah & Vincent, 1997; Afsah, Laplante & Wheeler, 1997; Wheeler, 1997.

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4. Green: Factories or business activities that conduct environmental impact management efforts and achieve better than the national standards for air, water, solid and toxic wastes.

5. Gold: Factories or business activities that use the best available clean technology; promote zero discharge of pollutants; and conduct environmental impact management efforts with very satisfactory results.

BAPEDAL worried about mistakes that could be exposed after the color grades had been made public because mistakes made in public could weaken credibility of information. In order to reduce mistakes, BAPEDAL based the grading system upon multiple sources of data, included independent inspections, developed a user friendly computer program for analyzing the data, and designed a multiple step process for reviewing proposed grades before disclosing them to the public. For an example of the multiple reviewing processes, BAPEDAL employed a three-step review process. The reviewers were 1) a special advisory board that included members from outside BAPEDAL (e.g., the Department of Health, business associations, and NGOs), 2) the State Minister of Environment, and 3) the President. To ensure that press reports on the rating system were accurate, BAPEDAL arranged for officers involved in the project to visit the offices of major local newspapers, to explain the system, and to demonstrate the computer program.

BAPEDAL surveyed initially 350 facilities participating in PROKASIH, a semi-voluntary program for controlling the discharge of industrial pollution in waterways initiated in 1989, formally labeled the Clean River Program. Through the survey,

BAPEDAL judged that 176 facilities had sufficient data to be graded. Thus, BAPEDAL invited facilities not included in PROKASIH to volunteer to be graded. As a result, the initial number of participants in the grading system was 187 facilities.

BAPEDAL decided initially to release the names of only those facilities earning green or gold grades. For the remaining facilities, it decided to initially release just the number in each color category. Finally, it decided to allow facilities six months to improve their environmental performance before it disclosed their names and grades. BAPEDAL also decided not to release all the blue, red, and black facilities simultaneously in order to sustain interest in the news. Instead, it disclosed their names and grades industry by industry.

The Minister of Environment announced the names of five facilities graded as "Green" in June 1995. It also disclosed the distribution of the grades, but not the identities of the remaining 182 facilities. Most facilities, 115 facilities, obtained "Red" and 6 facilities received "Black." None of 187 facilities gained "Gold" and 61 facilities received "Blue." The percentage of facilities receiving "Blue" or "Green" was 36 %. That is more than a third of the total.

Significant improvements in compliance status, both before and following the public announcement, were observed. The information disclosure worked as a credible threat of real punishment to the polluters rated as "Black" (Afsah, Laplante & Wheeler, 1997). By December 1995, when the Minister started disclosing the names and grades of all facilities, the number of facilities graded as "Black" dropped from 6 to 3. The number of facilities graded as "Red" fell from 115 to 108. Consequently, the number of facilities graded as "Blue" meeting the basic requirements for compliance increased from 61 to 72.

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That is, in six months, PROPER raised the compliance rate from 36 % to 41 %. More than a quarter of the facilities graded as "Red" or "Black" in December 1995 improved their grade to "Blue" or "Green" by September 1996.

PROPER embodied a power strategy for strengthening relationships with three important external stakeholders: NGOs, communities, and the press. These three groups are empowered when they are informed of corporate environmental performance. A study of PROPER found that armed with credible corporate environmental information, NGOs, communities, and the media effectively exerted pressure on polluters to improve performance (Afsah, Laplante & Wheeler, 1997).

Toxic Release Inventory

In 1986 the U.S. Congress passed the Emergency Planning and Community Right to Know Act (EPCRA) that includes the Toxic Release Inventory (TRI) designed to provide information to the public on the release of toxic substances into the environment. EPCRA required manufacturing establishments with certain threshold sizes of chemical emissions to disclose publicly the quantity and type of toxic chemicals released into the environment. Consequently, TRI lists those corporations that use 10,000 pounds or more of a listed chemical in a given calendar year. Corporations that import, process, and manufacture 25,000 pounds or more of a listed chemical must file a report on each of the chemicals in existence within the facilities if they have 10 or more full time employees. The first reports were on July 1, 1988 for toxic emissions in the calendar year 1987. The first public disclosure of TRI data occurred on June 19, 1989.

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The 30 / 50 Program

In 1991, the U.S. EPA initiated the 30 / 50 program, the first voluntary Industrial Toxics Emissions Reduction Program. Under this program, participating corporations agreed to reduce emissions of seventeen priority chemicals by 33 percent through mid-1992 and to achieve a further 50 percent reduction by 1995. The number of participating corporations was expanded from 555 to 5,000. Participating corporations decreased their emissions by more than 50 percent (a total of 757 million pounds of pollutants) by 1994, a year ahead of schedule. A primary factor attracting chemical corporations to participate in this program was a national media campaign promoting better images for them (Arora & Cason, 1996; Batie, 1997; Tietenburg, 1998; Hoffman, 2000 a).

Pollutant Release and Transfer Register[11]

Inspired by the successes of TRI, the OECD initiated a program of Pollutant Release and Transfer Register (PRTR). Agenda 21 of the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 set a specific objective. By the turn of the century governments were to implement and improve databases and inventories on chemical emissions. PRTR can be defined as an environmental database or inventory of potentially harmful chemicals that are released to air, water and soil as well as water for their treatment and disposal. PRTR uses the same format as TRI but restricts listed chemicals to those with relatively high hazard ratings. PRTR is currently implemented in the United Kingdom[12], Egypt, the Czech Republic,

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[11] Environmental NGOs such as the Environmental Defense Fund have used an Internet site (e.g., http://www.scorecard.org) to inform the public of the risks of chemicals and to assist communities in identifying polluters and assessing communities' overall pollution problems.

[12] PRTR is implemented in the name of the Chemical Release Inventory in the United Kingdom.

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and Mexico. The results of those programs, however, have not been reported (Wheeler, 1999).

Previous Empirical Studies

The New Ideas in Pollution Regulation (NIPR) in the World Bank provided empirical evidence about the effectiveness of the information disclosure program named Pollution Control, Evaluation and Rating (PROPER) initiated in Indonesia in 1995.

Effectiveness of Public Information Disclosure in Canada

In addition to evidence from PROPER in Indonesia, Foulon, Lanoie and Laplante (1999) provided empirical evidence about the effectiveness of the information disclosure program in Canada by comparing the existing regulatory enforcement actions.

The Ministry of Environment, Lands, and Parks of British Columbia, Canada (MOE) publishes twice a year a list of firms that either do not comply with the existing regulation or whose environmental performance is of concern to MOE since July 1990. The information revealed by MOE includes the names of the firm, the location, the nature of concern (e.g. mining operation effluent, pulp mill effluent, sawmill emissions), the reason for which the firm is on the list, and the number of times the firm has been on the list.

Foulon, Lanoie and Laplante conducted the empirical investigation based on a sample covering 15 plants in the pulp and paper industry over the period 1987 – 1996. BOD (Biological Oxygen Demand) and TSS (Total Suspended Solids) were considered. They found that the adoption of stricter standards and higher penalties had a significant impact on emissions levels, but the public disclosure strategy adopted by the province of

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British Columbia (Canada) has a larger impact on both emission levels and compliance status than orders, fines, and penalties traditionally imposed by the Ministry of the Environment and courts. They concluded that the public disclosure of environmental performance does create additional and strong incentives for pollution control.

Financial Market and Corporate Environmental Performance Information

Several empirical studies that define the association between stock value change and CEPI release have been performed. They mostly focus on the effect of TRI reports on the stock values of corporations listed in the reports.

Klassen and McLaughlin (1993) investigated the stock market reaction to positive or negative environmental information using event study methodology. They found that positive environmental news in the form of the announcement of an environmental award resulted in positive excess market returns and negative news in the form of a crisis such as an oil spill resulted in negative excess returns.

Cohen, Fenn and Naimon (1995) examined the stock market response to new information of TRI emission on the environmental performance of individual firms, and found that corporations with lower TRI emissions outperformed their industry competitors in the stock market between 1987 and 1989. They also presented evidence for the assertion that green investors need not pay a premium for their convictions and argued "the fact that greener firms are doing as well or better than their more pollution-intensive counterparts may be due to the fact that firms with more efficient manufacturing processes also pollute less" (p. 14).

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Hamilton (1995) found that publicly traded corporations whose TRI releases were

first reported on that date experienced statistically significant negative abnormal market

returns and 2) TRI provided news to investors and journalists. He investigated stock

values of the corporations listed in the reports released by the U.S. EPA in 1989 in order

to examine the reaction of journalists and stockholders to the TRI reports. Hamilton

found that the higher the pollution figures (such as air emissions or offsite shipments of

toxic waste) were in TRI reports, the more likely print journalists were to write about the

corporate toxic releases and the more likely print journalists were to write about the

firm's toxic release, and this would be more likely to affect investors' behavior. For those

companies that reported TRI data to the EPA, the average abnormal return on the day this

information was made public was negative and statistically significant. Hamilton

estimated that corporations reporting TRI information lost on average $ 4.1 million in

stock value on the first day the data were released. The abnormal negative return effects

of stock price were reduced for corporations where investors had previous information

about pollution patterns such as companies with exposure at Superfund sites.

Laplante and Lanoie (1995) observed the reaction of the stock market to the

announcement of environmental incidents, environmental lawsuits, or suit settlements.

They found abnormal losses in stock value of Canadian-owned corporations ranging

between 1.65% and 2% when the firms were found guilty (and fines imposed) on the day

that the settlements of lawsuits were announced. No losses in stock value were

experienced when lawsuits were first initiated. They analyzed the impact of the

announcement of 47 environmental incidents, investment in emission control equipment

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on the equity value of Canadian corporations, 9 announcements of lawsuits and 13 announcements of suit settlements in Canada, using data from 1982 to 1991.

Lanoie, Laplante and Roy (1997) provided evidence indicating that stock markets react to the release of information based on American and Canadian data. Every six months since July 1990, the Ministry of the Environment of British Columbia (BC, Canada) publishes a list of polluters identified in two categories: "not complying" and "of concern to the Ministry." They found that appearing on the BC polluters' list had no impact on a firm's equity value in Canada, using the SIMM (single-index market model) version of the standard event-study technique (i.e., DAY -1, DAY 0, and DAY +1). However, they also found that large polluters were affected more significantly from the release of polluter lists than smaller polluters. It was also observed that penalties imposed by courts and regulators did not provide enough incentive for investment in pollution control because fines or penalties (as imposed by regulators and courts) were too low (compared to pollution abatement cost) to act as effective deterrents. "Upon trading-off the costs and benefits of pollution control, profit-maximizing firms may choose not to invest their resources in pollution abatement since the expected penalty imposed by regulators falls considerably short of the investment cost" (Lanoie, Laplante & Roy, 1997, p. 17). Hence, Lanoie, Laplante and Roy asserted that capital markets may play a role in creating the incentive for pollution control. They concluded that information has an impact on market valuation, and it affects a polluter's environmental performance.

Konar and Cohen (1997) studied an impact of CEPI disclosure on financial markets based on the TRI data by comparing 1989 emission to 1992 levels. Their study focused on firm behavior in response to a significant stock market reaction to new

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information on toxic chemical emissions. They observed that corporations with the largest negative stock price effects following the announcement of their TRI emissions were found subsequently to reduce their emissions more than other firms in their industry and also to make other significant attempts at improving their environmental performance by reducing the number and severity of oil and chemical spills (e.g., top 40 polluting firms subsequently reduced their emissions more than other firms.). They also found that media attention and resultant stock price effects have more of an effect on subsequent firm behavior than simply being known as the largest emitters in the U.S. It is also found that the market reacted more to unexpected TRI disclosures than to those that were already expected to be very large. Konar and Cohen provided a rationality for the negative stock price effect. That is, firms high on the TRI list can be expected to spend resources to catch up with their competitors who are not polluting as much and to defend themselves in costly litigation. Investors who learn that a firm is high on the TRI list may rationally react to this information by bidding down that firm's stock price. Thus, investors use TRI emissions as a signal of the corporate productive efficiency. Financial markets provide a strong incentive for firms to change their environmental behavior. Thus, it can be asserted that under the efficient markets hypothesis, we can expect any abnormal movement in stock prices to be the result of new information that changes the expectations of the investing public about the future prospects of a firm. Konar and Cohen argued that if the provision of this information negatively impacts the financial performance of the firm, it will provide strong incentive to the firm to become a better environmental actor. They concluded that providing information to the public may be an effective remedy to reduce environmental externalities beyond a regulatory standard.

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Some studies focused on an association between corporate environmental performance and economic performance in the stock market, not focusing on the effect of disclosure of CEPI on stock market. The Alliance for Environmental Innovation reviewed seventy studies and found a positive correlation between corporate environmental performance and economic practice in stock market, meaning that corporations that environmentally outperform their peers outperform them on the stock market by as much as two percentage points (Hoffman, 2000 a). ICF Kaiser International, Inc. found a similar correlation in a study of 300 of the largest public corporations in the U.S (Hoffman, 2000 a, p. 79). Feldman, Soyka, and Ameer (1996) found that corporations with high scores on environmental criteria were considered less risky for investments and would thus enjoy a lower cost of capital and ultimately a higher stock price (Hoffman, 2000 a, p. 79).

Dasgupta, Laplante and Mamingi (1998) found that capital markets in Argentina, Chile, Mexico, and the Philippines appeared to react to the announcement of environmental events (news) involving publicly traded companies. They investigated the reaction of the capital market in Argentina, Chile, Mexico, and the Philippines to environmental news such as violation of permits, spills, court actions, citizen complaints and protests, agreement between government and companies, investment in clean technologies and environmental protection, the announcement of pollution abatement, government black list of polluters, and government actions such as warnings, fines, penalties, complaints, and company shutdowns. Their investigation proved that capital markets react negatively (i.e., decrease corporate value) to citizens' complaints targeted at specific firms. Markets reacted positively (i.e., increase corporate market value) to the

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announcement of rewards and explicit recognition of superior environmental performance. Thus, Dasgupta, Laplante and Mamingi (1998) concluded that capital markets have penalized corporations suffering from adverse environmental events, and rewarded corporations with positive environmental news.

Effectiveness of Public Information Disclosure in Korea

The study performed by Byung-Jun Jeon (1998) is the first and only study related to Public Information Disclosure as a pollution control strategy in the Korean stock market. Jeon examined the effects of both good news and bad news about corporations on stock values between 1992 and 1995. The good news was environmental information that was intentionally disclosed by corporations. The bad news was about environmental violations reported by government. He used event test and multiple regression for data analysis. Jeon found that 1) investors responded to information on environmental violations, and 2) environment-related self-disclosure news did not have significant effects on the stock market because of the weak reliability of information. Based on his findings, he concluded: "the use of information by the Korean government as an environmental policy tool already has had effects" (Jeon, 1998, p. 155).

Cautious interpretation of Jeon's research is advised for the following reasons: First, 53.5 %[13] of the good news that was intentionally disclosed by corporations was business-related data rather than environment-related data. These data could provide information about business practices, not about corporate environmental performance.[14]

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[13] Data items include "Environmental Business (42.4 %)," "Entry in Spring Water Business (9.7%)," "Construct of golf Business (0.7%)," and "Construct of Natural Park (0.7%)." See Jeon, 1998, p103.
[14] Jeon's data analysis result of t-statistics also shows that the variable of golf course did not have significant influence on the abnormal return of stock value. Refer to Jeon, 1998, p 147.

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Therefore, more than half of the data may not have been useful in predicting

environmental performance. This problem could weaken the validity of his conclusions.

Second, the bad news used for Jeon's study was not easily understood information

by the public. The bad news was available only to a few people concerned in contrast to

the case of TRI. The bad news adopted for the event test in Jeon's research was not

disseminated to the Korean public by mass media or environmental and social NGO's.

This means that the bad news used in Jeon's research could not create the pressures

necessary to increase the potential cost incurred by corporate management, and

consequently creating incentives for polluting corporations to reduce their pollution.[15]

Therefore, the bad news used in Jeon's research does not seem to be valid data for

measuring what Jeon intended to measure.

Product Market and Environmental Information Disclosure

Consumers could react by not buying the products of corporations with very large

emissions. So far no study directly examined the effect of CEPI disclosure on product

markets. However, some studies about tendencies of consumer behavior related to

corporate environmental information and tendencies of corporate behavior related to

green consumerism have been done.

Rosendahl (1990) found evidence supporting the existence of green consumerism

from a 1989 survey. Eighty nine percent responded that they were concerned about the

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[15] Investors paid attention to the increase in community pressure, citizen lawsuits, product boycotts of green consumers or environmental NGOs, and enforcement action of government caused by TRI release. Investors assessed the potential cost that firms on the TRI list were expected to incur in order to catch up with their competitors (Konar and Cohen, 1997).

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environmental impact of products purchased, and 78 percent said they were willing to pay for more recyclable or biodegradable packaging.

Krupp (1990) also observed the same consumer tendency as Rosendahl. In response to a July 1989 survey, 77 percent of Americans said that they consider a company's reputation when they buy a product.

Magat and Viscusi (1992) examined the potential effectiveness of hazard warnings and found consumers do react to warning labels. For example, in the case of insect spray, half of consumers stopped using insect spray. However, information used in their study was about the product, not corporate environmental performance.

Arora and Gangopadhyay (1995) found that industries that relate more closely to consumers were more likely to participate in voluntary pollution prevention efforts. This finding supports the claim that consumer power in the market can be assumed to threaten polluters.

Arora and Cason (1996) investigated participation in the EPA's 33 / 50 to determine the potential that such voluntary environmental regulation has for improving environmental quality. They found that industries with greater consumer contact participated more in this program than industries with less consumer contact.

Wheeler (1997) addressed four factors for impact of public information: citizens, NGOs, investors, and consumer. Relying on results of the PROPER program in Indonesia he asserted that environmental reputation does matter to corporations whose expected costs or revenues are affected by judgments of environmental performance by customers, suppliers, and stockholders.

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In one of the most recent studies, Lanoie, Laplante and Roy's (1997) study

focused on the capital market. Based on their findings, the authors asserted that collective

information, which compares firms with bad performance to those with good

performance, is more likely to allow consumers to switch away from the products

produced by the firms with bad environmental performance.

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CHAPTER III

CONCEPTUAL FRAMEWORK OF PUBLIC INFORMATION DISCLOUSRE

Assumption for Corporate Behavior

Loss of market shares or stock values by disclosure of corporate environmental

performance information (CEPI) is asserted to be a key factor motivating corporations to

reduce their total quantity of pollution in the scheme of Public Information Disclosure

(PID). This assertion is made on the basis of the following assumptions about corporate

behavior:

1. The corporation is a profit-maximizing behavioral entity.

2. The quantity of corporate pollution is decided based on cost and benefit
   analysis.

3. Potential cost from CEPI disclosure causes loss of market shares or stock
   values for polluting corporations.

4. Loss of market shares or stock values motivate corporations to reduce the
   pollution of polluting corporations.

As is well known in economics, the corporations are profit-maximizing entities

that make decisions based on self-interest. Corporate managers are actually the ones who

decide the amount of corporate pollution. They can change their behaviors related to

corporate pollution without changing their attitudes, beliefs, or values for the

environment. As Green and Cowden (1992) have argued, the prospect of behavioral

involvement (unlike the request for an opinion) forces people to consider cost and hence,

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prompts self-interest reflection. Miller and Ratner (1998) asserted that the link between self-interest and behavior is stronger than that between self-interest and attitudes. Increase of cost because of the disclosure of CEPI forces managers to reduce the amount of pollution to satisfy their self-interest, which is maximizing their profit, even though they still keep the negative attitudes, beliefs, or values toward the environment.

Social Norms and Corporate Profit Maximizing Behavior

Social norms or desires also drive polluting corporations to abate pollution when information that they are severely polluting is revealed to the public. In the PROPER program in Indonesia, some factories were located in areas where formal regulators are absent or ineffective. However those factories voluntarily reduced the amount of pollution (Hettige, Hug, Pargal & Wheeler, 1996).[1] It is explained that polluting corporations complied with social norms or community desires that the community environment should be protected and factories should not deteriorate the air and water of the community. This sort of pollution control through social norms or community desires is called "informal regulation" in pollution control studies.

However, the motivation of compliance to social norms also resulted from the potential cost by violation of social norms. The potential cost of violating social norms is driven by community grassroots organizations or environmental NGOs: local religious institutions, social organizations, community leaders, citizens' movements or politicians,[2] in other words, the international, resource, market, and social drivers of corporate

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[1] Additional evidences from Asia can be found in the following papers: Pargal & Wheeler, 1996; Huq & Wheeler, 1993.

[2] Refer to Huq & Wheeler, 1993; Hettige, Hug, Pargal & Wheeler, 1996; Pargal & Wheeler, 1996; Hartman, Huq & Wheeler, 1997; Dasgupta, Lucas & Wheeler, 1997.

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environmental performance. Therefore, it appears that compliance of polluting

corporations with social norms or community desires is also a profit-maximizing

behavior.

Corporate Reputation and Environmental Information

Information about corporate environmental performance disclosed to the public

for promoting pollution control would be very effective, especially in the situation where

environmental reputation plays an important role in determining business strategies,

consumers' purchase behavior, and investors' financial investment decisions. Damage to

the image and reputation of polluting corporations becomes the pressure or motivation

and the incentive for pollution reduction.

Some corporations became concerned about their environmental reputations (i.e.,

green reputation) in their business strategies. For example, the Chemical Manufacturers

Association (CMA) developed a set of environmental standards for all member

companies to adopt and instituted a program, "Responsible Care," in 1990. Responsible

Care bound its members to a set of principles designed to improve environmental

performance. The primary goal of this program was to mend the public image of the

chemical industry following events such as the disaster of Union Carbide's pesticide gas

accident at Bhopal, India, in 1989, and eventually to improve member companies'

environmental reputation (Nash & Ehrenfeld, 1996). Similarly, programs designed to

improve environmental reputation were flourishing in other industries, such as the

Strategies for Today's Environmental Partnership (STEP) of the American Petroleum

Institute in 1990, the Encouraging Environmental Excellence (E3) of the American

Textile Manufacturers Institute in 1992, the Environmental Management Program (EMP)

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of the Printing Industries of America, Inc. in 1992, the Great Lakes Automotive Pollution

Prevention Project (APPP) of the American Automobile Manufacturers Association in

1991, etc. (Hoffman, 2000 a). Thus, environmental reputation is becoming more critical

in the area of business.

A critical factor encouraging corporations to make stronger efforts for improving

their environmental reputation is consumers' environmental concerns related to corporate

business performances. It is because consumers began to consider a corporations' green

reputation in making their purchase decision. In other words, consumers began to demand

environmentally friendly attributes in products and companies.[3] Another critical factor is

financial market drivers. Financial investors including bankers, shareholders, and

insurance companies also began to consider environmental reputation in their investment

or lending decisions in order to reduce investment risks because of the possible positive

correlation between environmental performance and economic practices.[4] According to

Dasgupta, Laplante, and Mamingi (1998), a high level of pollution intensity may signal to

investors the inefficiency of the firm's production process. "For reputationally-sensitive

companies, public recognition of good or bad performance may translate to large

expected gains or losses over time. These can affect lending decisions by bankers, who

may also be concerned about legal or financial liability for polluters who are not

complying with regulations" (Wheeler, 1997, p 8). Thus, investors began to make

decisions for their financial investment based on the data about corporate environmental

performance. Environmental reputation matters for firms whose expected costs or

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[3] Refer to the "Market Drivers" in Chapter II, p. 27.
[4] Refer to the "Resource Drivers" in Chapter II, p. 23.

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revenues are affected by judgments of environmental performance by customers, suppliers, and stockholders (Cohen, 1998).

CEPI influences the image and reputation of related corporations. Dasgupta, Laplante, and Mamingi (1998) claimed, "If properly informed, capital markets may provide the appropriate reputational and financial incentive" (p. 5). Similarly, Wheeler and Afsah, (1996) stated, "Public knowledge of environmental performance has important implications for reputaionally sensitive companies" (p. 2) and "Good PROPER ratings will enhance business reputations with investors and consumers" (p. 4). Thus, reliable and understood information of corporate environmental performance can create strong new reputational incentives to polluters to move beyond compliance and toward attainment of higher performance ratings (Wheeler, 1997). In sum, CEPI disclosures to the public change corporate image and reputation and they would be effective for pollution reduction, especially for reputationally sensitive companies.

Role of Information: Carrot and Stick

Information disclosure of corporate environmental performance to the public may be seen as a "Carrot" or "Stick" approach where the carrot is the incentive and the stick as the threat of enforcement. In other words, the donkey or corporations moves forward because information disclosure causes a decrease in revenue due to a shrinking market share and loss of stock value. This in turn causes an increase of corporate management costs when boycotts by green consumers occurs, or when citizen complaints and litigation results in stronger environmental law enforcement by government and results in mass media exposure of corporate environmental practice.

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These potential losses and increased management costs would weaken the corporate competitive position and eventually cause them to lose competitive standing in the industry. That is, the new industrial competitive business environment is driven by corporate environmental information. Therefore, for polluters, the financial loss and increase of costs are nothing more than a stick strongly threatening their survival in their new business environment. For green firms, the relative benefit from polluters' financial loss and increased costs are a carrot granting competitive advantages. Thus, it is assumed that the stronger the firms perceive threats, the more voluntarily they will comply or over-comply to environmental standards.

The carrot and stick principle implied in the idea of PID is visually summarized into the following Figure3.1.

Figure 3.1. Public Information Disclosure as Pollution Control Tool: Carrot and Stick

Principle of Organizational Behavior Control

Environmental Information Disclosure

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(MARKET)

Carrot (Prize) for Non-Polluting Corporation	*Stick (Threat)* to Polluting Corporation
Relative **Benefit**	Loss of corporation & Brand credibility **Revenue Loss**: Decrease of Market Share **Financial Loss**: Decrease of Stock Value

(INDUSTRY: New Competitive Environment)

Threats to Survival of Polluting Corporations
Encouragement for Non-polluting corporations

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Voluntary Compliance to Environmental Standards: Polluting Corporations

Over-Compliance: Non-polluting Corporation

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Conceptual Framework of Public Information Disclosure

When Corporate Environmental Performance Information (CEPI) is disclosed to the public in an easily understood form, the information may generate motivation[5] and pressures for profit-maximizing corporations to comply with environmental standards. The motivation and pressure for voluntary compliance basically results from potential loss of market share, potential increase of cost by threats of divers social drivers, and loss of stock value. Thus, the idea of Public Information Disclosure (PID) for pollution control is claimed to have the following content for polluting corporations:

1. CEPI can turn consumer attitude in a negative direction against the polluting corporations, and the negative attitude will decrease the demand for the products. Decreased product demand causes *a loss of market share*. CEPI, therefore, motivates corporations to comply voluntarily with environmental standards.

2. CEPI motivates the public to pressure politicians, government, environmental NGOs, the community, and the market to act against polluting corporations. These pressures result in a strengthening of environmental law enforcement, increasing environmental litigation, stimulating product boycotts, and strengthening mass media exposures. *The threats can constitute potential costs for the polluting corporations* and the potential cost is a reason for corporations to comply voluntarily with environmental standards.

3. CEPI influences investors to predict that the stock prices of the polluting corporations will drop because of the potential effects of negative information

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[5] Economists generally use the term "incentive" rather than motivation or pressure.

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such as the potential loss of market share and the increased costs of corrective

action by the polluting corporations. This results in the *reduction of stock*

value and *motivates polluting corporations to comply voluntarily with*

environmental standards.

Disclosure of CEPI for non-polluting corporations creates the opposite effect. That is, the potential increase of market shares and stock values produces the motivation or incentive for non-polluting corporations to over-comply with the environmental standards.

The idea of PID is visually summarized in the following Figure 3.2: A Causation-Focused Model of Public Information Disclosure.

Figure 3.2. A

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Figure 3.2. A Causation-Focused Model of Public Information Disclosure

Corporate Environmental Information disclosure by Government

(Public)

GOVERNMENT
Tighter Law
Enforcement:
Fines/Regulations

COMMUNITY
Civil Complaints
Law Suits
Boycott by NGOs
Political Pressure
Direct Negotiation
Mass Media Exposure

MARKET

Consumer Attitude
and Purchase
Behavioral Change

INDUSTRY
Effect on Stock Value
**Effect on Market
Share**

Polluting Corporations
Reputation Loss
Profit Loss
Financial Loss

*Non-polluting
corporations*
Relative Benefit

(INDUSTRY)
Voluntary Compliance / Over-Compliance for Survival
in the New Competitive Business Environment

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Three actors are at work in the framework of PID: government, public or diverse social drivers, and corporations. Government should provide highly credible and easily understood CEPI to public. CEPI disclosures may create negative attitude and behavior of the public toward polluting corporations and create positive attitude and behavior of the public toward non-polluting corporations. Then, negative attitude and behavior of public for polluting corporations or positive attitude and behavior of public to non-polluting corporations force corporations to reduce the total quantity of pollution emissions. Thus, the government's CEPI disclosure is the initial stage, the public's attitude and behavior change is the intermediate stage, and corporate pollution reduction is the last stage in the framework of PID.

Environmental information about corporate pollution disclosed to the public changes the public's behaviors (i.e., consumer purchase behavior or investors' behavior) toward polluting or non-polluting corporations and the behavior changes are preceded by the attitude changes.[6] The resulting is expressed in altered purchase practices, and this behavioral change creates incentives (i.e., pressure or motivation) for corporate pollution abatement. Therefore, the conceptual framework of PID can be examined in terms of the following components (Refer to Figure 3.3):

1. Development and release of CEPI to the public

2. CEPI influence on public's negative (or positive) attitude and behavior toward polluting corporations (or toward non-polluting corporations).

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[6] Assumption about the relationship between behavior and attitude is discussed in the Chapter IV Research Question and Hypothesis.

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3. Negative attitude and behavior toward polluting corporations causes loss of market share of polluting corporations.

4. Loss of market share or the fear of lost market share leads to corporate pollution reduction.

Figure 3.3

Conceptual Framework of Public Information Disclosure

GOVERNMENT   PUBLIC   MARKET   CORPORATION

| CEPI Disclosure | → | Attitude & Behavior Change | → | Loss of Market Share | → | Pollution Reduction |

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CHAPTER IV

RESEARCH QUESTIONS AND HYPOTHESES

Research Questions

The primary research question is: "Does corporate environmental performance information (CEPI), when disclosed to the public, influence the product market by creating incentives (i.e., pressures or motivations) for corporations to reduce their pollution?"

To answer this primary question, the following three subsidiary questions have been developed:

1. Do negative CEPI disclosures generate negative consumer attitudes and behavior toward polluting corporations and, conversely, do positive CEPI disclosures cause positive consumer attitude and behavior toward non-polluting corporations?

2. Do CEPI disclosures shrink the product market of polluting corporations and, conversely, do the CEPI disclosures expand the product market of non-polluting corporations?

3. Could public information disclosure (PID) as a pollution control tool be effective in Korea?

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Research Focus

This research focuses on the causal relationship between CEPI disclosure and changes in consumer attitude and purchase behavior. An empirical approach is employed to answer the research questions.

The conceptual framework of PID related to product markets is defined as follows:

1. CEPI leads consumers to develop negative attitudes and behavior toward polluting corporations and positive attitudes and behavior toward non-polluting corporations.

2. The negative or positive attitude and behavior toward polluting corporations or non-polluting corporations cause corporate pollution reduction.

Based on the findings discussed in the Chapter II, the second stage of the conceptual framework has been demonstrated to be true. Now, the first stage of the conceptual framework must be examined in order to determine the truth of the conceptual framework of PID. Hence, the research focus is on the question "Does CEPI disclosure influence the public's attitudes and purchase behavior toward polluting corporations and non-polluting corporations?"

Research Hypothesis

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It is hypothesized that CEPI disclosures change consumers' attitude toward polluting and non-polluting corporations. Most PID advocates assert that disclosing CEPI to the public creates reputational incentives for pollution reduction because information about the polluting actions and practices of corporations can damage corporate image and reputation. Conversely, environmental information of non-polluting corporations improves their image and reputation. When the Exxon Valdez oil spill disaster occurred in Alaska in 1989, consumers not only developed unfavorable attitudes toward Exxon, they also boycotted Exxon products and returned thousands of the company's credit cards (Bovee & Arens, 1992). Assuming that corporate image or reputation can have a direct effect on consumer attitude toward corporations, it is inferred that an image or reputation changed by CEPI disclosure can change consumer attitude toward corporations. Simply put, CEPI can change consumer attitude toward corporations.

Attitudes directly influence behavior or influence behavior through intentions (Fishbein & Ajzen, 1975).[1] "Attitude is conceptually defined as a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1993, p. 1). According to Eagly and Chaiken (1993), "An attitude toward a specific behavior directed toward a given target in a given context at a given time should predict the specific behavior quite well because this attitude exactly corresponds to the specific behavior" (p. 167). For example, the changes of attitude toward buying Exxon products strongly influences the behavioral changes of purchasing Exxon products because Exxon event released 11 million gallons of crude oil that

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[1] The theory of reasoned action asserts that intentions have a direct effect on behavior and attitudes have a direct effect only on behavioral intentions, not on behavior.

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polluted the Alaskan coastline in 1989. Thus, attitude toward purchase behavior strongly influences the purchase behavior (or purchase intention).

Even though it is not attitudes toward a specific behavior[2], attitude toward targets (i.e., corporations) also could strongly influence the behavior of purchasing products of corresponding corporations. So far, environmental studies have not provided any evidence supporting the assertion that attitude toward polluting corporations influences on consumer purchase behaviors (or purchase intention) against products of polluting corporation. However, some studies of advertising have identified the relationship between attitude toward corporations and purchase behavior. Winters (1989) suggests that consumers' attitude toward a corporation has a direct effect on brand purchasing. In his study, Chevron Corporation ran corporate commercials with the objective of improving consumers' unfavorable attitudes toward the company. Through these advertisements, corporate credibility improved and attitude toward Chevron became more favorable. The company experienced increased brand sales among those consumers who were aware of the campaign.

Therefore, based on the inference that a positive relationship exists between attitude toward corporation and purchase behavior (or intention), it is inferred that CEPI disclosure has a direct effect on the consumers' attitude[3] toward corporations. Thus, the first hypothesis is as follows:

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[2] Attitude toward behavior (e.g., buying Samsung Cellular phone) is a distinctly different class of attitude than the attitude toward targets (e.g., Samsung Co.).

[3] Like hypothetical constructs, attitudes are not directly observable but can be inferred from observable responses. Social sciences often have assumed that people's attitudes can be or should be divided into three classes: cognition, affect, and behavior. Thus, observable responses for attitude inference are cognitive responses, affective responses, and behavior responses (Eagly & Chaiken, 1993).

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H 1: CEPI disclosures change consumer attitude toward corporations positively

for non-polluting corporations and negatively for polluting corporations.

CEPI and Corporate Credibility

It is assumed that CEPI disclosures change consumers' perception of credibility about polluting and non-polluting corporations. Previously mentioned, PID advocates assert that CEPI creates reputational incentives for pollution reduction because environmental information of polluting corporations damages their image and reputation and environmental information of non-polluting corporations improves their image and reputation.

The change of corporate images or reputation means the change of corporate credibility. The terms "reputation" or "image" are conceptually very similar to the term credibility. According to the definitions from Newell (1993), image is the concept of someone or something that is held or projected by the public and reputation is the general estimation by which one is held by the public. "Corporate credibility" is defined as the perceived expertise, truthfulness, and/or honesty of the firm (Mackenzie & Lutz, 1989). Hence, the term "credibility" seems to be definitionally more specific and for the purpose of academic research, more appropriate, than either of the terms "image" or "reputation" (Newell, 1993). Image and reputation, on the other hand, seem to be much broader in scope, and encompass many other dimensions including credibility. Therefore, it is asserted that CEPI disclosures influence consumers' perception of credibility toward corporations, instead of asserting that CEPI disclosures influence corporate reputations or images.

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More recently, Newell (1993) found that corporate credibility had a positive effect on attitude toward brands (i.e., corporations). Fombrun (1996) asserted that high corporate credibility is important in producing positive attitudinal changes toward a corporate advertisement and toward the brand as well as in influencing purchase intentions. Lafferty and Goldsmith's (1999) experiment also proved that corporate credibility or reputation influences consumers' attitudes toward brand and purchase intentions.

Based on these findings and the identification of the conceptual relation among the terms "image," "reputation" and "credibility," it is asserted that CEPI disclosure influences the corporate images or reputations, and consequently changes consumer perception of credibility toward corporations. Thus, the relationship between CEPI and the consumers' perception of corporate credibility is reflected in the following hypothesis:

H 2: CEPI disclosures change the consumers' perception of corporate credibility
positively for non-polluting corporations and negatively for polluting
corporations.

CEPI and Purchase Intention

PID advocates assert that CEPI changes consumer purchase behavior negatively for polluting corporations and positively for non-polluting corporations that in turn create incentives for corporations to reduce pollution. A number of the cases of consumer

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boycott or green consumerism support this assertion.[4] Thus, the research should observe

purchase behavioral change to prove the causal relationship between CEPI and behavior

change. However, a number of variables influence behavior change. Therefore,

constructing an experiment in which the subject shows behavioral changes caused only

by the CEPI is extremely costly.

The purchase behavior can be well predicted from purchase intention that is a

psychological construct distinct from attitude. Intention represents the person's

motivation or conscious plan to exert effort to carry out. Purchase intention, therefore,

has an effect on the purchase behavior (Eagly & Chaiken, 1993).[5] Thus, it can be

assumed that purchase behavior and purchase intention are comparable for the purpose of

this research. Thus, the third hypothesis is developed as follows:

H 3: CEPI disclosures increase consumer purchase intention for the products of

non-polluting corporations and decrease consumer purchase intention for the

products of polluting corporations.

Hypotheses 1, 2, and 3 are illustrated in Figure 4.1.

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[4] Refer to "Market Drivers" in the Chapter II, p. 27.
[5] Refer to the Fishbein and Ajzen's theory of reasoned action or planned behavior (Ajzen, 1985; Ajzen, 1988; Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein, 1967; Fishbein, 1980; Fishbein & Ajzen, 1975; Fishbein & Ajzen, 1977).

Figure 4

Figure 4.1. Hypothetical Diagram of the Effectiveness of CEPI on Consumer Purchase
Behavior[6].

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[6] This research does not focus on the causal relationship among the three variables but focuses on the causal relationship between CEPI and the three variables: attitude, credibility, and purchase intention.

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Environmental Attitude as a Moderator[7] Variable

The public's environmental attitude toward pollution is assumed to influence the effectiveness of the public information disclosure as a pollution control tool because it is reasoned that the extent of changes in consumers' purchase behavior by CEPI disclosure varies depending on the intensity of consumers' environmental attitude toward pollution. Chan (1996) found that respondents who were more concerned about environmental issues tended to purchase more environmentally friendly products. As is well known, the movements for green consumerism or boycotts have been initiated mostly by environmentalists who apparently are high on the environmental attitude scale. Thus, it is inferred that there is a relationship between consumers' environmental attitude and consumer purchase behavior, related to CEPI disclosure so that the fourth hypotheses is:

> H 4: Consumers who have strong environmental attitudes about pollution (EAP) will change the three dependent variables more than consumers who have weak EAP[8]. In other words, a positive relationship exists between EAP and the three dependent variables: attitude toward corporation (AC), corporate credibility (CC), and purchase intention (PI).

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[7] Moderator is defined as a variable that intervenes between independent and dependent variable and influences the intensity of effect in the dependent variable. However, it is neither an independent variable nor a mediator variable. Moderator variable is a special case of the masking variable. Masking variables are unknown variables that affect the defendant variable. Meanwhile, Mediator variable is defined as a middle variable located between the first and the final variable in the causal diagram so that mediator is both independent and dependent variable. For more details, see chapter VII, p. 221.

[8] In this research, environmental attitude specifies the environmental attitude toward pollution (EAP) because the research is related to industry pollution. Thus, high EAP is defined as the status of a strong concern, awareness, and belief about pollution. Low EAP is defined as the status of a weak concern, awareness and belief about pollution.

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Corporate Familiarity as a Moderator Variable

There may also be a relationship between consumers' familiarity with corporations and consumers' purchase attitude and/or behavior changes. According to Eagle and Chaiken (1993), the amount of stored information or knowledge that is available and accessible to people (i.e., familiarity[9]) moderates attitude-behavior correspondence. The less information possessed by an individual, the greater the change induced by any new piece of information. Then, Eagle and Chaiken's assertion is consistent with the finding of Lavine, Huff, Wagner and Sweeney (1998) that one with more information has a stronger and more stable attitude than one with less information. Many consumers do not change their purchase behavior even though they are exposed to CEPI because they already have strong familiarity (or preferences) for specific products or brands. Thus, the fifth hypothesis is developed:

H 5: Consumers that are highly familiar with a corporation (CFC) change consumer attitude, corporate credibility, and purchase intention less than one with low familiarity. In other words, a negative relationship exists between CFC and the three dependent variables: attitude toward corporation (AC), corporate credibility (CC), and purchase intention (PI).

CEPI Credibility as a Moderator Variable

The credibility of CEPI in the mind of the consumer moderates the change of consumer attitude, corporate credibility, and purchase intention. The credibility of information is a critical element for the success of the PID program aimed to reduce

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[9] Additionally, for a conceptual understanding about "familiarity", refer to Brucks (1985).

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industry pollution. BAPEDAL (Indonesia's National Pollution Control Agency) and NIPR (the New Ideas in Pollution Regulation: a group of the World Bank) initiated an Indonesian PID program "PROPER." In 1995, PROPER made considerable effort to increase the credibility of information which they disclosed to the public because mistakes made in public could destroy the credibility of the grading system of CEPI. To increase the credibility of CEPI, they based the grading system upon multiple sources of data, conducted independent inspections, developed a user friendly computer program for analyzing the data, and designed a multiple step process for reviewing proposed grades before disclosing CEPI to the public. Aronson, Turner and Carlsmith (1963) found that for messages from a high credible source, there was a substantial increase in opinion change but when the source had only a moderate level of credibility, opinion change decreased. Thus, the sixth hypothesis is introduced:

H 6: The greater the credibility of CEPI (CCI), the greater the effect of the CEPI rating on the dependent variables. That is, there is a positive relationship between CCI and the three dependent variables: AC, CC, and PI.

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CHAPTER V

RESEARCH METHOD[1]

Introduction

The primary purpose of this experiment is to test the hypothesis that corporate

environmental performance information (CEPI) disclosures change consumers' attitude

and purchase behavior negatively against polluting corporations or positively for non-

polluting corporations.

The experiment is designed to observe causal effects of CEPI on purchase

behavior changes. Hence, CEPI is an independent variable and the dependent variables

serving to predict purchase behavior are as follows:

1. Attitude toward corporation (AC)

2. Consumer corporate credibility (CC)

3. Consumer purchase intention (PI)

The following three variables are moderator[2] variables that are used to test

hypothesis H 4, H 5, and H 6:

4. Environmental attitude toward pollution (EAP)[3]

5. Consumer familiarity with a corporation (CFC)

6. Credibility of Corporate Environmental Performance Information (CCI)

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[1] Images in this dissertation are presented in color.

[2] Moderator is defined as a variable that intervenes between independent and dependent variable and influences the degree of dependent variable. However, it is neither an independent variable nor a mediator variable. Masking variables are unknown variables that affect the defendant variable. Meanwhile, Mediator variable is a middle variable located between the first and the final variable in the causal diagram so that mediator is both independent and dependent variable. For more details, see chapter VII, p. 221.

[3] High EAP is defined as the status of a strong concern, awareness, and belief about pollution. Low EAP is defined as the status of a weak concern, awareness and belief about pollution.

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Experimental Design and Participants

An experiment was conducted to collect data identifying the causal relationship between CEPI and consumers' purchase behavior change.

The over-arching the research design is the two-group random assignment method combined with pre-post tests in the laboratory environment (i.e., university classroom). [4] The post-test was performed approximately one week after the initial experiment (i.e., pre-test) to track individual attitude and behavior change caused by a stimulus, which was CEPI. This test was used to observe differences of individual attitude or behavior before and after exposure to the stimuli information.

Both of the two groups in the post-test were defined as treatment groups because they were provided with stimuli, but subjects in the pre-test were not given any stimuli so that subjects in the pre-test were a control group. In the post-test, each of the two groups were treated with inverse information (e.g., positive versus negative CEPI) in order to comparatively observe how the subjects responded to inverse information about the same corporations concerning corporate pollution emissions. For example, Group A in the post-test was given negative information and Group B in the post-test was given positive information about pollution emissions of Samsung Electronics Co.

Three hundred six Korean undergraduate students participated in this experiment on a voluntary basis.

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[4] All data were collected during regular class session. A laboratory setting for the experiment was selected rather than field experiment because it is desirable to control the experimental situation and to manipulate experimental stimuli more precisely for the causation study (Wimmer & Dominick, 1994). Therefore, subjects were invited into the laboratory (i.e., classroom) rather than having experimenter go to the subjects in a real world setting.

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Corporations and Products Selected

The four real[5] Korean corporations and their new unnamed products presented to subjects were 1) Samsung Electronics Cellular Phone Co. and its new cellular phone, 2) Hyundai Electronics Cellular Phone Co. and its new cellular phone, 3) Nongsim Ramyeun Co. and its new instant noodle, and 4) Binggrae Ramyeun Co. and its new instant noodle.

Four corporations, two of which are cellular phone companies and two of which are instant noodle companies, were selected to measure attitude and credibility toward corporations. Their four new unnamed products were presented to subjects to measure purchase intention.

To eliminate the influence of established brands, this experiment employed new unnamed products that were fictitious. Consumers' purchase intention for particular products is influenced by previous knowledge, experiences, or preferences for those products. By using a new unnamed product, the influence of previous knowledge, experiences, and/ or preferences on purchase intention can be reduce.

The market share of Samsung and Hyundai for cellular phones and Nongsim and Binggrae for instant noodles were almost equal at this time. Dominant market share means a pre-existing strong preference by consumers. The strong pre-exiting preference of subjects hinders constructing a strong experiment because the strong preference hinders changes of consumer purchase behavior, even though external stimuli are strong. Cellular phones and instant noodles are considerably salient for Korean university

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[5] Using real corporation names is expected to diminish issues resulting from the artificial nature of the experimental environment.

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students.[6] Student subjects know enough about cellular phones and instant noodles to formulate meaningful estimates of brand[7] attitude and purchase intention. Korean university students also are very familiar with the above four corporate names.

Stimuli

One of two colors (green and red)[8] was assigned to a corporation to show the status of corporate compliance with Korean national pollution standards. "Green" was assigned to Samsung and Nongsim, and "Red" was assigned to Hyundai and Binggrae for Group A in the post-test. For Group B in the post-test, "Green" was assigned to Hyundai and Binggrae, and "Red" was assigned to Samsung and Nongsim. That is, two booklets of stimuli distributed to subjects contained inverse CEPI.[9]

The graded CEPI was disclosed under the name of the Bureau of Environmental Policy in the Korean Ministry of Environment (KME) to increase the credibility of information provided to subjects.[10] Subjects were informed that the Bureau of Environmental Policy in the KME gathered data, and rated the status of corporate compliance with the pollution standards.

The meaning of the color grades of four corporations were repeatedly presented to subjects in the format of simple and colorful written sentences, a table, and a graph

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[6] For example, a golf club is not a salient item for Korean university students because golf is a very luxurious sport in Korea. However, according to an informal survey, most (or al most all) university students have cellular phones and almost all students frequently enjoy instant noodles.

[7] "Brand name" is synonymous with "corporate name" in this study. When the brand name is more familiar to consumers than the corporate name, brand name instead of corporate name can be presented to experimental subjects.

[8] A five-color grade system is used for PROPER in Indonesia to rate the extent of corporate compliance to national pollution regulation standards. This system already effectively worked without any problems in Indonesia. Therefore, the color-coded grades as an evaluation system for corporate environmental performance is expected to work effectively in Korea.

[9] Assigned color grade is arbitrarily produced for the experiment. That is, the grades are not true.

[10] The credibility of KME was known to be high for the Korean public.

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depicting the corporate environmental index[11] to help subjects easily remember the information provided in the booklets. The corporate environmental index was provided in the name of the Department of Environmental Assessment in the Bureau of Environmental Policy in the Korean Ministry of Environment (KME) in order to give subjects the understanding that the information provided to subjects was produced by scientific professionals. Two photos of industrial pollution were placed on the cover page of the booklets to attract subjects' attention. All colors in the booklets for stimuli were color-printed.

Except environmental performance information of four corporations, no other information relating to the four corporations was provided to the subjects because information not related to the environmental performance of the four corporations could be confounding variables.

Except two types of CEPI (i.e., each the inverse information), all contents in stimuli material (e.g., cover photos in the front pages of two stimuli printing materials) were exactly the same. This helped remove influences from unexpected factors on dependent variables.

Measures of Dependent and Moderator Variables

The subjects were asked to respond to several questions. First, they were asked to rate their overall impression of the four corporations on a four- tem and 7-point, bipolar adjective scale (i.e., Semantic Differential type scale) to measure consumer attitudes

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toward each corporation. The scales are anchored with "unreputable / reputable," "untrustworthy / trustworthy," "negative / positive," and "dislike / like."[12]

Second, the subjects were asked to rate their overall evaluation about corporate credibility on a four-item and 7-point bipolar adjective scale. Two of the four items anchored with "overall low quality products / overall high quality products" and with "not at all good at manufacturing / very good manufacturing" measured corporate expertise. The other two items anchored with "not at all dependable / very dependable" and with "not at all concerned about customers / very concerned about customers," measured trustworthiness.[13]

Third, subjects were asked how likely they would be to consider buying that product and that they would purchase it. A three-item and 7-point Semantic Differential type scale was employed. The three items were anchored by "very likely / very unlikely," "probable / improbable," and "possible / impossible" (Yi, 1990).

The scales used for all of the three dependent variables were the same so that each variable would contribute equally to the distance measure. It was, therefore, not necessary to standardize the data.

A moderate variable of familiarity that was subjective knowledge about corporations used in the stimuli was measured in the pre-test. One of two measures for subjective knowledge asked subjects to respond to the following statement: "Rate Your knowledge of this item, as compared to the average undergraduate students." This measure was anchored by "one of the most knowledgeable / one of the least

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[12] Measures for attitude toward corporations was developed based on the measure used by Bruner & Hensel eds., 1992, # 29 (Boulding and Kirmani) .
[13] Bruner & Hensel eds., 1992, # 72 (Keller & Asker). Four of six items used by Keller and Asker were adopted for the measure of corporate credibility in this experiment.

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knowledgeable." The second measure asked subjects to respond to the following statement: "Circle one of the numbers below to describe your familiarity to this item." The anchor for this scale was "Extremely Familiar / Not at all familiar." For both measures, 7–point semantic differential scales were used (Brucks, 1985).

Subjects were asked to rate their overall concern, consciousness, and belief toward Korean pollution on a 5-point Likert type scale. Eight items measuring environmental attitude consisted of the verbal and behavioral commitment, affect and cognitive dimension (i.e., knowledge about environment), and government action for environmental protection. [14]

The questions for environmental attitude were not placed before the questions for three dependent variables in order to prevent subjects from guessing the experimental hypothesis from the measure of environmental attitude.

Questions to check manipulation of CEPI were presented in the post-test because subjects received stimuli in the post-test. To assess the effectiveness of the experimental CEPI manipulation, subjects were asked whether the four corporations complied with national environmental standards "very much" or "not at all," and whether the four corporations had severely negative or positive impacts on the environment and the health of human beings. The rating scale was a 7-point Semantic Differential type scale.

Credibility of stimuli information presented by the KME name was measured on a 7-point, bipolar adjective scale, anchored by "not credible / credible" and "scientific / unscientific."

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[14] See Appendix A. Questionnaire for Experimental Tests. Referring to Leeming, Dwyer and Bracken (1995), Berberoglu and Tosunoglu (1995), the measure for environmental attitude was developed for this experiment.

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All measures for variables mentioned above were scaled with a high number (e.g., 5 or 7) denoting a positive response (e.g., "like") and a lower number (e.g., 1) denoting a negative response (e.g., "dislike").

The final questions in the booklet were constructed for demographic data. They were placed in the pre-test. Demographic data consisted of "Gender," "Age," "Major," "Hometown," and "Average monthly family income." Demographic data was additionally collected to obtain basic information about subjects.

Procedures

<u>Translation and Back-Translation Test</u>

A translation and back-translation test for measurement and CEPI stimuli was conducted before implementing the pilot test to ensure reliable and valid translation from English to Korean. The original questionnaires and content of stimuli drafted first in English were translated into Korean, and then back translated into English using external translators blind to the hypotheses. As a final process, the original English and back-translated English version of the measurement and stimuli were compared to find problematic differences between them that could weaken their reliability and validity.

A difference found from the translation and back-translation test was about the measure for the variable of "purchase intention," anchored with "very unlikely / very likely," "improbable / probable," and "impossible / possible." The meanings of "likely" and "probable" in the original questionnaires were back-translated into "probable" in the last process because the meanings of both terms are almost the same in Korean language.

Thus, "very unlikely / very likely" was translated into "not want to / want to" in the Korean version.

<u>Pilot Test</u>

The pilot test was conducted during January 2001 to achieve its three purposes: 1) manipulation check for stimuli, 2) measurement check, and 3) checking Korean wording in Korean questionnaires.

Twenty five Korean Kyeung-Gi university undergraduate students participated in the pilot test. They had been at Michigan State University since December 2000 as visiting students. Their age, major, and sex were diverse.

A manipulation check for stimuli confirmed that the manipulation of CEPI was successful as expected. Negative information was perceived as negatively and positive information was perceived as positively in the pilot test.

Except the measure of environmental attitude, all measures were revealed to be highly reliable and valid. Exploratory factor analysis performed on the eight items for the measure of environmental attitude postulated a three-factor model so that confirmatory factor analysis based on both the posited three factors and one factor were conducted on its eight items to observe the heterogeneity (i.e., parallelism) and homogeneity (i.e., internal consistency) among the three factors or within one factor. As a result, a significant reason for the three-factor model was not found. After inspecting the factor loadings and errors generated from the discrepancy between the obtained and predicted correlations, it was concluded that it was not necessary to exclude any item of the environmental attitude measure.

Based on comments from participants, one of 8 questions for environmental attitudes was redeveloped. Except comments about an item of environmental attitude, there were no comments about the Korean wording from participants so that it was assumed that the questionnaires have no Korean wording problems in the Korean version of the questionnaires and the stimuli materials.

Administration

The experiment was implemented from May 17, 2001 to June 12, 2001 in the classrooms of Seoul City University located in Seoul and in the Kangwon University located in Chun-Chen[15] in Korea. For the pre-test of the experiment, participants first received an "Informed Consent Form" containing assurance of confidentiality of data and statement of agreement. Participants also received an instruction asking to read each page of the booklet carefully without being allowed to turn back and without being allowed to talk to each other. In addition to the written instruction, administrators gave very detailed verbal instructions on how to complete the questionnaire. Then, stimuli booklets were randomly distributed to three hundred six participants and they were asked to write down their student ID number in the first page of the questionnaire booklets, in order to know the identification of subjects between pre-post tests. They were asked to keep the booklet face down, when the questions were finished.

The post-test with the same participants was performed approximately one week after the pre-test in the same classroom during normal class-time. [16]

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[15] The city of Chun-Chen is located around 150 miles west from Seoul.

[16] Time interval between pre-post tests is M (Mean) = 8.7 and SD (Standard Deviation) = 4.0 days (7 days=68.1% and 8 days=15.5% of cases). All subjects answered to experimental questionnaires just after

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In the post-test, two types of stimuli booklets that contain the manipulated CEPI were distributed randomly to participants and they were asked to read the booklets very carefully. Participants were asked to write down their student ID on the first page of the questionnaire booklets to figure out the participants' identification to observe the individual differences of responses to the stimuli. They also were asked to write the type of stimuli (e.g., "A" or "B") on the first page of the questionnaire booklets for the post-test to identify who belonged to which stimuli Group A or Group B.

Other instructions given in the post-test were the same as the ones in the pre-test.

Debriefing

As a final step in the process, when participants finished the questions for the post-test, they received notes of debriefing saying that all the information about the four corporations given to the subjects was not true and was arbitrarily created for the experimental purposes. The debriefing also addressed the true purpose of this experiment and contained a thank you note for participation.

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reading a print material for stimuli in the post-test so the time interval between reading the material and answering questionnaires of post-test is constant.

CHAPTER VI

DATA ANALYSIS AND RESULTS

Data and Subject Profile

Three hundred six Korean undergraduate students participated in this experiment on a voluntary basis; 469 participated in the pre-test and 439 participated in the post-test. Some students did not write down the stimuli type A or B and student identification numbers. The cases not indicating the stimuli type and student identification numbers were discarded. The final cases matched by student identification numbers totaled 306 cases.

Of the total number of participants, 52.6 percent were males and 47.4 percent were females. Their ages ranged from 18 to 33 years of age (M = 21.5, SD = 2.78)[1]. Most subjects were majoring in the social sciences such as: Politics (49.2 %), Business Administration (9.3%), Mass Media (8.6 %), Psychology (6.6 %) of the participants, etc. Of the 306 participants, 57.5 percent were students of the Seoul City University in Seoul, Korea and 42.5 percent of the participants were students of the Kangwon University in Choon-Chun, a small city located 150 miles west of Seoul. Three fourths of the subjects grew up in urban areas (big city = 37.2%, small city = 39.1% and rural area = 22.7%). The Family Monthly Average Income of subjects was 2,160,000 Won or approximately 1,674 US dollars (SD = 1,260,000 Won / approximately 976 U.S. $)[2].

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[1] M = Mean, SD = Standard Deviation

[2] "Won" is a unit of Korean money. The exchange rate was U.S. $ 1 = approximately 1,290 Won in May or June, 2001 when the experiments were conducted. Thus, most subjects would belong to a middle class in terms of Korean social economics.

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Checking Unexpected Intervention between Pre and Post-tests

All subjects completed experimental questionnaires immediately after reading printed materials for stimuli in the post-test. Thus, the time interval between reading the material and answering questionnaires in the post-test is constant and very short. Therefore, the probability of unexpected factors influencing subjects' responses to the stimuli would be low.

However, probability that unexpected factors intervened between the pre and post-test exists because the time interval between pre and post-tests was on average 8.7 days. The tests were implemented from May 17, 2001 to June 12, 2001. In order to check the intervention of unexpected factors between pre and post-tests, the researcher observed negative or positive news related to the four corporations Samsung, Hyundai, Nongsim and Binggrae, which were released in several major newspapers at the national level between May 17 and June 12, 2001. Negative or positive news that could influence each subject's attitude, credibility and purchase intention related to the four corporations and their products was not found.

Stimuli Manipulation Check

Stimuli (i.e., treatment) were artificially manipulated. Stimuli consisted of negative and positive information concerning the environmental performances of the four companies: Samsung & Hyundai Electronics, and Nongsim & Binggrae Ramyeun. The research is needed to check whether subjects perceived the stimuli in the same manner as the researcher intended. That is, did the subjects perceive negative information of stimuli as negative information, and positive information of stimuli as positive information?

A variable "stimuli" was measured with two items in a 7-point Semantic Differential type scale. One item of the measurement of stimuli asked whether the four corporations complied with national environmental standards and another item asked whether the four corporations had severely negative or positive impacts on the environment and the health of human beings[3]. Subjects of A and B groups were given reverse information of each other. That is, if group A was given positive environmental performance information for Samsung, group B was given negative performance information for Samsung. When group A was given negative environmental performance information for Hyundai, group B was given with positive environmental performance information for Hyundai. Table 6.1 includes basic statistics related to the manipulation test.

Table 6.1. Stimuli Type and Mean, SD and SE of Stimuli

	Treatment Type	N	Mean	Std. Deviation	Std. Error Mean
SAMSUNG	1	154	5.4318	1.1520	9.283E-02
	2	152	2.3224	1.2387	.1005
HYUNDAI	1	154	2.7370	1.2475	.1005
	2	152	5.3684	1.1901	9.653E-02
NONGSIM	1	154	5.3669	1.1896	9.586E-02
	2	152	2.4145	1.2067	9.788E-02
BINGGRAE	1	154	2.8961	1.3811	.1113
	2	152	5.5132	1.1068	8.977E-02

- Group A was exposed to Stimuli (i.e., treatment) Type 1
- Group B was exposed to Stimuli Type 2

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[3] The questionnaires for stimuli is as follows:
* Rate the extent to which the following corporations comply to the national pollution standards.
  1. Samsung Electronics Cellular Phone Co. has complied with national environmental standards
Not at all   1   2   3   4   5   6   7   Very well

  2. The environmental performance of Samsung Electronics Cellular Phone Co. has created on the health of human being and nature
Very severe   1   2   3   4   5   6   7   Very Positive
Adverse effects   Effects

T-tests suggested that manipulation of the stimuli for corporate environmental performance information (CEPI) about four corporations was successful. To check the success of manipulation, independent sample T-tests were conducted to verify statistical significance for mean differences between Group A and Group B in the variable "stimuli." Significant differences were found for the stimuli of Samsung (M = 3.1094) (t (304)= 22.74, p < .001), Hyundai (M = -2.6314) (t (304) = -18. 86, p < .001), Nongsim (M = 2.9524) (t (304) = 21.55, p < .001), and Binggrae (M = -2.171) (t (292) = -18.30, p < .001).[4]

Measurement Reliability and Validity

Measurements of five variables with twenty-one items were used in the pre-test. The variables were:

1. Attitude toward the four corporations (four items)

2. Credibility of the four corporations (four items)

3. Purchase Intention toward products of the four corporations (three items)

4. Familiarity with the four corporations (two items)

5. Environmental Attitude (eight items)

Measurements for five variables with fifteen items were used in the post-test. The variables were:

1. Attitude toward the four corporations (four items)

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[4] T = t-value, p = p-value, figure in a parenthesis (i.e., t (304)) is a degree of freedom.

2. Credibility of the four corporations (four items)

3. Purchase Intention toward products of the four corporations (three items)[5]

4. Stimuli for manipulation check (two items)

5. Information Credibility of Stimuli (two items)

Factors of measurements and number of items (i.e. questions) of each factor are summarized in Table 6.2.

Table 6.2

Factors and Number of Items (i.e., questions)

| | Pre-Test | | | | |
	Credibility	Attitude	Intention	Familiarity	Environmental Attitude
Samsung	4	4	3	2	
Hyundai	4	4	3	2	
Nongsim	4	4	3	2	
Binggrae	4	4	3	2	
All subjects					8

| | Post-Test | | | | |
	Credibility	Attitude	Intention	Stimuli	Information Credibility
Samsung	4	4	4	2	
Hyundai	4	4	4	2	
Nongsim	4	4	4	2	
Binggrae	4	4	4	2	
All subjects					2

- "4" is the number of item of a factor. For example: "4 " in the cell of "Samsung" by "Credibility" in pre-test means that the factor of Credibility of Samsung is constructed by four items.

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[5] Questions were the same in measuring three variables "attitude," "credibility," and "purchase intention" in the pre and post-test.

Confirmatory factor analysis (CFA)[6] was performed in order to assess the uni-dimensionality of each scale (i.e., internal consistency and discrimination of each measurement) because each measurement should retain internal consistency (i.e., homogeneity) within each factor and should maintain discrimination (i.e., heterogeneity) among factors (Hunter & Gerbing, 1982). The first-order CFA set each scale toward different corporations as a factor (e.g., "attitude" to Samsung is a factor and "attitude" to Hyundai is another factor) so that the first-order CFA included 17 factors with 60 items of the pre-test and 17 factors with 54 items of the post-test (Refer to table 6.1). The second-order CFA set each scale of four corporation as a factor (e.g., setting attitude to all of Samsung, Hyundai, Nongsim and Binggrae as a factor) so that the second-order CFA included 5 factors with 60 items of pre-test and 5 factors with 54 items of post-test. The CFA by a unit of corporation was also conducted. For example, CFA for the scales used for Samsung included 5 factors (Attitude, Credibility, Purchase Intention, Familiarity, and Environmental Attitude) with 21 items in the pre-test and 5 factors (Attitude, Credibility, Purchase Intention, Stimuli, and Information Credibility) with 15 items in the post-test.

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[6] A confirmatory factor analysis was conducted by the computer statistics program "CFA" (1992) developed by Mark A. Hamilton and John E. Hunter, "M-MODEL" (version 1.0, 1988) developed by Mark A. Hamilton, "PACKET" (version 1.0, 1988) developed by John E. Hunter and "HT2 (Tests of Homogeneity and Heterogeneity for Confirmatory Factor Analysis)" (version 1.0) developed by Vernon Miller and Joyce Lanning. These programs are working on MS-DOS. Dr. Mark A. Hamilton is a professor at University of Connecticut. John E. Hunter is a professor in the Department of Psychology at Michigan State University. Vernon Miller and Joyce Lanning are professors in the Department of Communication at Michigan State University.

Inter-correlations among factors in the first-order CFA are summarized in the three following tables, which include correlation

Inter-correlations among factors in the first-order CFA are summarized in the three following tables, which include correlation corrections.

Table 6.3. Corrected Inter-Correlation between Factors in the Pre-test

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1=Credibility of Samsung	1.00	.36	.47	.30	.86	.20	.34	.22	.49	-.07	.20	.09	.50	.20	.23	.10	.12
2=Credibility of Hyundai	.36	1.00	.22	.41	.20	.89	.09	.40	.15	.68	.12	.26	.08	.15	.04	.17	.05
3=Credibility of Nongsim	.47	.22	1.00	.36	.47	.15	.83	.19	.28	.06	.55	.10	.18	.08	.51	.03	.11
4=Credibility of Binggrae	.30	.41	.36	1.00	.25	.37	.25	.88	.08	.22	.26	.63	.18	.17	.12	.52	.07
5=Attitude to Samsung	.86	.20	.47	.25	1.00	.20	.42	.17	.63	-.05	.15	.08	.52	.26	.24	.05	.03
6=Attitude to Hyundai	.20	.89	.15	.37	.20	1.00	.02	.38	.04	.69	.12	.29	-.04	.11	-.04	.19	.04
7=Attitude to Nongsim	.34	.09	.83	.25	.42	.02	1.00	.15	.25	-.03	.64	.04	.20	.08	.63	-.01	.13
8=Attitude to Binggrae	.22	.40	.19	.88	.17	.38	.15	1.00	-.01	.24	.16	.71	.13	.17	.08	.55	.12
9=Purchase Intention for Samsung cellular phone	.49	.15	.28	.08	.63	.04	.25	-.01	1.00	.22	.09	-.12	.47	.24	.13	-.04	.06
10=Purchase Intention for Hyundai cellular phone	-.07	.68	.06	.22	-.05	.69	-.03	.24	.22	1.00	.00	.17	-.10	.12	-.14	.15	.10
11=Purchase Intention for Nongsim instant noodle	.20	.12	.55	.26	.15	.12	.64	.16	.09	.00	1.00	.37	.12	.04	.48	.06	.09
12=Purchase Intention for Binggrae instant noodle	.09	.26	.10	.63	.08	.29	.04	.71	-.12	.17	.37	1.00	.11	.12	.02	.46	.01
13=Familiarity with Samsung	.50	.08	.18	.18	.52	-.04	.20	.13	.47	-.10	.12	.11	1.00	.61	.48	.31	.21
14=Familiarity with Hyundai	.20	.15	.08	.17	.26	.11	.08	.17	.24	.12	.04	.12	.61	1.00	.20	.29	.05
15=Familiarity with Nongsim	.23	.04	.51	.12	.24	-.04	.63	.08	.13	-.14	.48	.02	.48	.20	1.00	.45	.18
16=Familiarity with Binggrae	.10	.17	.03	.52	.05	.19	-.01	.55	-.04	.15	.06	.46	.31	.29	.45	1.00	.04
17=Environmental Attitude	.12	.05	.11	.07	.03	.04	.13	.12	.06	.10	.09	.01	.21	.05	.18	.04	1.00

- Inter-correlations calculated by SPSS are almost equivalent but slightly different (i.e., lower) than the inter-correlations calculated with the CFA program developed by Hamilton and Hunter (1992). In the table 6.3, 6.4 and 6.5, inter-correlations corrected by program CFA are presented because CFA makes corrections for attenuation of correlations caused by measurement error.

Table 6.4. Corrected Inter-Correlation between Factors in the Post Test

Table 6.4. Corrected Inter-Correlation between Factors in the Post-test

	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
18=Credibility of Samsung	1.00	-.45	.89	-.45	.93	-.44	.85	-.45	.77	-.37	.72	-.35	.70	-.53	.68	-.55	.15
19=Credibility of Hyundai	-.45	1.00	-.50	.84	-.44	.93	-.48	.77	-.41	.73	-.45	.63	-.57	.69	-.54	.61	.05
20=Credibility of Nongsim	.89	-.50	1.00	-.55	.82	-.50	.96	-.54	.66	-.38	.85	-.46	.74	-.56	.77	-.62	.13
21=Credibility of Binggrae	-.45	.84	-.55	1.00	-.41	.76	-.52	.94	-.38	.58	-.43	.80	-.55	.66	-.60	.68	.02
22=Attitude to Samsung	.93	-.44	.82	-.41	1.00	-.47	.86	-.43	.79	-.39	.70	-.36	.71	-.52	.66	-.54	.03
23=Attitude to Hyundai	-.44	.93	-.50	.76	-.47	1.00	-.51	.77	-.44	.70	-.46	.59	-.54	.66	-.52	.61	.08
24=Attitude to Nongsim	.85	-.48	.96	-.52	.86	-.51	1.00	-.55	.67	-.40	.87	-.45	.74	-.58	.77	-.63	.09
25=Attitude to Binggrae	-.45	.77	-.54	.94	-.43	.77	-.55	1.00	-.42	.59	-.45	.82	-.59	.70	-.62	.72	.04
26=Purchase Intention for Samsung cellular phone	.77	-.41	.66	-.38	.79	-.44	.67	-.42	1.00	-.28	.64	-.37	.66	-.49	.62	-.47	.05
27=Purchase Intention for Hyundai cellular phone	-.37	.73	-.38	.58	-.39	.70	-.40	.59	-.28	1.00	-.49	.61	-.44	.59	-.42	.60	.10
28=Purchase Intention for Nongsim instant noodle	.72	-.45	.85	-.43	.70	-.46	.87	-.45	.64	-.49	1.00	-.41	.70	-.57	.72	-.60	.05
29=Purchase Intention for Binggrae instant noodle	-.35	.63	-.46	.80	-.36	.59	-.45	.82	-.37	.61	-.41	1.00	-.52	.62	-.55	.68	.12
30=Stimuli of Samsung	.70	-.57	.74	-.55	.71	-.54	.74	-.59	.66	-.44	.70	-.52	1.00	-.86	.99	-.81	.08
31=Stimuli of Hyundai	-.53	.69	-.56	.66	-.52	.66	-.58	.70	-.49	.59	-.57	.62	-.86	1.00	-.84	.94	.07
32=Stimuli of Nongsim	.68	-.54	.77	-.60	.66	-.52	.77	-.62	.62	-.42	.72	-.55	.99	-.84	1.00	-.83	.05
33=Stimuli of Binggrae	-.55	.61	-.62	.68	-.54	.61	-.63	.72	-.47	.60	-.60	.68	-.81	.94	-.83	1.00	.06
34=Information Credibility	.15	.05	.13	.02	.03	.08	.09	.04	.05	.10	.05	.12	.08	.07	.05	.06	1.00

- These corrected correlations in the Table 6.3, 6.4 and 6.5 are calculated by dividing the observed inter-correlation between factor 1 and factor 2 by the square root of the product of the standardized α of factor 1 and 2.

Table 6.5. Inter-Correlation between Factors in the Pre and Post-test

	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1=Credibility of Samsung	.52	.02	.31	-.01	.46	-.03	.28	.05	.30	-.07	.24	.11	.15	-.04	.12	-.07	.13
2=Credibility of Hyundai	.14	.50	.10	.29	.13	.50	.11	.24	.10	.33	.11	.15	.09	.06	.09	.04	.17
3=Credibility of Nongsim	.25	.05	.34	.03	.23	.02	.33	.04	.20	.01	.27	.05	.09	.04	.13	.02	.14
4=Credibility of Binggrae	.15	.20	.13	.39	.10	.17	.12	.36	.07	.12	.11	.29	.10	-.01	.10	.04	.11
5=Attitude to Samsung	.53	.00	.32	.01	.51	-.06	.32	.04	.42	-.07	.23	.06	.15	-.03	.11	-.03	.07
6=Attitude to Hyundai	.06	.55	.07	.30	.06	.52	.09	.24	.00	.33	.07	.22	.04	.11	.04	.08	.18
7=Attitude to Nongsim	.22	-.01	.25	.01	.18	-.01	.30	.05	.12	.00	.21	.07	.04	.03	.06	.03	.13
8=Attitude to Binggrae	.10	.18	.05	.39	.09	.17	.05	.40	.02	.09	.07	.32	.12	-.03	.08	.05	.06
9=Purchase Intention for Samsung cellular phone	.34	.01	.18	-.03	.31	.01	.15	-.01	.53	.13	.08	.01	.08	.00	.06	.00	-.01
10=Purchase Intention for Hyundai cellular phone	-.08	.42	-.04	.20	-.05	.46	-.02	.17	.06	.51	-.08	.21	.02	.10	.03	.09	.12
11=Purchase Intention for Nongsim instant noodle	.09	.13	.17	.18	.02	.13	.17	.21	-.01	.04	.19	.20	-.02	.12	-.01	.13	.20
12=Purchase Intention for Binggrae instant noodle	.00	.27	-.01	.44	-.02	.22	.02	.42	-.06	.11	.11	.41	-.01	.10	-.03	.13	.12
13=Familiarity with Samsung	.21	.08	.15	.12	.19	.07	.09	.14	.21	.02	.09	.07	.05	.06	.07	.02	.01
14=Familiarity with Hyundai	.13	.11	.09	.13	.09	.14	.05	.18	.10	.15	.02	.13	-.02	.11	.01	.08	.11
15=Familiarity with Nongsim	.07	.01	.15	.09	.02	-.05	.12	.11	.08	.06	.12	.07	-.07	.15	-.05	.15	.13
16=Familiarity with Binggrae	-.05	.15	-.04	.35	-.09	.16	-.09	.34	-.04	.14	-.05	.32	-.03	.13	-.05	.17	.09
17=Environmental Attitude	-.13	-.05	.03	-.07	-.09	.01	-.03	.00	-.13	-.06	-.04	-.06	-.02	-.01	-.01	-.03	.03

- About the numbers from 18 to 34 in the first row, refer to Table 6.4.

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Second-order factor correlations (i.e., inter-correlation among factors across corporations) in the pre and post-test are presented in the following two tables[7].

Table 6.6[8]

Second-Order Factor Correlation in the Pre-test

Factor	501	502	503	504	505
501	100	97	70	42	12
502	97	100	76	45	13
503	70	76	100	38	12
504	42	45	38	100	17
505	12	13	12	17	100

- The correlation "97" in the table is actually ".97."
- Factor 501= Credibility of 4 corporations: – Samsung, Hyundai, Nongsim and Binggrae
- Factor 502= Attitude of 4 corporations
- Factor 503= Purchase intention of 4 corporations
- Factor 504= Familiarity of 4 corporations
- Factor 505= Environmental Attitude

Table 6.7

Second-Order Factor Correlation in the Post-test

Factor	501	502	503	506	507
501	100	122	101	54	21
502	122	100	100	58	15
503	101	100	100	65	22
506	54	58	65	100	22
507	21	15	22	22	100

[7] Unfortunately, second-order correlation between factors in the pre-test and factors in the post-test is not presented because the CFA program developed by Hamilton and Hunter (1992) is incapable of handling a large size of correlation matrix with 114 items of 34factors, which are 17 factors with 60 items in the pre-test plus 17 factors with 54 items in the post-test.
[8] Correlations in Table 6.6 and 6.7 are generated by program CFA.

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- The correlation "58" in the table refers to ".58."
- Factor 501= Credibility of 4 corporations: Samsung, Hyundai, Nongsim and Binggrae
- Factor 502= Attitude of 4 corporations
- Factor 503= Purchase intention of 4 corporations
- Factor 506= Stimuli of 4 corporations
- Factor 507= Information Credibility

Discrimination among factors was checked based on the error matrix of factor loadings generated by a statistical computer programs HT 2 (Tests of Homogeneity and Heterogeneity for Confirmatory Factor Analysis). At present time HT 2 is not capable of handling a size of correlation matrix with 60 items in the pre-test or/ and 54 items in the post-test, thus, HT 2 was performed by a unit of corporations in the pre and post-test separately. The following error tables of factor of loading by a unit of corporations show error rate that is the discrepancy between the obtained and predicted correlations (i.e., observed factor loading – expected factor loading).

Table 6.8. Error Rate of Heterogeneity (Samsung in the Pre-test)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	10	3	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1	7	13	12	-	-	-	-	-	-	-	-	-	-	-	-	-
7	8	12	2	10	-	-	-	-	-	-	-	-	-	-	-	-	-
8	10	9	4	9	-	-	-	-	-	-	-	-	-	-	-	-	-
9	15	11	16	12	17	16	17	25	-	-	-	-	-	-	-	-	-
10	15	15	2	2	13	10	12	5	-	-	-	-	-	-	-	-	-
11	15	16	2	4	13	10	12	4	-	-	-	-	-	-	-	-	-
12	1	1	3	2	4	2	7	0	0	2	3	-	-	-	-	-	-
13	8	0	9	0	9	1	3	3	10	6	2	-	-	-	-	-	-
14	4	7	5	2	9	1	11	13	7	2	2	12	6	-	-	-	-
15	1	0	5	3	6	1	3	4	7	1	0	9	7	-	-	-	-
16	3	9	5	2	0	1	3	7	10	0	2	1	2	-	-	-	-
17	7	10	0	3	10	6	1	3	0	5	11	5	4	-	-	-	-
18	3	2	2	9	8	5	12	7	4	3	6	4	6	-	-	-	-
19	0	3	8	3	1	1	4	1	1	7	7	2	2	-	-	-	-
20	6	8	3	8	5	6	1	0	1	5	1	2	3	-	-	-	-
21	2	5	10	15	3	6	10	5	1	2	2	1	0	-	-	-	-

	18	19	20	21
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-
19	-	-	-	-
20	-	-	-	-
21	-	-	-	-

- Error rate "10" in the table refers to ".10." This rule applies to error rate of all error rate tables.
- 1, 2, 3 and 4: Items of Credibility of Samsung
- 5, 6, 7 and 8: Items of Attitude toward Samsung
- 9, 10, 11 and 12: Items of Purchase Intention toward Samsung Cellular Phone
- 13 and 14: Items of Familiarity with Samsung
- 15, 16, 17, 18, 19, 20 and 21: Environmental Attitude

Table 6.9. Error Rate of Heterogeneity (Hyundai in the Pre-test)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	8	14	8	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	0	5	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
7	5	1	7	5	-	-	-	-	-	-	-	-	-	-	-	-	-
8	2	3	4	0	-	-	-	-	-	-	-	-	-	-	-	-	-
9	10	17	3	6	11	7	8	11	-	-	-	-	-	-	-	-	-
10	1	6	3	6	2	3	4	3	-	-	-	-	-	-	-	-	-
11	8	3	4	6	5	5	9	2	-	-	-	-	-	-	-	-	-
12	12	5	6	17	1	2	0	1	3	3	1	-	-	-	-	-	-
13	11	7	2	10	0	1	4	1	1	0	1	-	-	-	-	-	-
14	2	4	2	3	3	2	0	5	2	7	3	6	6	-	-	-	-
15	7	8	1	7	6	3	2	2	7	8	1	13	15	-	-	-	-
16	1	2	1	4	3	1	4	5	1	5	2	1	2	-	-	-	-
17	2	0	8	7	5	1	6	3	3	8	12	10	5	-	-	-	-
18	3	2	0	2	2	3	1	3	1	4	5	1	1	-	-	-	-
19	1	0	1	7	1	9	3	1	4	8	5	11	1	-	-	-	-
20	11	7	1	5	7	12	7	7	7	6	1	6	2	-	-	-	-
21	12	7	14	12	13	10	12	8	16	7	7	1	1	-	-	-	-

	18	19	20	21
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-
19	-	-	-	-
20	-	-	-	-
21	-	-	-	-

- 1, 2, 3 and 4: Items of Credibility of Hyundai
- 5, 6, 7 and 8: Items of Attitude toward Hyundai
- 9, 10, 11 and 12: Items of Purchase Intention toward Hyundai Cellular Phone
- 13 and 14: Items of Familiarity with Hyundai
- 15, 16, 17, 18, 19, 20 and 21: Environmental Attitude

Table 6.10. Error Rate of Heterogeneity (Nongsim in the Pre-test)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	4	3	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
6	4	3	8	14	-	-	-	-	-	-	-	-	-	-	-	-	-
7	9	10	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-
8	10	16	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
9	1	1	3	13	9	0	2	4	-	-	-	-	-	-	-	-	-
10	6	4	4	9	4	5	7	1	-	-	-	-	-	-	-	-	-
11	4	1	4	7	3	1	2	0	-	-	-	-	-	-	-	-	-
12	3	0	2	7	7	1	7	3	5	6	4	-	-	-	-	-	-
13	1	1	7	0	14	1	2	1	5	2	7	-	-	-	-	-	-
14	10	7	3	7	1	4	6	7	10	2	2	9	6	-	-	-	-
15	1	5	2	10	12	6	2	0	1	1	8	16	10	-	-	-	-
16	5	5	4	10	13	9	1	0	4	5	1	3	2	-	-	-	-
17	8	4	1	2	4	8	3	7	1	3	0	11	7	-	-	-	-
18	5	6	1	0	1	7	1	4	5	7	4	9	1	-	-	-	-
19	1	3	1	9	4	3	3	1	7	8	4	5	2	-	-	-	-
20	1	6	2	4	4	6	1	10	1	1	2	7	3	-	-	-	-
21	3	5	7	7	2	0	2	6	3	6	11	2	6	-	-	-	-

	18	19	20	21
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-
19	-	-	-	-
20	-	-	-	-
21	-	-	-	-

- 1, 2, 3 and 4: Items of Credibility of Nongsim
- 5, 6, 7 and 8: Items of Attitude toward Nongsim
- 9, 10, 11 and 12: Items of Purchase Intention toward Nongsim Instant Noodle
- 13 and 14: Items of Familiarity with Nongsim
- 15, 16, 17, 18, 19, 20 and 21: Environmental Attitude

Table 6.11. Error Rate of Heterogeneity (Binggrae in the Pre-test)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	12	5	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1	2	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
7	5	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
8	1	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
9	11	9	0	3	10	1	3	7	-	-	-	-	-	-	-	-	-
10	1	1	7	7	1	8	6	0	-	-	-	-	-	-	-	-	-
11	1	2	5	5	0	6	3	4	-	-	-	-	-	-	-	-	-
12	4	0	0	2	5	1	2	2	3	5	1	-	-	-	-	-	-
13	3	1	2	3	3	2	8	5	2	2	3	-	-	-	-	-	-
14	3	2	1	1	9	2	2	4	0	6	9	2	3	-	-	-	-
15	5	2	1	6	6	0	1	1	2	3	10	13	11	-	-	-	-
16	0	1	3	7	2	3	1	3	9	7	2	6	10	-	-	-	-
17	10	13	13	6	7	9	7	4	3	1	3	7	0	-	-	-	-
18	1	2	1	2	3	5	4	2	6	9	12	6	1	-	-	-	-
19	4	2	6	8	4	7	4	5	0	4	0	3	4	-	-	-	-
20	6	0	4	5	8	5	2	3	1	3	1	8	10	-	-	-	-
21	4	7	5	0	2	2	4	2	3	2	4	3	1	-	-	-	-

	18	19	20	21
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-
19	-	-	-	-
20	-	-	-	-
21	-	-	-	-

- 1, 2, 3 and 4: Items of Credibility of Binggrae
- 5, 6, 7 and 8: Items of Attitude toward Binggrae
- 9, 10, 11 and 12: Items of Purchase Intention toward Binggrae Instant Noodle
- 13 and 14: Items of Familiarity with Binggrae
- 15, 16, 17, 18, 19, 20 and 21: Environmental Attitude

Table 6.12

Error Rate of Heterogeneity (Samsung in the Post-test)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	16	16	3	2	-	-	-	-	-	-	-	-	-	-	-
6	11	9	6	10	-	-	-	-	-	-	-	-	-	-	-
7	15	15	5	13	-	-	-	-	-	-	-	-	-	-	-
8	14	9	2	10	-	-	-	-	-	-	-	-	-	-	-
9	5	8	18	19	13	15	11	16	-	-	-	-	-	-	-
10	14	13	1	1	6	6	10	6	-	-	-	-	-	-	-
11	13	11	2	2	7	6	9	4	-	-	-	-	-	-	-
12	21	20	13	28	5	2	1	0	8	8	2	-	-	-	-
13	22	21	11	27	5	1	1	1	8	7	0	-	-	-	-
14	5	1	5	0	5	1	5	3	0	3	3	0	0	-	-
15	1	0	6	1	5	2	7	1	0	5	3	0	2	-	-

- 1, 2, 3 and 4: Items of Credibility of Samsung
- 5, 6, 7 and 8: Items of Attitude toward Samsung
- 9, 10, 11 and 12: Items of Purchase Intention toward Samsung Cellular Phone
- 13 and 14: Items of Stimuli for Samsung
- 15 and 16: Information Credibility

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Table 6.13

Error Rate of Heterogeneity (Hyundai in the Post-test)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	12	13	9	7	-	-	-	-	-	-	-	-	-	-	-
6	9	8	5	12	-	-	-	-	-	-	-	-	-	-	-
7	12	8	4	11	-	-	-	-	-	-	-	-	-	-	-
8	10	7	1	8	-	-	-	-	-	-	-	-	-	-	-
9	10	12	2	4	12	6	5	7	-	-	-	-	-	-	-
10	10	7	1	2	6	3	2	2	-	-	-	-	-	-	-
11	9	7	1	5	10	5	3	2	-	-	-	-	-	-	-
12	20	18	11	22	10	4	2	1	6	5	3	-	-	-	-
13	19	18	13	27	10	6	6	5	1	4	7	-	-	-	-
14	4	1	1	2	4	4	2	3	2	2	4	0	3	-	-
15	1	1	1	4	6	2	4	5	4	1	1	3	1	-	-

- 1, 2, 3 and 4: Items of Credibility of Hyundai
- 5, 6, 7 and 8: Items of Attitude toward Hyundai
- 9, 10, 11 and 12: Items of Purchase Intention toward Hyundai Cellular Phone
- 13 and 14: Items of Stimuli for Hyundai
                    - 15 and 16: Information Credibility

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Table 6.14

Error Rate of Heterogeneity (Nongsim in the Post-test)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	14	6	6	3	-	-	-	-	-	-	-	-	-	-	-
6	3	3	2	4	-	-	-	-	-	-	-	-	-	-	-
7	7	11	2	5	-	-	-	-	-	-	-	-	-	-	-
8	6	7	0	6	-	-	-	-	-	-	-	-	-	-	-
9	2	1	7	10	4	3	4	7	-	-	-	-	-	-	-
10	4	5	2	2	1	4	5	1	-	-	-	-	-	-	-
11	4	4	2	2	1	5	5	1	-	-	-	-	-	-	-
12	10	9	10	14	5	3	4	3	6	1	0	-	-	-	-
13	12	13	7	12	6	1	1	0	4	3	1	-	-	-	-
14	5	4	4	2	10	4	3	0	4	2	2	3	1	-	-
15	3	0	8	5	6	0	7	6	0	1	1	2	2	-	-

- 1, 2, 3 and 4: Items of Credibility of Nongsim
- 5, 6, 7 and 8: Items of Attitude toward Nongsim
- 9, 10, 11 and 12: Items of Purchase Intention toward Nongsim Instant Noodle
- 13 and 14: Items of Stimuli for Nongsim
- 15 and 16: Information Credibility

Table 6.15

Error Rate of Heterogeneity (Binggrae in the Post-test)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	17	11	6	4	-	-	-	-	-	-	-	-	-	-	-
6	7	6	2	6	-	-	-	-	-	-	-	-	-	-	-
7	14	11	7	11	-	-	-	-	-	-	-	-	-	-	-
8	10	6	4	9	-	-	-	-	-	-	-	-	-	-	-
9	2	1	2	9	4	1	5	5	-	-	-	-	-	-	-
10	10	5	1	8	2	6	0	2	-	-	-	-	-	-	-
11	10	6	1	9	0	4	1	1	-	-	-	-	-	-	-
12	15	15	13	20	4	2	5	1	4	1	0	-	-	-	-
13	18	16	12	19	9	0	5	0	2	2	5	-	-	-	-
14	5	5	1	1	2	2	0	2	2	2	0	0	2	-	-
15	1	0	5	6	4	1	2	4	1	2	3	1	0	-	-

- 1, 2, 3 and 4: Items of Credibility of Binggrae
- 5, 6, 7 and 8: Items of Attitude toward Binggrae
- 9, 10, 11 and 12: Items of Purchase Intention toward Binggrae Instant Noodle
- 13 and 14: Items of Stimuli for Binggrae
- 15 and 16: Information Credibility

Error rate of Heterogeneity table 7.8 shows that item 9 (i.e. the first question for purchase intention toward Samsung cellular phone) and item 8 (i.e. the fourth question for attitude of Samsung) in the pre-test generates relatively high error rate (.25) to maintain heterogeneity among factors. However, except the case of Samsung in the pre-test, items 8 and 9 in other cases of measurements in the both pre and post-test do not generate high error: Hyundai (.11), Nongsim (.04), Binggrae (.07) in the pre-test and Samsung (.16), Hyundai (.07), Nongsim (.7), Binggrae (.5) in the post-test. Therefore, this study concluded that it was not necessary to exclude items 8 and 9 from the original measurements in order to raise discrimination among factors.

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Items 12 and 13 of the scale "stimuli" generated a high error rate for discrimination among factors in Samsung, Hyundai and Binggrae of the post-test (refer to table 7.12, 7.13 and 7.15). However, the high error rate of the "stimuli" scale is not significant because the scale "stimuli" is measuring whether the experimental stimuli is successful or not and it is not all related to any scales of dependent variables. Therefore, the "stimuli" scale does not weaken the discrimination among factors of dependent variables.

Internal consistencies of factors are represented by reliability coefficient "Alpha (α)".Standardized Alpha (α) generated by CFA for each scale in the pre and post-test is presented in the following table 6.16.

Table 6.16. Measurement Reliability – Standardized α

| | Pre-Test | | | | |
	Credibility	Attitude	Intention	Familiarity	Environmental Attitude
Samsung	.80	.90	.86	.71	
Hyundai	.83	.93	.90	.85	
Nongsim	.83	.91	.93	.62	
Binggrae	.88	.93	.94	.81	
All subjects					.68

| | Post-Test | | | | |
	Credibility	Attitude	Intention	Stimuli	Information Credibility
Samsung	.86	.93	.92	.97	
Hyundai	.88	.94	.94	.95	
Nongsim	.91	.94	.97	.96	
Binggrae	.89	.91	.95	.97	
All subjects					.89

CFA revealed that all scales except two retained high reliability that is internally consistent within the factor. The two scales are "environmental attitude" (α =.68) and "familiarity" (α = .62, .71, .81 and .85). Even though the reliability of these scales is not strong, the validity of the two scales is strong because they maintain high discrimination among factors (refer to table 7.8, 7.9, 7.10 and 7.11). Considering the point that validity is a relatively more important criterion for a healthy measurement than reliability, it is concluded that these two scales are still useful measurements for this research.

In summary, the original measurements used in the pre-test and post-test retains high discrimination among factors (i.e., validity) and high internal consistency within factor (i.e., reliability). The results of CFA suggested that the data were fitted with the posited construct models for pre-test measurements and for post-test measurements. Inspection of the factor loadings and errors produced from the discrepancy between the obtained and predicted correlations resulted in no exclusion of items.

Statistics for Data Analysis

Changes of attitude toward four corporations, credibility of corporations, and purchase intension toward products (i.e., three major variables) after stimuli were measured. The four corporations were Samsung Electronics Cellular Phone Co., Hyundai Electronics Cellular Phone Co., Nongsim Ramyeun Co. and Binggrae Ramyeun Co.[9] The new cellular phone products of Samsung and Hyundai were unnamed, as were the new

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[9] Samsung Electronics Cellular Phone Co. is denoted by Samsung, Hyundai Electronics Cellular Phone Co. is denoted by Hyundai, Nongsim Ramyeun Co. is denoted by Nongsim and Binggrae Ramyeun Co. is denoted by Binggrae.

instant noodles products of Nongsim and Binggrae[10]. Stimuli were negative or positive

information of the four corporations' environmental performances (i.e., CEPI: corporate

environmental performance information).

The Within Subjects Analysis was performed to investigate individual changes of

three major variables. A Paired Samples T-test[11] was performed to gain 1) raw mean

scores of individual changes of three major variables (i.e., gain score = score after stimuli

– score before stimuli), 2) one-directional confidence interval for the gain scores at 95 %

level, and 3) one-tailed significance for the gain scores at α =.05. Three major variables

were measured on the 7-point scale. For a stimuli (i.e., treatment) effect size of three

major variables, stimuli (i.e., treatment) correlation and one-sided confidence interval of

stimuli correlation at 95 % level was calculated by the statistical computer program

"Within (Within Subjects Analysis, 1995 version)[12]."

When a directional hypothesis is tested, the Inference Probability makes sense.

Inference probability (IP) for these research hypotheses were gained by the "Within." IP

is the probability that an effect occurs in the hypothesized direction. In other words, IP is

the probability that the directional hypothesis is correct. Thus, if a directional hypothesis

is positive, IP is the probability of rho (i.e. correlation of population) being positive (i.e.,

$P (\rho > 0)$). If a directional hypothesis is negative, IP is the probability of rho being

negative (i.e., $P (\rho < 0)$). The inverse concept to IP is referred to as Reverse Probability

(RP). RP is the probability that the effect occurs in the opposite direction to hypothesis.

In order words, The RP is the probability that the directional hypothesis is incorrect.

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[10] The unnamed new cellular phones of Samsung and Hyundai are denoted by Samsung cellular phone and
Hyundai cellular phone. The unnamed new instant noodles of Nongsim and Binggrae are denoted by
Nongsim instant noodle and Binggrae instant noodle.
[11] It was conducted by a statistical computer program "SPSS" version 10.0.
[12] "Within" was developed by John E. Hunter.

Thus, RP is 1 minus IP (RP = 1 – IP) because the probability ranges from 0 to 1. For

example, If IP is .85, RP is .15 (1.0 -.85). For an interpretation of IP, this study follows

the suggestions from Ralph Levine[13]:

Table 6.17. Interpretation of Inference Probability

Inference Probability (IP)	Interpretation
.667 ≤ IP	Probably in the direction predicted
.333 (1/3) ≤ IP < .667 (2/3)	Too close to call* and Wait for further studies to confirm the hypothesis
IP < .333	Probably not in the direction predicted

* The sample size is not large enough to conclude whether stimuli effect is in the
direction predicted.[14]

The stimuli (i.e., treatment) correlations were corrected for measurement error

through considering measurement reliabilities of Time 1 (Pre-test) and Time 2 (Post-

test). [15] This correction was conducted through the "Within[16]." Thus correlation reported

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[13] Levine' suggestions about an interpretation of IP is cited from his unpublished paper "Messing Again
With the Correlation: Inference Techniques And the Mysterious Inference Probability (Revised 7/24/98).
Ralph Levine was a professor in the department of Psychology and is a professor in the department of
Resource Development at Michigan State University.
[14] The idea of inference probability comes from unpublished papers by Dr. John E. Hunter and Ralph
Levine. John E. Hunter is a professor in the Department of Psychology, and Ralph Levine was a professor
in the department of Psychology and is a professor in the department of Resource Development at
Michigan State University. For more detail on inference probability, refer to Appendix D. Inference
Probability.
[15] Standardized reliability was used for correction.
[16] The "Within" program describes corrections for measurement as follows: "The variance in gain scores
may or may not be evidence of an interaction. Either all or a large portion of the apparent individual
differences in gain may be caused by error of measurement rather than variation in the stimuli effect."

in this study is corrected stimuli (i.e., treatment) correlation coefficient. Basic interpretational wording for the stimuli effect size in this paper follows the following rules: 1) Very Small or Very Weak: $0 < r < 0.1$, 2) Small or Weak: $0.1 \leq r < 0.2$, 3) Moderate: $0.2 \leq r < 0.3$, 4) Large or Strong : $0.3 \leq r < 0.4$ and 5) Very Large or Very Strong: $0.4 \leq r$.

Between groups analysis (i.e., group mean comparison) also was performed to compare attitude, credibility, and purchase intention changes after stimuli at the group level using Independent Samples T-test[17]. One group was exposed to positive CEPI and another was negative CEPI in the post-test. An independent sample t-test was conducted to test the statistical significance at $\alpha = .05$ and two-tailed level for group mean comparison of three major variables.

Attitude toward Corporation

Hypothesis for attitude toward corporation (Hypothesis One: H1) posited that CEPI disclosures change consumer attitude toward corporations positively for non-polluting corporations and negatively for polluting corporations.

Basic descriptive statistics related to the variable "attitude toward four corporations" are summarized in the following table 6.17. Stimuli effects of attitude toward four corporations are summarized in the table 6.18.

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[17] It was conducted by a statistical computer program "SPSS" version 10.0.

Table 6.18. Descriptive Statistics of Attitude toward Four Corporations

			Group A	Group B
Samsung	Pre-test	Mean	5.36	5.31
		SD	.95	.99
	Post-test	Mean	5.60	4.28
		SD	1.06	1.33
	D	Mean	.24	-1.03
		SD	.92	1.23
	N		154	151
Hyundai	Pre-test	Mean	3.90	3.94
		SD	1.10	.98
	Post-test	Mean	3.35	4.53
		SD	1.27	.98
	D	Mean	-.55	.59
		SD	1.04	1.07
	N		154	152
Nongsim	Pre-test	Mean	5.59	5.59
		SD	.89	.79
	Post-test	Mean	5.70	4.08
		SD	1.10	1.30
	D	Mean	.11	-1.50
		SD	1.06	1.37
	N		151	152
Binggrae	Pre-test	Mean	4.24	4.13
		SD	.88	1.00
	Post-test	Mean	3.51	4.74
		SD	1.21	.86
	D	Mean	-.73	.61
		SD	1.05	1.03
	N		149	152

- SD = Standard Deviation
- D = Gain Score (Gain score of post-test – Gain score of pre-test)
- N = Sample size

Table 6.19

Attitude Changes toward Four corporations

	Group	D	t	Sig	95% CI of D (1-tailed)		r	95% CI of r (1-tailed)		IP
					Lower	Upper		Lower	Upper	
Samsung	A: +	.24	3.28	.001	.12	7.00	.12	-.01	1	.94
Samsung	B: -	-1.03	-10.28	.000	-7.00	-.86	-.42	-1	-.31	1.00
Hyundai	B: +	.59	6.81	.000	.45	7.00	.30	.18	1	1.00
Hyundai	A: -	-.55	-6.57	.000	-7.00	-.41	-.23	-1	-.11	1.00
Nongsim	A: +	.11	1.29	.100	-.03	7.00	.06	-.08	1	.76
Nongsim	B: -	-1.50	-13.52	.000	-7.00	-1.32	-.59	-1	-.51	1.00
Binggrae	B: +	.61	7.35	.000	.48	7.00	.33	.21	1	1.00
Binggrae	A: -	-.73	-8.46	.000	-7.00	-.59	-.34	-1	-.22	1.00

- A = Group A that had type A of stimuli in the post-test
- B = Group B that had type B of stimuli in the post-test
- "+" = Positive information of corporate environmental performance
- "-" = Negative information of corporate environmental performance
- D = mean of raw gain score (Gain score = gain score after stimuli - gain score before stimuli)
- r = Point estimate of stimuli correlation coefficient
- IP (Inference Probability) = Probability that effect occurs in the hypothesized direction.
- Sig = p-value

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The direction and degree (i.e., size) of attitude changes in raw score by negative

and positive CEPI stimuli are visualized in the following Figure 6.1.

Figure 6.1. Attitude Change toward Samsung

Attitude Change (Samsung)

	Pre-test	Post-test
Group A	5.36	5.60
Group B	5.31	4.28

- Group A was exposed to positive CEPI.
- Group B was exposed to negative CEPI.
- Data reflect raw scores

The individual attitude change toward Samsung caused by negative CEPI (i.e.,

gain score) was significant: Dw = -1.03, t (150) = -10.28, p < .001, and CI = -7 to -

.86.The degree of attitude change (i.e., stimuli effect size) from *negative* CEPI is very

strong: r = -.42, CI = -1 to -.31.The probability that attitude change caused by the

negative CEPI occurs in the positive direction is 100 percent: IP = 1.00.

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[18] Dw = raw mean gain score within subjects, t= t-value from t-test, p = p-value, r = stimuli (i.e., treatment) correlation coefficient, CI = confidence interval, PI = inference probability, and Db = difference between groups

The attitude gain score for Samsung by *positive* CEPI was significant: Dw = .24, t

(153) = 3.28, p = .001, and CI = .12 to 7. The effect size of attitude by *positive* CEPI is

small: r = .13, CI = -.01 to 1.The probability that attitude change caused by the *positive*

CEPI occurs in the positive direction is 94 percent: IP = .94.

The group mean difference of attitude toward Samsung between two groups that

had opposite information of stimuli each other is also significant: Db= 1.27, t (277)

=10.22 and p < .001. The subjects responded to negative CEPI more strongly (r = -.42)

than positive CEPI (r = .12).

The data are strongly consistent with H 1. It was statistically significant that

subjects' attitudes toward Samsung changed negatively when they were exposed to

negative CEPI and changed positively when they were exposed to positive CEPI. The

extent of the attitude change caused by the negative was very strong but the extent of the

attitude change caused by positive CEPI was small. The probability that consumers

change their attitude to the negative direction when they are exposed to the negative

CEPI is 100 percent and change their attitude in the positive direction when they are

exposed to the positive CEPI is 94 percent. As a result, it can be concluded that the H 1 is

strongly confirmed in the case of consumer attitude toward Samsung.

Attitude toward Hyundai

The direction and degree of attitude changes in raw score by negative and positive

CEPI stimuli are presented in the following Figure 6.2.

Figure 6.2. Attitude Change toward Hyundai

Attitude Change (Hyundai)

	Pre-test	Post-test
—✗— Group A	3.90	3.35
—▪— Group B	3.94	4.53

Y-axis: Credibility (raw score), scale 1.00 to 7.00

Legend: —✗— Group A, —▪— Group B

- Group A was exposed to negative CEPI.
- Group B was exposed to positive CEPI.
- Data reflect raw scores

The individual attitude change toward Hyundai caused by negative CEPI was significant: Dw = -.55, t (153) = -6.57, p < .001, and CI = -7 to -.41. The degree of attitude change (i.e., effect size) from *negative* CEPI is moderate: r = -.23, CI = -1 to -.11. The probability that attitude change caused by the negative CEPI occurs in the negative direction is 100 percent: IP = 1.00.

The attitude gain score for Hyundai by *positive* CEPI was significant: Dw = .59, t (151) = 6.81, p < .001, and CI = .45 to 7. Effect size of attitude by *positive* CEPI was substantial: r = .30, CI = .18 to 1. The probability that attitude change caused by the *positive* CEPI occurs in the positive direction is 100 percent: IP = 1.00.

The group mean difference in attitude between the two groups that had opposite information of stimuli is also significant: Db= 1.14, t (304) =9.46 and p < .001. In contrast to the case of Samsung, the subjects were a little more responsive to positive CEPI (r = .30) than to negative CEPI regarding Hyundai (r = -.23).

The data are strongly consistent with H 1. It was statistically significant that the subjects' attitudes toward Hyundai changed negatively when they were exposed to negative CEPI and changed positively when subjects were exposed to positive CEPI. The degree of attitude change (i.e., stimuli effect size) caused by the negative and positive CEPI are moderate and substantial. The probability that consumers change their attitude in the negative direction when they are exposed to the negative CEPI is 100 percent and change their attitude in the positive direction when they are exposed to the positive CEPI is also 100 percent. Therefore, it can be concluded that the Hypothesis One is strongly confirmed in the case of consumer attitude toward Hyundai.

Attitude toward Nongsim

The direction and degree of attitude changes in raw score by negative and positive CEPI stimuli are presented in the following Figure 6.3.

Figure 6.3. Attitude Change toward Nongsim

Attitude Change (Nongsim)

	Pre-test	Post-test
Group A	5.59	5.70
Group B	5.59	4.08

- Group A was exposed to positive CEPI.
- Group B was exposed to negative CEPI.
- Data reflect raw scores

The individual attitude change toward Nongsim caused by negative CEPI was significant: $Dw = -1.50$, $t(151) = -13.52$, $p < .001$, and $CI = -7$ to -1.32. The degree of attitude change (i.e., stimuli effect size) from *negative* CEPI is very strong: $r = -.59$, $CI = -1$ to $-.51$. The probability that attitude change caused by the negative CEPI occurs in the negative direction is 100 percent: $IP = 1.00$.

The attitude gain score for Nongsim by *positive* CEPI was barely significant at the level of $\alpha = 0.05$ and one-tailed significance test: $Dw = .11$, $t(150) = 1.29$, $p = .100$, and $CI = -.03$ to 7. The stimuli effect size of attitude by *positive* CEPI was also very small: $r = .06$, $CI = -.08$ to 1. The probability that change in attitude caused by the *positive* CEPI occurs in the positive direction is not strong: $IP = .76$.
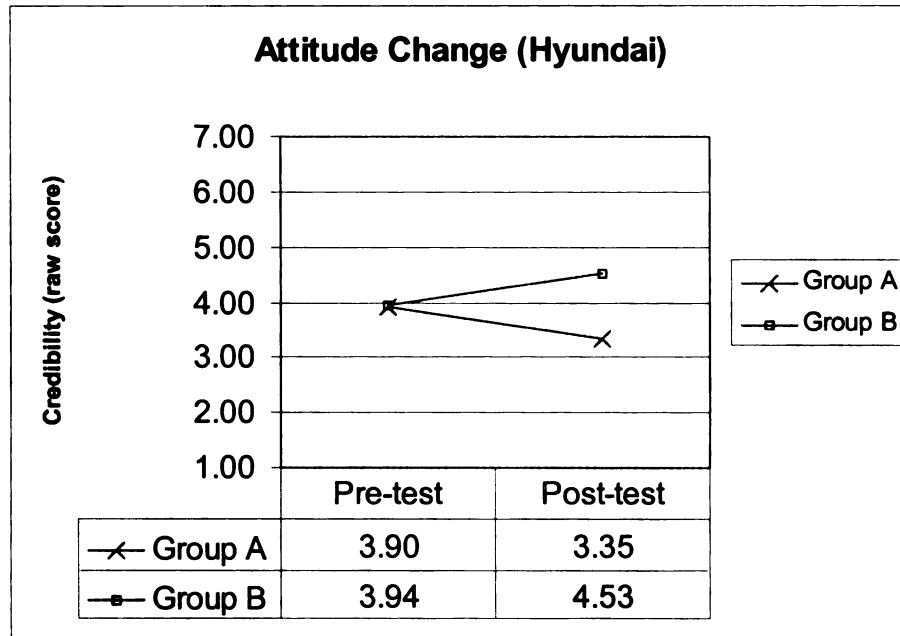
The group mean difference in attitude toward Nongsim between the two groups

that had opposite information of stimuli is also significant: Db= 1.61, t (284) =11.48 and

p < .001. Consistent with the case of Samsung, subjects responded to negative CEPI

much more strongly (r = -.59) than positive CEPI (r = .06).

The data are consistent with H 1. It was statistically significant that subjects'

attitude toward Nongsim became negative when they were exposed to negative CEPI and

became positive when they were exposed to positive CEPI. The degree of attitude change

(i.e., effect size) caused by the negative CEPI is very strong and the probability that

consumers change their attitude in the negative direction when exposed to the negative

CEPI is 100 percent. The degree in credibility change caused by the positive CEPI is very

small. However, the probability that consumers change their perception of credibility in

the positive direction when they are exposed to the positive CEPI is strong (IP = .76),

meaning that the effect probably occurs in the direction predicted. Meanwhile, the result

from the two-group comparison revealed that raw mean gain scores of two groups are

significantly different. Therefore, it can be concluded that in the case of consumer

attitude for Nongsim, the H 1 is confirmed in the case of both negative CEPI disclosure

and positive CEPI disclosure.

Attitude toward Binggrae

The direction and degree of attitude changes in raw score by negative and positive

CEPI stimuli are presented in the following Figure 6.4.

Figure 6.4. Attitude Change toward Binggrae

Attitude Change (Binggrae)

	Pre-test	Post-test
✕ Group A	4.24	3.51
■ Group B	4.13	4.74

- Group A was exposed to negative CEPI.
- Group B was exposed to positive CEPI.
- Data reflect raw scores

The individual attitude change toward Binggrae caused by negative CEPI was significant: Dw = -.73, t (148) = -8.46, p < .001, and CI = -7 to -.59. The degree of attitude change by *negative* CEPI is strong: r = -.34, CI = -1 to -.22. The probability that attitude change caused by the negative CEPI occurs in the negative direction is 100 percent: IP = 1.00.

The attitude gain score for Binggrae by *positive* CEPI was significant: Dw = .61, t (151) = 7.35, p < .001, and CI = .48 to 7. The degree of attitude change from *positive* CEPI is also strong: r = .33, CI = .21 to 1. The probability that attitude change caused by the *positive* CEPI occurs in the positive direction is 100 percent: IP = 1.00.
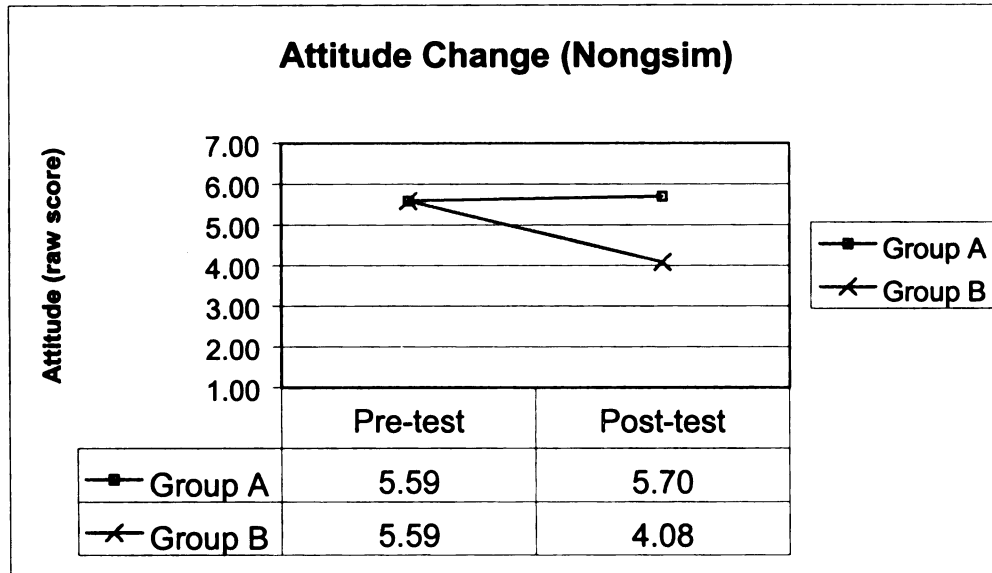
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The group mean difference in attitude toward Binggrae between the two groups that were given opposite information is also significant: Db= 1.61, t (299) =11.20 and p < .001. Subjects responded to negative CEPI (r = -.34) and positive CEPI (r = .33) in the almost equal intensity.

The data are strongly consistent with H 1. It was statistically significant that subjects' attitudes toward Binggrae became negative when they were exposed to negative CEPI and became positive when they were exposed to positive CEPI. The degree of attitude change caused by the both negative and positive CEPI is substantial. The probability that consumers change their attitude in the negative direction when they are exposed to the negative CEPI is 100 percent and change their attitude in the positive direction when they are exposed to the positive CEPI is 100 percent. As a result, it can be concluded that H1 is strongly confirmed in the case of attitudes toward Binggrae.

Credibility of Corporation

The hypothesis for credibility about corporation (Hypothesis Two: H2) posited that CEPI disclosures change consumer corporate credibility positively for non-polluting corporations and negatively for polluting corporations.

Basic descriptive statistics related to the variable "credibility of four corporations" are summarized in the following Table 6.19. Stimuli (i.e., Treatment) effects of credibility of four corporations are summarized in the Table 6.20.

Table 6.20. Descriptive Statistics of Credibility for Four Corporations

			Group A	Group B
Samsung	Pre-test	Mean	5.21	5.14
		SD	.80	.87
	Post-test	Mean	5.59	4.33
		SD	.95	1.12
	D	Mean	.38	-.81
		SD	.82	1.10
	N		154	151
Hyundai	Pre-test	Mean	3.99	3.99
		SD	.98	.88
	Post-test	Mean	3.41	4.61
		SD	1.14	.84
	D	Mean	-.57	.62
		SD	1.00	.93
	N		154	152
Nongsim	Pre-test	Mean	5.34	5.31
		SD	.86	.75
	Post-test	Mean	5.62	4.10
		SD	1.05	1.19
	D	Mean	.28	-1.21
		SD	1.04	1.21
	N		154	152
Binggrae	Pre-test	Mean	4.20	4.17
		SD	.84	.89
	Post-test	Mean	3.53	4.72
		SD	1.18	.84
	D	Mean	-.67	.55
		SD	1.16	.90
	N		153	152

- SD= Standard Deviation
- D= Gain Score (Gain score of post-test – Gain score of pre-test)
- N= Sample size

Table 6.21

Credibility Changes of Four Corporations

	Group	D	T	Sig	95% CI of D (1-tailed)		r	95% CI of r (1-tailed)		IP
					Lower	Upper		Lower	Upper	
Samsung	A: +	.38	5.71	.000	.27	7.00	.23	.10	1	1.00
Samsung	B: -	-.81	-9.03	.000	-7.00	-.66	-.41	-1	-.30	1.00
Hyundai	B: +	.62	8.21	.000	.50	7.00	.38	.26	1	1.00
Hyundai	A: -	-.57	-7.13	.000	-7.00	-.44	-.28	-1	-.15	1.00
Nongsim	A: +	.28	3.30	.001	.14	7.00	.15	.02	1	.97
Nongsim	B: -	-1.21	-12.35	.000	-7.00	-1.05	-.55	-1	-.46	1.00
Binggrae	B: +	.55	7.58	.000	.43	7.00	.33	.21	1	1.00
Binggrae	A: -	-.67	-7.19	.000	-7.00	-.52	-.33	-1	-.21	1.00

- A = Group A that had type A of stimuli in the post-test
- B = Group B that had type B of stimuli in the post-test
- "+" = Positive information of corporate environmental performance
- "-" = Negative information of corporate environmental performance
- D = mean of raw gain score (Gain score = gain score after stimuli - gain score before stimuli)
- r = Point estimate of stimuli correlation coefficient
- IP (Inference Probability) = Probability that effect occurs in the hypothesized direction.
- Sig = p-value

Credibility of Samsung

The direction and extent (i.e., size) of credibility changes in raw score by negative and positive CEPI stimuli are presented in the following Figure 6.5.

Figure 6.5. Credibility Change for Samsung

Credibility Change (Samsung)

	Pre-test	Post-test
Group A	5.21	5.59
Group B	5.14	4.33

- Group A was exposed to positive CEPI.
- Group B was exposed to negative CEPI.
- Data are raw scores

The individual change of perception of credibility about Samsung caused by

negative CEPI (i.e., gain score) was significant: Dw = -.81, t (150)= -9.03, p < .001, and

CI = -7 to -.66. The degree of credibility change (i.e., stimuli effect size) by *negative*

CEPI is strong: r = -.41, CI = -1 to -.30. The probability that credibility change caused by

the negative CEPI occurs in the negative direction is 100 percent: IP = 1.00.

The credibility gain score for Samsung by *positive* CEPI was significant: Dw =

.38, t (153) = 5.71, p < .001, and CI = .27 to 7. Effect size of credibility by *positive* CEPI

is moderate: r = .23, CI = .10 to 1. The probability that the change in credibility caused

by the *positive* CEPI occurs in the positive direction is 100 percent: IP = 1.00.

The group mean difference in credibility about Samsung between the two groups that were presented with opposite information is also significant: Db= 1.18, t (277) =10.66 and p < .001. Subjects responded to negative CEPI more strongly (r = -.41) than positive CEPI (r = .23).

The data are strongly consistent with H 2. It was statistically significant that subjects changed negatively their perception of credibility about Samsung when they were exposed to negative CEPI and changed positively their perception of credibility when they were exposed to positive CEPI. The extent of credibility change caused by the negative and positive CEPI was strong and moderate. The probability that consumers change their perception of credibility to the negative direction when they are exposed to the negative CEPI is 100 percent and change them in the positive direction when they are exposed to the positive CEPI is 100 percent. Therefore, it can be concluded that H 2 is strongly confirmed in the case of credibility for Samsung.

Credibility of Hyundai

The direction and extent of credibility changes in raw score to negative and positive CEPI stimuli are presented in the following Figure 6.6.

Figure 6.6. Credibility Change for Hyundai

Credibility Change (Hyundai)

	Pre-test	Post-test
⭢✗ Group A	3.99	3.41
⭢■ Group B	3.99	4.61

- Group A was exposed to negative CEPI.
- Group B was exposed to positive CEPI.
- Data reflect raw scores

The individual change of perception of credibility about Hyundai caused by

negative CEPI was significant: Dw = -.57, t (153)= -7.13, p < .001, and CI = -7 to -.44.

The degree of credibility change (i.e., effect size) by *negative* CEPI is moderate: r = -.28,

CI = -1 to -.15. The probability that credibility change caused by the negative CEPI

occurs in the negative direction is 100 percent: IP = 1.00.

Credibility gain score for Hyundai by *positive* CEPI was significant: Dw = .62, t

(151) = 8.21, p < .001 and CI = .50 to 7. Effect size of credibility by *positive* CEPI was

large: r = .38, CI = .26 to 1. The probability that the credibility change caused by the

positive CEPI occurs in the positive direction is 100 percent: IP = 1.00.

The group mean difference in credibility between the two groups that had opposite information of stimuli is also significant: Db= 1.20, t (304) =10.81 and p < .001. The difference with the case of Samsung is that subjects responded more strongly to positive CEPI (r = .38) than to negative CEPI of Hyundai (r = -.28).

The data are strongly consistent with H 2. It was statistically significant that subjects reduced their perception of credibility about Hyundai when they were exposed to negative CEPI and increased their perception of credibility when they were exposed to positive CEPI. The extent of credibility change caused by the negative and positive CEPI was moderate or strong. The probability that consumers change their perception of credibility in the negative direction when they are exposed to negative CEPI is 100 percent and change them in the positive direction when they are exposed to the positive CEPI is also 100 percent. Therefore, it can be concluded that H 2 is strongly confirmed in the case of consumer's perception of credibility for Hyundai.

Credibility of Nongsim

The direction and extent of credibility changes in raw score to negative and positive CEPI stimuli are visualized in the following Figure 6.7.

Figure 6.7. Credibility Change for Nongsim

Credibility Change (Nongsim)

	Pre-test	Post-test
Group A	5.34	5.62
Group B	5.31	4.10

- Group A was exposed to positive CEPI.
- Group B was exposed to negative CEPI.
- Data are raw scores

The individual perception change of credibility about Nongsim caused by negative CEPI was significant: $Dw = -1.21$, $t(151) = -12.35$, $p < .001$, and $CI = -7$ to -1.05. The degree of credibility change (i.e., effect size) from *negative* CEPI is very strong: $r = -.55$, $CI = -1$ to $-.46$. The probability that credibility change caused by the negative CEPI occurs in the negative direction is 100 percent: $IP = 1.00$.

The credibility gain score for Nongsim by *positive* CEPI was significant: $Dw = .28$, $t(153) = 3.30$, $p = .001$, and $CI = .14$ to 7. The stimuli effect size of credibility by *positive* CEPI was small: $r = .15$, $CI = .02$ to 1, but the probability that credibility change caused by the *positive* CEPI occurs in the positive direction is very strong: $IP = .97$.

The group mean difference (i.e., two group comparison) of credibility about Nongsim between two groups that had been presented with opposite information is significant: Db= 1.49, t (296) =11.56 and p < .001. Consistent with the case of Samsung, subjects responded to negative CEPI more strongly (r = -.55) than positive CEPI (r = .15).

The data are strongly consistent with H 1. It was statistically significant that subjects' perception of credibility for Nongsim became negative when they were exposed to negative CEPI and became positive when they were exposed to positive CEPI. The degree of attitude change (i.e., effect size) caused by the negative CEPI is very strong and the probability that consumers change their perception of credibility in the negative direction when exposed to the negative CEPI is 100 percent. While, the degree of credibility change caused by the positive CEPI is weak, but the probability that consumers change their perception of credibility in the positive direction when they are exposed to the positive CEPI is 97 percent. Therefore, it can be concluded that the H 2 is strongly confirmed in the case of consumer perception of credibility for Nongsim.

Credibility of Binggrae

The direction and extent of credibility changes in raw score to negative and positive CEPI stimuli are presented in the following Figure 6.8.

Figure 6.8. Credibility Change for Binggrae

Credibility Change (Binggrae)

	Pre-test	Post-test
Group A	4.20	3.53
Group B	4.17	4.72

- Group A was exposed to negative CEPI.
- Group B was exposed to positive CEPI.
- Data reflect raw scores

The individual perception change of credibility about Binggrae caused by negative CEPI was significant: Dw = -.67, t (152) = -7.19, p < .001, and CI = -7 to -.52. The degree of change in credibility (i.e., effect size) caused by *negative* CEPI was strong: r = -.33, CI = -1 to -.21. The probability that change in credibility caused by the negative CEPI occurs in the negative direction is 100 percent: IP = 1.00.

The credibility gain score for Binggrae resulting from *positive* CEPI was significant: Dw = .55, t (151) = 7.58, p < .001, and CI = .43 to 7. Effect size of credibility by *positive* CEPI was large: r = .33, CI = .21 to 1. The probability that the change in credibility caused by the *positive* CEPI occurs in the positive direction is 100 percent: IP = 1.00.
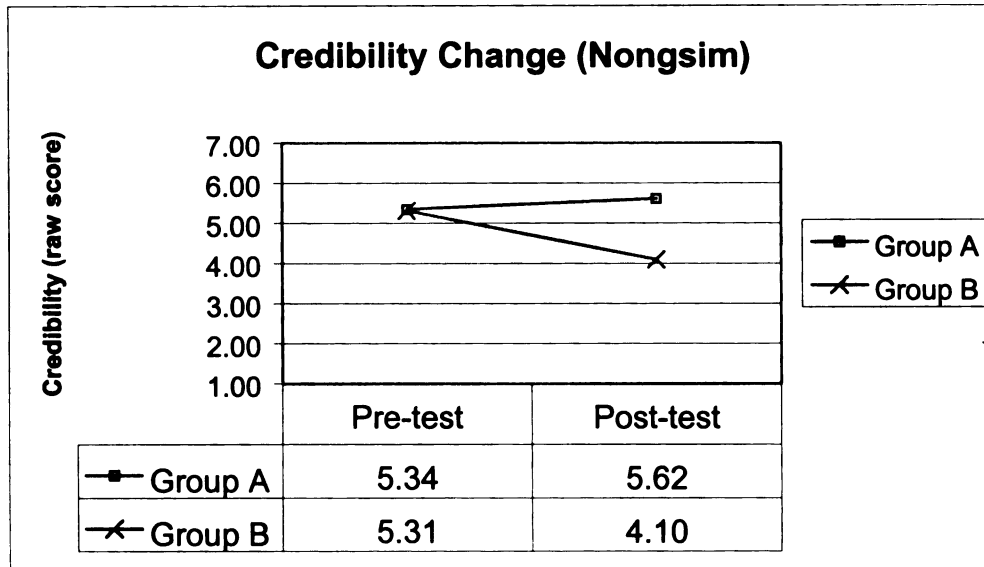
The group mean difference in credibility about Binggrae between the two groups that were given opposite information is also significant: Db= 1.23, t (286) =10.33 and p < .001. Subjects responded to negative CEPI (r = -.33) and positive CEPI (r = .33) in the equal intensity.

The data are strongly consistent with H 2. It was statistically significant that subjects reduced their perception of credibility change about Binggrae when they were exposed to negative CEPI and increased them when they were exposed to positive CEPI. The degree of credibility change caused by the both negative and positive CEPI is strong. The probability that consumers change their perception of credibility in the negative direction when they are exposed to the negative CEPI is 100 percent and change their perception of credibility in the positive direction when they are exposed to the positive CEPI is also 100 percent. As a result, it can be concluded that H 2 is strongly confirmed in the case of credibility for Binggrae.

Purchase Intention toward Products

The hypothesis for purchase intention toward products (Hypothesis Three: H 3) posited that CEPI disclosures increase consumer purchase intention for the products of non-polluting corporations and decrease consumer purchase intention for the products of polluting corporations.

Basic descriptive statistics related to the variable "purchase intention toward products of the four corporations" are summarized in the following Table 6.21. Stimuli effects of purchase intention toward four products are summarized in the Table 6.22.

Table 6.22. Descriptive Statistics of Purchase Intention

			Group A	Group B
Samsung	Pre-test	Mean	4.68	4.73
		SD	1.33	1.35
	Post-test	Mean	5.11	3.84
		SD	1.23	1.76
	D	Mean	.43	-.89
		SD	1.26	1.56
	N		151	152
Hyundai	Pre-test	Mean	3.04	3.04
		SD	1.28	1.24
	Post-test	Mean	2.79	4.10
		SD	1.32	1.39
	D	Mean	-.25	1.06
		SD	1.16	1.38
	N		151	152
Nongsim	Pre-test	Mean	5.54	5.66
		SD	1.19	1.06
	Post-test	Mean	5.69	4.00
		SD	1.14	1.61
	D	Mean	.15	-1.66
		SD	1.19	1.86
	N		153	151
Binggrae	Pre-test	Mean	4.19	4.29
		SD	1.25	1.43
	Post-test	Mean	3.49	4.82
		SD	1.44	1.14
	D	Mean	-.70	.53
		SD	1.38	1.47
	N		153	151

- SD = Standard Deviation
- D = Gain Score (Gain score of post-test – Gain score of pre-test)
- N = Sample size

Table 6.23

Individual Purchase Intention Changes toward Four Products

	Group	D	t	Sig	95% CI of D (1-tailed)		r	95% CI of r (1-tailed)		IP
					Lower	Upper		Lower	Upper	
Samsung	A: +	.43	4.17	.000	.26	7.00	.18	.05	1	.99
Samsung	B: -	-.89	-7.01	.000	-7.00	-.68	-.28	-1	-.16	1.00
Hyundai	B: +	1.06	9.50	.000	.83	7.00	.39	.27	1	1.00
Hyundai	A: -	-.25	-2.64	.004	-7.00	-.09	-.10	-1	.03	.89
Nongsim	A: +	.15	1.52	.066	-.01	7.00	.06	-.07	1	.79
Nongsim	B: -	-1.66	-10.98	.000	-7.00	-1.41	-.53	-1	-.44	1.00
Binggrae	B: +	.53	4.43	.000	.33	7.00	.21	.08	1	1.00
Binggrae	A: -	-.70	-6.33	.000	-7.00	-.52	-.26	-1	-.14	1.00

- A = Group A that had type A of stimuli in the post-test
- B = Group B that had type B of stimuli in the post-test
- "+" = Positive information of corporate environmental performance
- "-" = Negative information of corporate environmental performance
- D = mean of raw gain score (Gain score = gain score after stimuli - gain score before stimuli)
- r = Point estimate of stimuli correlation coefficient
- IP (Inference Probability) = Probability that effect occurs in the hypothesized direction.
- Sig = p-value

Purchase Intention toward Samsung Cellular Phone

The direction and extent of change in purchase intention in raw score to negative

and positive CEPI stimuli are presented in the following Figure 6.9.

Figure 6.9. Purchase Intention Change toward Samsung Cellular Phone

Purchase Intention Change (Samsung)

	Pre-test	Post-test
—■— Group A	4.68	5.11
—✕— Group B	4.73	3.84

- Group A was exposed to positive CEPI.
- Group B was exposed to negative CEPI.
- Data reflect raw scores

The changes in individual purchase intention toward the Samsung cellular phone related to negative CEPI (i.e., gain score) was significant: Dw = -.89, t (151) = -7.01, p < .001, and CI = -7 to -.68. The degree of change in purchase intention resulting from *negative* CEPI (i.e., effect size) was moderate: r = -.28, CI = -1 to -.16. The probability that changes in purchase intention related to negative CEPI occur in the negative direction is 100 percent: IP = 1.00.

The gain score in purchase intention for Samsung cellular phone resulting from *positive* CEPI was significant: Dw = .43, t (150) = 4.17, p < .001, and CI = .26 to 7. Effect size of purchase intention by *positive* CEPI is small: r = .18, CI = .05 to 1.

However, the probability that purchase intention change caused by the *positive* CEPI occurs in the positive direction is 99 percent: IP = .99.

The group mean difference in purchase intention toward Samsung cellular phone between the two groups that were presented with opposite information is also significant: Db= 1.31, t (289)=8.07 and p < .001. Subjects responded to negative CEPI more strongly (r = -.28) than positive CEPI (r = .18).

The data are strongly consistent with H 3. It was statistically significant that the subjects changed their purchase intention negatively toward Samsung cellular phone when they were exposed to negative CEPI and changed their purchase intention positively toward Samsung cellular phone when they were exposed to positive CEPI. The degree of purchase intention change related to the negative information was moderate and the probability that consumers would change their purchase intention in the negative direction when they are exposed to the negative CEPI is 100 percent. The extent of change in purchase intention resulting from positive CEPI is small, but the probability that consumers change their purchase intention in the positive direction when they are exposed to the positive CEPI is 99 percent. Therefore, it can be concluded that H 3 is strongly confirmed in the case of consumer purchase intention toward Samsung cellular phone.

Purchase Intention toward Hyundai Cellular Phone

The direction and extent of change in purchase intention in raw score to negative and positive CEPI stimuli are visualized in the following Figure 6.10.

Figure 6.10. Purchase Intention Change toward Hyundai Cellular Phone

Purchase Intention (Hyundai)

	Pre-test	Post-test
—✗— Group A	3.04	2.79
—▫— Group B	3.04	4.10

- Group A was exposed to negative CEPI.
- Group B was exposed to positive CEPI.
- Data reflect raw scores

The change in individual purchase intention toward Hyundai cellular phone

related to negative CEPI was significant: Dw = -.25, t (150) = -2.64, p = .004, and CI = -

7 to -.09. The degree of purchase intention change (i.e., effect size) resulting from

negative CEPI is small: r = -.10, CI = -1 to -.03. The probability that changes in purchase

intention change resulting from the negative CEPI occur in the negative direction is 89

percent: IP = .89.

The gain score in purchase intention for Hyundai cellular phone resulting from

positive CEPI was significant: Dw = 1.06, t (151) = 9.50, p < .001, and CI = .88 to 7.

Effect size of purchase intention by *positive* CEPI is large: r = .39, CI = .27 to 1. The

probability that changes in purchase intention change resulting from *positive* CEPI occur in the positive direction is 100 percent: IP = 1.00.

The group mean difference in purchase intention between two groups that were presented with opposite information is also significant: Db= 1.31, t (301) = 8.96 and p < .001. In contrast to the case of Samsung, the subjects responded a little more strongly to positive CEPI (r = .39) than to negative CEPI for Hyundai (r = -.10).

The data is strongly consistent with H 3. It was statistically significant that the respondents changed their purchase intention negatively toward Hyundai cellular phone when they were exposed to negative CEPI and changed their purchase intention positively toward Hyundai cellular phone when they were exposed to positive CEPI. The extent of change in purchase intention related to negative and positive CEPI is respectively small and large. However, the probability that consumers change their purchase intention in the negative direction when they are exposed to the negative CEPI is 89 percent (i.e., probably in the direction predicted) and change their purchase intention in the positive direction when they are exposed to the positive CEPI is 100 percent.

Therefore, it can be concluded that in the case of consumer purchase intention toward Hyundai cellular phone, H 3 is confirmed in the case of negative CEPI disclosure and it is strongly confirmed in the case of positive CEPI disclosure.

Purchase Intention toward Nongsim Instant Noodle

The direction and degree of changes in purchase intention in raw score to negative and positive CEPI stimuli are presented in the following Figure 6.11.

Figure 6.11. Purchase Intention Change toward Nongsim Instant Noodle

Purchase Intention Change (Nongsim)

	Pre-test	Post-test
—□— Group A	5.54	5.69
—✕— Group B	5.66	4.00

- Group A was exposed to positive CEPI.
- Group B was exposed to negative CEPI.
- Data reflect raw scores

The change in individual purchase intention toward Nongsim instant noodle related to negative CEPI was significant: Dw = -1.67, t (150) = -10.98, p < .001, and CI = -.7 to –1.41. The extent of change in purchase intention (i.e., effect size) resulting from *negative* CEPI is very strong: r = -.53, CI = -1 to -.44. The probability that change in purchase intention related to negative CEPI occurs in the negative direction is 100 percent: IP = 1.00.

However, the gain score in the purchase intention for Nongsim instant noodle related to *positive* CEPI was significant (in one-tailed significance test at α = 0.05 level): Dw = .15, t (152) = 1.52, p = .066, and CI = -.01 to 7. The effect size of purchase intention by *positive* CEPI is also very small: r = .06, CI = -.07 to 1. The probability that

change in purchase intention related to the *positive* CEPI occurs in the positive direction is not strong: IP = .79.
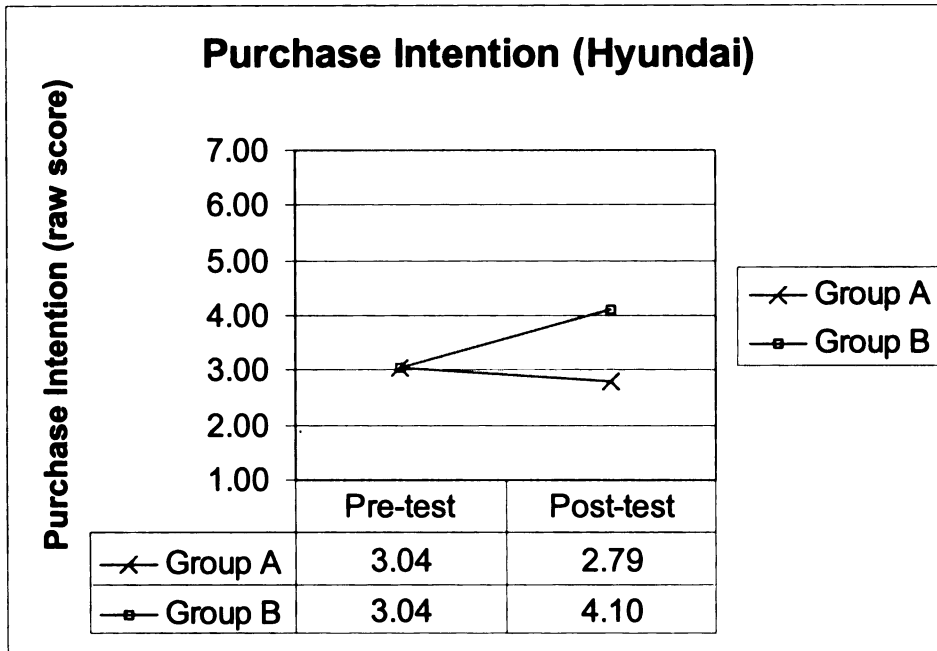
The group mean difference in purchase intention toward Nongsim instant noodle between the two groups that were presented with opposite information is significant: Db= 1.81, t (255) =10.08 and p < .001. Consistent with the case of Samsung, subjects responded to negative CEPI much more strongly (r = -.53) than positive CEPI (r = .06).

The data is strongly consistent with H 3 in the case of negative CEPI stimuli but are weakly consistent with H 3 in the case of positive CEPI stimuli. The subjects changed their purchase intention negatively toward Nongsim instant noodle when they were exposed to negative CEPI and changed positively their purchase intention toward Nongsim instant noodle when they were exposed to positive CEPI was statistically significant. The degree of purchase intention change resulting from negative CEPI is very substantial and the probability that consumers would change their purchase intention in the negative direction when they are exposed to the negative CEPI is 100 percent. The degree of change in purchase intention related to the positive CEPI is very weak, however the probability that consumers change their purchase intention in the positive direction when they are exposed to the positive CEPI is still large (IP = .79), meaning that effect occurs probably in the direction predicted. Meanwhile, the result from the two-group comparison revealed that raw mean gain scores of two groups are significantly different. Therefore, it can be concluded that in the case of consumer purchase intention toward Nongsim instant noodle, H 3 is strongly confirmed in the case of negative CEPI disclosure and is also confirmed in the case of positive CEPI disclosure.

<u>Purchase Intention toward Binggrae Instant Noodle</u>

The direction and extent of change in purchase intention in raw score related to

negative and positive CEPI stimuli are presented in the following figure 6.12.

Figure 6.12. Purchase intention Change toward Binggrae Instant Noodle

Purchase Intention Change (Binggrae)

	Pre-test	Post-test
—✕— Group A	4.19	3.49
—■— Group B	4.29	4.82

- Group A was exposed to negative CEPI.
- Group B was exposed to positive CEPI.
- Data reflect raw scores

The change in individual purchase intention toward Binggrae instant noodle

related to negative CEPI was significant: Dw = -.70, t (152) = -6.33, p < .001, and CI = -

7 to -.52. The degree of purchase intention change (i.e., effect size) by *negative* CEPI is

moderate: r = -.26, CI = -1 to -.14. The probability that change in purchase intention

related to the negative CEPI occurs in the negative direction is 100 percent: IP = 1.00.

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The gain score in the purchase intention for Binggrae instant noodle by *positive* CEPI was significant: Dw = .53, t (150) = 4.43, p < .001, and CI = .33 to 7. Effect size of purchase intention by *positive* CEPI was moderate: r = .21, CI = .08 to 1. The probability that changes in purchase intention related to the *positive* CEPI occur in the positive direction is 100 percent: IP = 1.00.

The group mean difference in purchase intention toward Binggrae instant noodle between the two groups that were presented with opposite information is also significant: Db= 1.23, t (302) =7.55 and p < .001. The subjects responded to negative CEPI (r = -.26) and to positive CEPI (r = .21) in the almost equal intensity.

The data are strongly consistent with H 3. It was statistically significant that subjects reduced their purchase intention toward Binggrae instant noodle when they were exposed to negative CEPI and increased their purchase intention toward Binggrae instant noodle when they were exposed to positive CEPI. The degree of purchase intention change caused by the both negative and positive CEPI is moderate. The probability that consumers would change their purchase intention in the negative direction when they are exposed to negative CEPI is 100 percent and change their purchase intention in the positive direction when they are exposed to positive CEPI is 100 percent. As a result, it can be concluded that H 3 is strongly confirmed in the case of purchase intention toward Binggrae.

Stimuli by Subject Interaction

In the absence of error of measurement, any variation in gain scores can be attributed to the Stimuli (i.e., treatment) by Subject Interaction. If there is no Stimuli by

Subject Interaction, all individuals have the same change score (i.e., standard deviation of

gain score , SD $_{\triangle Y}$ = 0). The degree of Stimuli by Subject Interaction can be measured

by the followings:

1. Raw score SD "STG" (i.e., Standard deviation of gain score)

2. Standard score SD "s" (STG / Within group SD)

3. Self-impact correlation "ir."

If there are interactions between stimuli and subjects, there would be differences

in the effect size that can be explained by different initial level. For example, subjects

who have strong attitude toward Samsung may be little sensitive to any information of

Samsung, but subject who have weak attitude toward Samsung may strongly response to

information about Samsung. This is measured by the extent of the correlation between

initial level and effect size. This correlation is called the self-impact correlation (i.e., ir).

The sizes of the Stimuli by Subject Interaction related to Attitude, Credibility and

Purchase Intention changes are summarized in the following Table 6.23. The Stimuli

(i.e., Treatment) by Subject Interaction reported in this Table 6.23 is calculated based on

the corrected basic statistics for measurement error. Statistical significance of the Stimuli

by Subject Interaction is tested at α = .05 and one-tailed level, assuming that distribution

of STG and ir are in a normal curve.

Table 6.24

Stimuli by Subject Interaction

	Attitude			Credibility			Purchase Intention		
	s	STG	ir	S	STG	ir	s	STG	ir
Samsung A	.852 **	.827 **	-.287 **	.815 **	.661 **	-.142 N sig	.864 **	1.006 **	-.528 **
Samsung B	.994 **	1.112 **	-.259 **	1.015 **	.917 **	-.295 **	.951 **	1.434 **	-.186 **
Hyundai A	.831 **	.958 **	-.262 **	.896 **	.895 **	-.278 **	.834 **	1.038 **	-.390 **
Hyundai B	1.046 **	.978 **	-.536 **	.976 **	.744 **	-.520 **	1.004 **	1.264 **	-.389 **
Nongsim A	1.027 **	1.001 **	-.342 **	1.039 **	.948 **	-.350 **	.988 **	1.118 **	-.517 **
Nongsim B	1.251 **	1.275 **	-.341 **	1.185 **	1.080 **	-.273 **	1.366 **	1.811 **	-.499 **
Binggrae A	.954 **	.977 **	-.188 **	1.096 **	1.072 **	-.282 **	.985 **	1.277 **	-.370 **
Binggrae B	1.048 **	.912 **	-.667 **	.955 **	.760 **	-.564 **	1.121 **	1.415 **	-.686 **

- s = Standard Score SD (Standard Deviation)
- STG = Raw Score SD
- ir = Self-impact correlation
- ** = Statistically Significant, alpha = .5, two-tailed test
- N sig = Not significant

Table 6.23 shows that except for a self-impact correlation (ir = -.142) related to

credibility change of Samsung Group A, all Stimuli by Subject Interaction of STG, s and

ir are statistically significant at α = .05, one-tailed level.[19] It means that masking

variables are affecting the extent of the effect of dependent variables: attitude, credibility

[19] The fact that standard deviation is not a zero and statistically significant, means that 1) masking variables that are unknown variables affecting the intensity of influence of CEPI on attitude, credibility and purchase intention, 2) situational random factors (e.g., hearing a news about Samsung Electronics' bad behavior just before administration of the post-test), or 3) random functioning of human psychology (e.g., participants' though or feeling during the experiment) were intervened in the experiment. Moderator variable is a special case of masking variable.

and purchase intention. It also implies that there are moderator variables that influence

the effect size of three dependent variables: attitude, credibility and purchase intention.

Therefore, it is relevant to investigate moderators for the three dependent variables.

Environmental Attitude as a Moderator[20]

It is hypothesized that a positive relationship exists between consumer

environmental attitude toward pollution and consumer purchase behavioral change

caused by CEPI disclosure. Thus, the fourth hypothesis (H 4) posited that a customer

who has strong environmental attitudes against pollution (EAP) changes the three

dependent variables more than a customer who has low EAP. In other words, a positive

relationship exists between EAP and the three dependent variables: attitude toward

corporation (AC), corporate credibility (CC), and purchase intention (PI). Data analysis

results related to H 4 are presented in the following Table 6.24.

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[20] Moderator is defined as a variable that intervenes between independent and dependent variable and influences the degree of dependent variable. However, it is neither an independent variable nor a mediator variable. Moderator variable is a special case of the masking variable. Masking variables are unknown variables that affect the defendant variable. Meanwhile, Mediator variable is a middle variable located between the first and the final variable in the causal diagram so that mediator is both independent and dependent variable. For more details, see chapter VII, p. 221.

Table 6.25

Environmental Attitude toward Pollution and Effect Size of Three Variables

Environmental Attitude &	Attitude				Credibility				Purchase Intention			
	r	sig	IP	H4	r	sig	IP	H4	r	sig	IP	H4
Samsung A:+	.09	.126	.88	C	-.03	.361	.36	F	.04	.312	.69	C
Samsung B: -	-.26	.001	1.00	C	-.33	.000	1.00	C	-.34	.000	1.00	C
Hyundai A: -	-.09	.128	.87	C	-.13	.061	.94	C	-.24	.002	1.00	C
Hyundai B:+	.10	.110	.89	C	.04	.310	.69	C	.01	.471	.53	F
Nongsim A:+	.14	.045	.96	C	.13	.054	.95	C	.08	.169	.83	C
Nongsim B: -	-.30	.000	1.00	C	-.21	.006	1.00	C	-.20	.006	1.00	C
Binggrae A: -	-.07	.197	.80	C	-.20	.007	.99	C	-.20	.007	.99	C
Binggrae B:+	-.01	.467	.47	F	.07	.185	.82	C	.10	.119	.88	C

- A = Group A / B = Group B in the experiment.
  - Positive CEPI was given to Samsung A, Hyundai B, Nongsim A and Binggrae B
  - Negative CEPI was given to Samsung B, Hyundai A, Nongsim B and Binggrae A
- + / - = Direction of r required to confirm H 4 under CEPI stimuli given
  - H 4 = positive correlation (+)
  - "-" is resulted from H 4 (+) and negative CEPI (-)
  - "+" is resulted from H 4 (+) and positive CEPI (+)
- C = Confirmed / F = need Further research / N = Not confirmed
- r = Pearson correlation coefficient
- IP = Inference Probability
- sig = p-value

Environmental Attitude and Attitude toward Corporation

Group B's attitude for Binggrae revealed the opposite directional correlation to H

4: r = -.01, p = .467, and IP = .47. The observed opposite correlation between

environmental attitude and attitude about Binggrae is extremely weak (r = -.01) and also

not statistically significant (p = .467 at the one-tailed α = 0.05 level). Reverse probability

(RP = .53) is almost equivalent to inference probability (IP = .47). Thus, the observed

correlation could be considered as "no correlation." However, inference probability (IP =

.47) falls between .333 and .667 (1/3 < IP < 2/3) so the sample size is not large enough

to draw a conclusion. For a sound conclusion, we would need further research to decide

"no correlation" related to H 4 in the case of positive CEPI stimuli about Binggrae

(Group B of Binggrae).

Four groups reveal that data are consistent with H 4: Group A of Samsung (r =

.09, p = .126, and IP = .88), Group A of Hyundai (r = -.09, p = .128 and IP = .87), Group

B of Hyundai (r = -.10, p = .110 and IP = .89) and Group A of Binggrae (r= -.07, p = .197

and IP = .80). In these four groups, the observed correlations were not statistically

significant at the one-tailed α = 0.05 level, but inference probability is moderately high. It

means that the probability that the correlation between environmental attitude and

attitude toward corporation is positive (i.e., in the direction hypothesized) is much higher

than the reverse probability that the correlation is negative. Therefore, it is concluded that

H 4 is confirmed in the cases of Group A of Samsung, Group A of Hyundai, Group B of

Hyundai and Group A of Binggrae.

The data from three groups are strongly consistent with H 4: Group B of Samsung

(r = -.26, p = .001 and IP = 1.00), Group A of Nongsim (r = .14, p = .045 and IP = .96)

and Group B of Nongsim (r = -.30, p < .001 and IP = 1.00). In these three groups, the

observed correlations were considerably significant at the one-tailed α = 0.05 level and

the inference probabilities are strongly high. Thus, the researcher concludes that H 4 is

strongly confirmed in the cases of Group B of Samsung, Group A of Nongsim and Group

B of Nongsim.

Figure 6.13. Inference Probability of H4 for Attitude toward Corporation

Environmental Attitude & Attitude to Corporation

	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
◆ Series1	.88	1.00	.87	.89	.96	1.00	.80	.47

Figure 6.13 summarizes that except for one case of positive CEPI stimuli about Binggrae (Group B of Binggrae), H 4 is confirmed in all cases (i.e., 7 of 8 cases). For a conclusion concerning Binggrae group B, further research is needed. Thus, the researcher concludes that "environmental attitude toward pollution" is a moderator variable for the variable "attitude toward corporation."

Environmental Attitude and Corporate Credibility

Group A's perception of credibility for Samsung revealed the opposite directional correlation to H 4: r = -.03, p = .361, and IP = .36. For H 4 to be confirmed, the correlation between environmental attitude and credibility of Samsung should be positive because Group A was exposed to positive CEPI of Samsung and hypothesized direction of H 4 is positive. However, the observed correlation is negative (r = -.03). Meanwhile,

the observed correlation is not statistically significant (p = .361 at the one-tailed α = 0.05 level). Thus, the observed negative correlation (r = -.03) could be generated from sampling error (Sample size of Group A = 154). Inference probability (IP = .36) falls between .333 and .667 (1/3 < IP < 2/3) so the sample size is not large enough to draw a conclusion. In order to draw a sound conclusion, we would need further research to decide disconfirmation of H 4 in the case of positive CEPI stimuli about Samsung (Group A of Samsung).

The two groups reveal that data are consistent with H 4: Group B of Hyundai (r = -.04, p = .310 and IP = .69) and Group B of Binggrae (r = -.07, p = .185 and IP = .82). In the two groups, the observed correlations were not statistically significant at the one-tailed α = 0.05 level. However, the inference probability is larger than .667. This means that the probability that the correlation between environmental attitude and corporate credibility is positive (i.e., in the direction hypothesized) is moderately larger than the reverse probability that the correlation is negative. Therefore, the researcher concludes that H 4 is confirmed in the cases of Group B of Hyundai and Group B of Binggrae.

Five groups revealed that data are strongly consistent with H 4: Group B of Samsung (r = -.33, p < .001 and IP = 1.00), Group A of Hyundai (r = -.13, p = .061 and IP = .94), Group A of Nongsim (r = .13, p = .054 and IP = .95), Group B of Nongsim (r = -.21, p = .006 and IP = 1.00), and Group A of Binggrae (r = -.20, p = .007 and IP = .99). In these five groups, the observed correlations were considerably significant at the one-tailed α = 0.05 level and the inference probabilities are strongly high. Thus, this study concludes that H 4 is strongly confirmed in the cases of Group B of Samsung, Group A of Hyundai, Group A of Nongsim, Group B of Nongsim, and Group A of Binggrae.

Figure 6.14. Inference Probability of H4 for Corporate Credibility

Environmental Attitude & Corporate Credibility

	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
Series1	.36	1.00	.94	.69	.95	1.00	.99	.82

Figure 6.14 shows that except for one case of positive CEPI stimuli about Samsung (Group A of Samsung), H4 is confirmed in all cases (i.e., 7 of 8 cases). For the conclusion about Samsung Group A, further research is needed. Thus, this study concludes that "environmental attitude toward pollution" is a moderator variable for the variable "corporate credibility."

Environmental Attitude and Purchase Intention

Group B's purchase intention for Hyundai's cellular phone revealed "no" correlation: $r = .01$, $p = .471$, and IP = .53. The observed correlation between environmental attitude and purchase intention is very weak ($r = .01$) and also not statistically significant ($p = .471$ at the one-tailed $\alpha = 0.05$ level). The inference

probability (IP = .53) is almost equivalent to reverse probability (RP = 47). Thus, the observed correlation could be considered as "no correlation." However inference probability (IP = .53) falls between .333 and .667 (1/3 < IP < 2/3) so the sample size is not large enough to draw a conclusion. Further research is needed to decide "no correlation" in relation to H 4 in the case of positive CEPI stimuli about Hyundai (Group B of Hyundai).

Three groups reveal that data are consistent with H 4: Group A of Samsung (r = .04, p = .312, and IP = .69), Group A of Nongsim (r = .08, p = .169 and IP = .83), and Group B of Binggrae (r = .10, p = .119 and IP = .88). In these three groups, the observed correlations were not statistically significant at the one-tailed α = 0.05 level, but inference probability is moderately high. It means that the probability of a relationship in the hypothesized direction is much higher than the reverse probability of a relationship in the opposite direction of H 4. Therefore, it is concluded that H 4 is confirmed in the cases of Group A of Samsung, Group A of Nongsim, and Group B of Binggrae.

Four groups revealed that data are strongly consistent with H 4: Group B of Samsung (r = -.34, p < .001 and IP = 1.00), Group A of Hyundai (r = -.24, p = .002 and IP = 1.00), Group B of Nongsim (r = -.20, p = .006 and IP = 1.00) and Group A of Binggrae (r = -.20, p = .007 and IP = .99). In these four groups, the observed correlations were considerably significant at the one-tailed α = 0.05 level and the inference probabilities are very high. Thus, it is concluded that H 4 is strongly confirmed in the cases of Group B of Samsung, Group A of Hyundai, Group B of Nongsim and Group A of Binggrae.

Figure 6.15. Inference Probability of H4 for Purchase Intention

**Environmental Attitude &
Purchase Intention**

	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
Series1	.69	1.00	1.00	.53	.83	1.00	.99	.88

Figure 6.15 shows that except for one case of positive CEPI stimuli about

Hyundai (Group B of Hyundai), H 4 is confirmed in all of the cases (i.e., 7 of 8 cases).

For a conclusion concerning the Hyundai group B, further research is needed. Thus, it is

concluded that "environmental attitude toward pollution" is a moderator variable for the

variable "purchase intention."

Corporate Familiarity as a Moderator

Hypothesis Five (H 5) posited that consumers with high familiarity with a

corporation (CFC) change their consumer attitude (AC), corporate credibility (CC), and

purchase intention (PI) less than one with low familiarity. In order words, H 5 states that

a negative relationship exists between CFC and three variables of AC, CC, and PI. Data

analysis results related to H 5 is presented in the following table 6.25.

Table 6.26

Familiarity with Corporation and Effect Size of Three Variables

Familiarity &		Attitude				Credibility				Purchase Intention			
		r	sig	IP	H5	r	sig	IP	H5	r	sig	IP	H5
Samsung	A: -	-.15	.029	.97	C	-.10	.108	.90	C	-.22	.003	1.00	C
Samsung	B:+	-.20	.008	.01	N	-.12	.071	.07	N	-.07	.210	.21	N
Hyundai	A:+	.07	.193	.81	C	.01	.439	.56	F	.08	.177	.82	C
Hyundai	B: -	.00	.482	.48	F	-.08	.153	.85	C	-.01	.448	.55	F
Nongsim	A: -	-.19	.010	.99	C	-.07	.199	.80	C	-.17	.017	.99	C
Nongsim	B:+	-.05	.279	.28	N	.00	.494	.50	F	-.01	.453	.45	F
Binggrae	A:+	-.04	.301	.30	N	.01	.431	.57	F	-.05	.288	.29	N
Binggrae	B: -	-.28	.000	1.00	C	-.22	.003	1.00	C	-.24	.001	1.00	C

- A = Group A / B = Group B in the experiment.
   - Positive CEPI was given to Samsung A, Hyundai B, Nongsim A and Binggrae B
   - Negative CEPI was given to Samsung B, Hyundai A, Nongsim B and Binggrae A
- + / - = Direction of r required to confirm H 5 under CEPI stimuli given
   - H 5: negative correlation (-)
   - "+" is resulted from H 5 (-) and negative CEPI (-)
   - "-" is resulted from H 5 (-) and positive CEPI (+)
- C = Confirmed / F = need Further research / N = Not confirmed
- r = Pearson correlation coefficient
- IP = Inference Probability
- sig = p-value

Familiarity and Attitude toward Corporation

Three groups' attitudes revealed the considerably opposite directional correlation

to H 5: Group B of Samsung (r = -.20, p = .008, and IP = .01), Group B of Nongsim (r = -

.05, p = 279 and IP = .28) and Group A of Binggrae (r = -.04, p = .301 and IP = .30). In

all three cases, the observed correlation should be positive in order to confirm H 5

because negative CEPI was given to them. However, the directions of observed

correlation are negative and the correlations are statistically significant at the one-tailed α

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= 0.05 level. Reverse probabilities are considerably higher than the inference probability: Group B of Samsung (RP = .99), Group B of Nongsim (RP = .72) and Group A of Binggrae (RP = .70). It means that the probability of response occurring in the opposite direction of H 5 is significantly larger than the probability of its occurring in the same direction of H 5. Therefore, this study concludes that H 5 is strongly disconfirmed in the case of Group B of Samsung, Group B of Nongsim and Group A of Binggrae.

Data revealed that no correlations would exist between familiarity and attitude in one case: Group B of Hyundai (r = -.00, p = .482 and IP = .48). For Group B of Hyundai, the observed correlations were zero and not statistically significant at one-tailed $\alpha = 0.05$ level. IP (.48) is almost equivalent to RP (1- .48 = .52). Meanwhile, the inference probability (IP = .48) falls between .333 and .667 (1/3 < IP < 2/3) and the sample size is not large enough to draw a conclusion. Further research is needed to conclude that "no correlation" is related to H 5 in the cases of Group B of Hyundai.

A group revealed that data are consistent with H 5: Group A of Hyundai (r = .07, p = .193 and IP = .81). In this group, the observed correlation should be positive in order to confirm H 5 because negative CEPI was given to them. The result correlation observed was positive. The observed correlations were not significant at the one-tailed $\alpha = 0.05$ level, but the inference probabilities was moderately higher than RP (1 - .81 = .19). Thus, it is concluded that H 5 is confirmed in the cases of Group A of Hyundai.

Three cases showed that data are strongly consistent with H 5: Group A of Samsung (r = -.15, p = .029 and IP = .97), Group A of Nongsim (r = -.19, p = .010 and IP = .99) and Group B of Binggrae (r = -.28, p < .001 and IP = 1.00). In these three cases, the observed correlations are significant and the inference probabilities are very high.

Therefore, this study concludes that H 5 is confirmed in the cases of Group A of

Samsung, Group A of Nongsim and Group B of Binggrae.

Figure 6.16. Inference Probability of H5 for Attitude toward Corporation

Familiarity and Attitude

	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
Series1	.97	.01	.81	.48	.99	.28	.30	1.00

Figure 6.16 shows that familiarity with corporations is a severe contingency[21]

variable for attitude toward corporation, related to the CEPI disclosure. H 5 is confirmed

in the four cases, but disconfirmed for the three cases. For the conclusion of one case,

additional research is needed. Therefore, this study concludes that H 5 related to attitude

toward corporation is disconfirmed and "familiarity" is not a moderator variable to the

variable "attitude toward corporation."

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[21] Contingency variable is defined as a variable, of which effect occurs in both positive and negative direction. Contingency variable is a special case of the moderator variable.

Familiarity and Corporate Credibility

Group B's perception of credibility for Samsung revealed the strongly opposite directional correlation to H 5: $r = -.12$, $p = .071$, and IP $= .07$. For H 5 to be confirmed, the correlation between familiarity and credibility for Samsung should be positive because Group B was exposed to negative CEPI of Samsung and the hypothesized direction of H 5 is negative. However, the observed correlation is negative ($r = -.12$) and is statistically significant ($p = .071$ at the one-tailed $\alpha = 0.05$ level). The inference probability is .07 and the reverse probability (RP)[22] is .93 (i.e., RP $= 1-.07 = .93$). The probability that the correlation between familiarity and corporate credibility exists in the opposite direction of H 5 is very larger than the probability that the correlation exists in the same direction of H 5. Therefore, it is concluded that H 5 is strongly disconfirmed in the case of negative CEPI stimuli about Samsung (Group B of Samsung).

Data revealed that there "no correlation" or "almost no correlations" would exist between familiarity and attitude in the three cases: Group A of Hyundai ($r = -.01$, $p = .439$ and IP $= .56$), Group B of Nongsim ($r = .00$, $p = .494$ and IP $= .50$) and Group A of Binggrae ($r = .01$, $p = .431$ and IP $= .57$). For Group B of Nongsim and Group A of Binggrae, the observed correlations were not statistically significant at one-tailed $\alpha = 0.05$ level and IP was almost equivalent to RP. It means that the probability of the correlation existing in the hypothesized direction is almost equal to the reverse probability of its correlation existing in the opposite direction of H 5. However, the inference probabilities fall between .333 and .667 ($1/3 <$ IP $< 2/3$); thus, the sample

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[22] Reverse probability (RP) is the probability that effect occurs in the opposite direction of hypothesis.

size is not large enough to make conclusions. To draw a conclusion, we need further research to decide that "no correlation" exists in relation to H 5 in the cases of Group A of Hyundai, Group B of Nongsim and Group A of Binggrae.

The three groups revealed that data are moderately consistent with H 5: Group A of Samsung (r = -.10, p = .108 and IP = .90), Group B of Hyundai (r = -.08, p = .153 and IP = .85) and Group A of Nongsim (r = -.07, p = .199 and IP = .80). In these three groups, the observed correlations were not significant at the one-tailed α = 0.05 level but the inference probabilities are substantially higher than RP. Thus, this study concludes that H 5 is confirmed in the cases of Group A of Samsung, Group B of Hyundai and Group A of Nongsim.

One case showed that the data are strongly consistent with H 5: Group B of Binggrae (r = -.22, p = .003 and IP = 1.00. In this case, the correlation is significant and the probability that the correlation between familiarity and corporate credibility exists in the direction opposite to H 5 is .00 (RP =1- 1.00). Therefore, this study concludes that H 5 is strongly confirmed in the cases of Group B of Binggrae.

Figure 6.17. Inference Probability of H5 for Corporate Credibility

Familiarity and Corporate Credibility

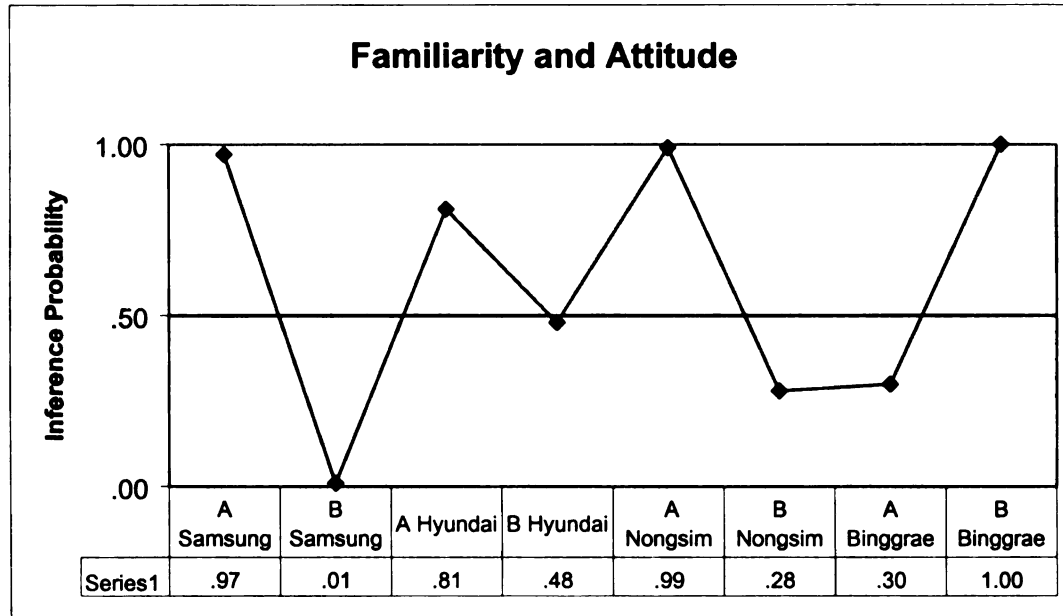|	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
Series1	.90	.07	.56	.85	.80	.50	.57	1.00

Figure 6.17 shows that familiarity with a corporation is a severe contingency[23] variable for corporate credibility, related to the CEPI disclosure. H 5 is confirmed in the four cases, but disconfirmed in the case of Group B of Samsung. Further research is needed to conclude that no correlation exists in the three cases. Therefore, this study concludes that H 5 related to corporate credibility is disconfirmed and "familiarity" is not a moderator variable to the variable "corporate credibility."

Familiarity and Purchase Intention

Two groups' perception of credibility revealed a considerably opposite directional correlation to H 5: Group B of Samsung ($r = -.07$, $p = .210$, and IP = .21) and Group A of Binggrae ($r = -.05$, $p = .288$ and IP = .29). In these two cases, the observed correlations are not statistically significant at the one-tailed $\alpha = 0.05$ level but reverse probabilities are

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[23] Contingency variable is defined as a variable, of which effect occurs in both positive and negative direction. Contingency variable is a special case of the moderator variable.

higher than inference probability: Group B of Samsung (RP = .79) and Group A of Binggrae (RP = .71). It means that the probability that the correlation between corporate familiarity and purchase intention exists in the opposite direction of H 5 is significantly stronger than the probability that the correlation exists in the same direction of H 5. Therefore, this study concludes that H 5 is strongly disconfirmed in the case of Group B of Samsung and Group A of Binggrae.

Data revealed that almost no correlations exists between familiarity and attitude in the two cases: Group B of Hyundai (r = -.01, p = .448 and IP = .55) and Group B of Nongsim (r = -.01, p = .453 and IP = .45). In these two cases, the observed correlations are almost zero and not statistically significant at one-tailed α = 0.05 level. IP is almost equivalent to RP: Group B of Hyundai (RP = .45) and Group B of Nongsim (RP = .55). However, the inference probabilities fall between .333 and .667 (1/3 < IP < 2/3) with the result that the sample size is not large enough to draw a conclusion. As a conclusion, further research is needed to decide "no correlation" related to H 5 in the cases of Group B of Hyundai and Group B of Nongsim.

One group revealed that data are consistent with H 5: Group A of Hyundai (r = -.08, p = .177 and IP = .82). In this group, the observed correlations were not significant at the one-tailed α = 0.05 level but the inference probabilities are moderately higher than RP (1 - .81 = .19). Thus, it is concluded that H 5 is confirmed in the cases of Group A of Hyundai.

Three cases showed that data are strongly consistent with H 5: Group A of Samsung (r = -.22, p = .003 and IP = 1.00), Group A of Nongsim (r = -.17, p = .017 and IP = .99) and Group B of Binggrae (r = -.24, p = .001 and IP = 1.00). In these three cases,

the observed correlations are significant and the inference probabilities are very high.

Therefore, it is concluded that H 5 is confirmed in the cases of Group A of Samsung,

Group A of Nongsim and Group B of Binggrae.

Figure 6.18. Inference Probability of H5 for Purchase Intention

Familiarity and Purchase Intention

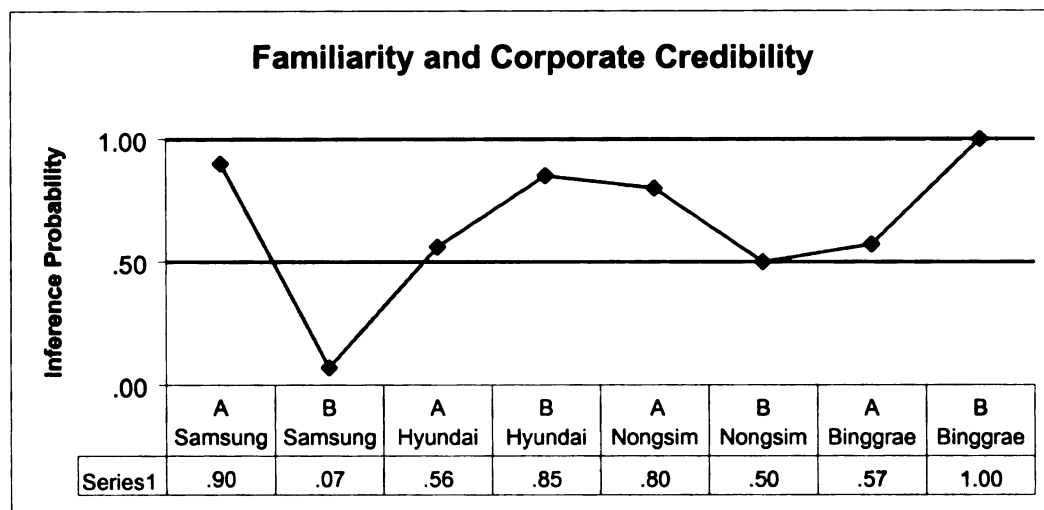|	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
Series1	1.00	.21	.82	.55	.99	.45	.29	1.00

Figure 6.18 shows that familiarity with corporations is a severe contingency

variable for purchase intention, related to the CEPI disclosure. H 5 is confirmed in the

four cases, but for the two cases H 5 is disconfirmed. For the conclusion in the two cases,

further research is needed. Thus, this study concludes that H 5 related to purchase

intention is disconfirmed and "familiarity" is not a moderator variable to the variable

"purchase intention."

Information Credibility as a Moderator

Hypothesis Six (H 6) posited that the greater the credibility of CEPI (CCI), the

greater the effect of the CEPI rating on the three dependent variables: consumer attitude

(AC), corporate credibility (CC), and purchase intention (PI). That is, a positive

relationship exists between CCI and the three dependent variables: AC, CC, and PI. Data

analysis results related to H 6 are presented in the following Table 6.26.

Table 6.27

Information Credibility and Effect Size of Three Variables

Information	Attitude				Credibility				Purchase Intention			
Credibility &	r	sig	IP	H6	r	sig	IP	H6	r	sig	IP	H6
Samsung A:+	.21	.005	1.00	C	.28	.000	1.00	C	.25	.001	1.00	C
Samsung B: -	-.21	.004	1.00	C	-.11	.094	.91	C	-.11	.093	.91	C
Hyundai A: -	-.24	.001	1.00	C	-.31	.000	1.00	C	-.14	.041	.96	C
Hyundai B:+	.11	.088	.92	C	.16	.027	.98	C	.14	.046	.96	C
Nongsim A:+	.15	.037	.97	C	.18	.014	.99	C	.07	.184	.82	C
Nongsim B: -	-.09	.148	.85	C	-.06	.239	.76	C	-.21	.005	1.00	C
Binggrae A: -	-.26	.001	1.00	C	-.27	.000	1.00	C	-.05	.284	.72	C
Binggrae B:+	.27	.000	1.00	C	.24	.001	1.00	C	.12	.066	.94	C

- A = Group A / B = Group B in the experiment.
    - Positive CEPI was given to Samsung A, Hyundai B, Nongsim A and Binggrae B
    - Negative CEPI was given to Samsung B, Hyundai A, Nongsim B and Binggrae A
- + / - = Direction of r required to confirm H 6 under CEPI stimuli given
    - H 6: positive correlation (+)
    - "-" is resulted from H 6 (+) and negative CEPI (-)
    - "+" is resulted from H 6 (+) and positive CEPI (+)
- C = Confirmed / F = need Further research / N = Not confirmed
- r = Pearson correlation coefficient
- IP = Inference Probability
- sig = p-value

Information Credibility and Attitude toward Corporation

Related to attitude change, Group B of Nongsim revealed that data are consistent

with H 6: r = -.09, p = .148, and IP = .85. In this case, the observed correlations were not

statistically significant at the one-tailed α = 0.05 level, but inference probability is larger

than RP (1 - .85 = .15). It means that the probability that the correlation between CEPI

credibility and attitude toward corporation is positive (i.e., the hypothesized direction of

H 6) is considerably larger than the reverse probability that the correlation is negative.

Therefore, it is concluded that H 6 is confirmed in the cases of Group B of Nongsim.

Except for Group B of Nongsim, seven of eight groups revealed that data are

strongly consistent of H 6: Group A of Samsung ($r = .21$, $p = .005$ and IP = 1.00), Group

B of Samsung ($r = -.21$, $p = .004$ and IP = 1.00), Group A of Hyundai ($r = -.24$, $p = .001$

and IP = 1.00), Group B of Hyundai ($r = .11$, $p = .088$ and IP = .92), Group A of

Nongsim ($r = .15$, $p = .037$ and IP = .97), Group A of Binggrae ($r = -.26$, $p = .001$ and IP

= 1.00), and Group B of Binggrae ($r = .27$, $p < .001$ and IP = 1.00). In these seven groups,

the observed correlations were highly significant at the one-tailed $\alpha = 0.05$ level and the

inference probabilities are very high. Thus, this study concludes that H 6 is strongly

confirmed in the cases of Group A of Samsung, Group B of Samsung, Group A of

Hyundai, Group B of Hyundai, Group A of Nongsim, Group A of Binggrae and Group B

of Binggrae.

Figure 6.19. Inference Probability of H 6 for Attitude toward Corporation

Information Credibility & Attitude

	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
Series1	1.00	1.00	1.00	.92	.97	.85	1.00	1.00

Figure 6.19 shows that data are strongly consistent with H 6 in 7 of 8 cases and consistent with H 6 in one case. Therefore, this study concludes that H 6 about attitude toward corporation is confirmed and "information credibility" is a moderator variable to the variable "attitude toward corporation."

Information Credibility and Corporate Credibility

Group B of Nongsim related to credibility change revealed that the data is consistent with H 6: $r = -.06$, $p = .239$, and IP $= .76$. In this case, the observed correlations were not statistically significant at the one-tailed $\alpha = 0.05$ level, but the inference probability is larger than the reverse probability (RP: $1 - .76 = .24$). It means that the probability of positive correlation between CEPI credibility and corporate credibility is considerably larger than the probability that the correlation is negative (i.e.,

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the opposite direction of H 6). Therefore, it is concluded that H 6 is confirmed in the

cases of Group B of Nongsim.

Except for Group B of Nongsim, the seven of eight groups revealed that data are

strongly consistent with H 6: Group A of Samsung (r = .28, p < .001 and IP = 1.00),

Group B of Samsung (r = -.11, p = .094 and IP = .91), Group A of Hyundai (r = -.31, p <

.001 and IP = 1.00), Group B of Hyundai (r = .16, p = .027 and IP = .98), Group A of

Nongsim (r = .18, p = .014 and IP = .99), Group A of Binggrae (r = -.27, p < .001 and IP

= 1.00), and Group B of Binggrae (r = .24, p = .001 and IP = 1.00). In these seven groups,

the observed correlations were considerably significant at the one-tailed $\alpha = 0.05$ level

and the inference probabilities are strongly high. Thus, this study concludes that H 6 is

strongly confirmed in the cases of Group A of Samsung, Group B of Samsung, Group A

of Hyundai, Group B of Hyundai, Group A of Nongsim, Group A of Binggrae and Group

B of Binggrae.

Figure 6.20. Inference Probability of H6 for Corporate Credibility

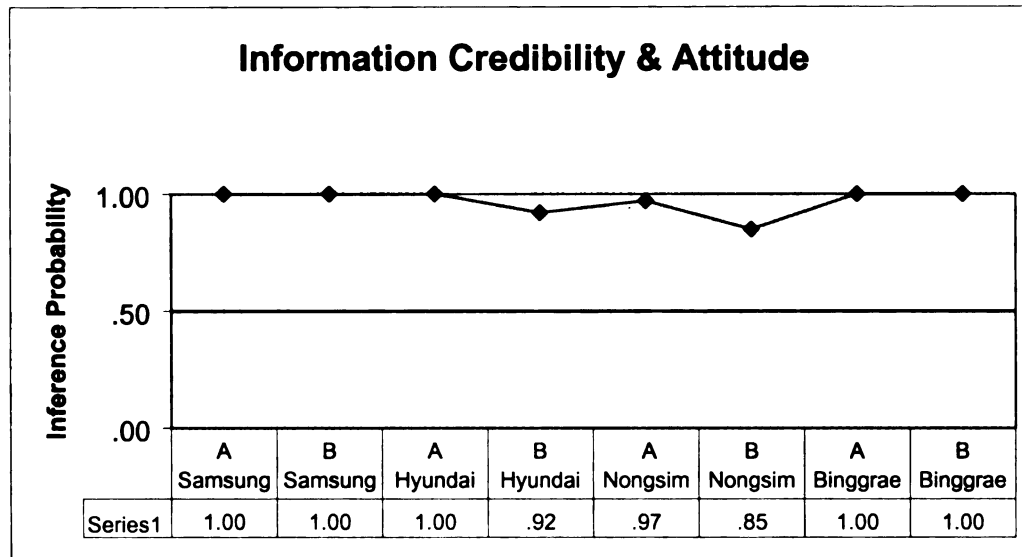|	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
Series1	1.00	.91	1.00	.98	.99	.76	1.00	1.00

Figure 6.20 shows that data are strongly consistent with H 6 in 7 of 8 cases and consistent with H 6 in one case. Therefore, this study concludes that H 6 related to corporate credibility is confirmed and "information credibility" is a moderator variable to the variable "corporate credibility."

Information Credibility and Purchase Intention

Related to purchase intention, data about two groups are consistent with H 6: Group A of Nongsim ($r = .07$, $p = .184$, and IP $= .82$) and Group A of Binggrae ($r = -.05$, $p = .284$ and IP $= .72$). In these two cases, the observed correlations were not statistically significant at the one-tailed $\alpha = 0.05$ level, but inference probability is larger than RP: Group A of Nongsim (RP $= 1 - .82 = .18$) and Group A of Binggrae (RP $= 1 - .72 = .28$). It means that the probabilities that the correlation between CEPI credibility and purchase intention exists in the hypothesized direction are considerably larger than the reverse probabilities that the correlation exists in the opposite direction of H 6. Therefore, it is concluded that H 6 is confirmed in the cases of Group A of Nongsim and Group A of Binggrae.

Except for the Group A of Nongsim and Group A of Binggrae, six of eight groups revealed that data are strongly consistent with H 6: Group A of Samsung ($r = .25$, $p = .001$ and IP $= 1.00$), Group B of Samsung ($r = -.11$, $p = .093$ and IP $= .91$), Group A of Hyundai ($r = -.14$, $p = .041$ and IP $= .96$), Group B of Hyundai ($r = .14$, $p = .046$ and IP $= .96$), Group B of Nongsim ($r = -.21$, $p = .005$ and IP $= 1.00$) and Group B of Binggrae (r

= .12, p = .066 and IP = .94). In these six groups, the observed correlations were strongly

significant at the one-tailed $\alpha = 0.05$ level and the inference probabilities are very high.

Thus, this study concludes that H 6 is strongly confirmed in the cases of Group A of

Samsung, Group B of Samsung, Group A of Hyundai, Group B of Hyundai, Group B of

Nongsim and Group B of Binggrae.

Figure 6.21. Inference Probability of H 6 for Purchase Intention

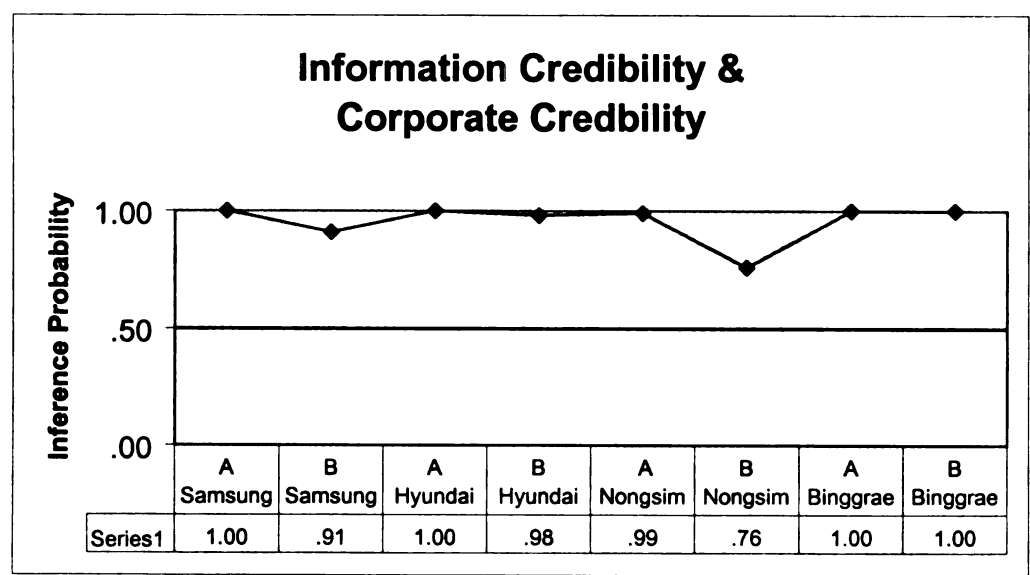|	A Samsung	B Samsung	A Hyundai	B Hyundai	A Nongsim	B Nongsim	A Binggrae	B Binggrae
Series1	1.00	.91	.96	.96	.82	1.00	.72	.94

Figure 6.21 shows that data are strongly consistent with H 6 in 6 of 8 cases and

also consist of H 6 in 2 cases. Therefore, the researcher concludes that H 6 related to

purchase intention is disconfirmed and "information credibility" is a moderator variable

to the variable "purchase intention."

CHAPTER VII

DISCUSSION AND INTERPRETATION

Chapter VI reported statistical data analysis and results. Results include both effects of the corporate environmental performance information (CEPI) about the four Korean corporations (i.e., Samsung, Hyundai, Nongsim and Binggrae) and effects of three moderators (i.e., familiarity with corporations, environmental attitude and CEPI credibility) on three dependent variables (i.e., attitude toward the four corporation, credibility of the four corporation and purchase intention toward the products of the four corporations).

This study's experiment tests the six hypotheses regarding PID. Among them, five hypotheses (H 1, 2, 3, 4, and 6) were confirmed, and one hypothesis (H 5) was disconfirmed. Participants in this experimental test consisted of three hundred and six Korean university students. The amount of results reported in the last chapter is vast, and its contents are complex. In order to obtain more clear understandings about the test results and to conduct rich discussion and appropriate interpretations for the test results, it is needed to organize the results of data analysis in the way of comparing all results from the four corporations. Thus, this chapter begins with summary and comparison of the results of all hypotheses tests.

Summary of Test of Hypothesis One, Two and Three

As shown in Table 7.1, all three major hypotheses are confirmed. The three hypotheses are as follows:

H 1: CEPI disclosures change consumer attitude toward corporations positively

for non-polluting corporations and negatively for polluting corporations.

H 2: CEPI disclosures change the consumers' perception of corporate credibility

positively for non-polluting corporations and negatively for polluting

corporations.

H 3: CEPI disclosures increase consumer purchase intention for the products of

non-polluting corporations and decrease consumer purchase intention for the

products of polluting corporations.

Table 7.1

Summary of Test of Hypothesis One, Two and Three

		Samsung	Hyundai	Nongsim	Binggrae
H I: Attitude	N. CEPI	S. Confirmed	S. Confirmed	S. Confirmed	S. Confirmed
	P. CEPI	S. Confirmed	S. Confirmed	Confirmed	S. Confirmed
H 2: Credibility	N. CEPI	S. Confirmed	S. Confirmed	S. Confirmed	S. Confirmed
	P. CEPI	S. Confirmed	S. Confirmed	S. Confirmed	S. Confirmed
H 3: Purchase	N. CEPI	S. Confirmed	S. Confirmed	S. Confirmed	S. Confirmed
Intention	P. CEPI	S. Confirmed	S. Confirmed	Confirmed	S. Confirmed

- S. Confirmed = Strongly Confirmed
- N. CEPI = Negative CEPI
- P. CEPI = Positive CEPI

Table 7.1 shows that all of the Hypothesis One, Two and Three are confirmed. In

the case of attitude change of Nongsim by positive CEPI, stimuli correlation is very weak

($r = .06$) and credibility change is barely significant ($p = .100$) at the level of $\alpha = .05$ and one-tailed significance test. However, inference probability is larger (IP = .76) than reverse probability (RI = .24). Thus, attitude change of Nongsim is interpreted as probably in the direction hypothesized. In the case of purchase intention toward Nongsim instant noodle by positive CEPI, stimuli correlation is very small ($r = .06$). However, purchase intention change is significant ($p = .066$) at the level of $\alpha = .05$ and one-tailed significance test and inference probability is larger (IP = .79) than reverse probability (RI = .21). Thus, the purchase intention change toward Nongsim instant noodle is interpreted as probably in the direction hypothesized. Except these two cases, all cases retained strong stimuli correlations, highly significant change of gain scores and high inference probability.

In the following, results of data analysis about changes of attitude, credibility, and purchase intention caused by CEPI disclosure are summarized in the charts.

CEPI Disclosure and Change of Attitude toward Corporation: H 1

The Hypothesis One (H 1) is that CEPI disclosures change consumer attitude toward corporations (AC) positively for non-polluting corporations and negatively for polluting corporation.

Figure 7.1. Attitude Change and Effect Direction

D of Attitude

	1	2	3	4	5	6	7	8
Series1	.24	-1.03	.59	-.55	.11	-1.50	.61	-.73

Raw Gain Score (y-axis: 3.00, 2.00, 1.00, .00, -1.00, -2.00, -3.00)

- D = Mean of difference of raw score between time 1 (Pre-test) and time 2 (Post-test).
- Raw score scale is –7 to 7.
- 1 = the case of Positive CEPI of Samsung
  2 = the case of Negative CEPI of Samsung
  3 = the case of Positive CEPI of Hyundai
  4 = the case of Negative CEPI of Hyundai
  5 = the case of Positive CEPI of Nongsim
  6 = the case of Negative CEPI of Nongsim
  7 = the case of Positive CEPI of Binggrae
  8 = the case of Negative CEPI of Binggrae
- These notes also apply to the next Figure 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8 and 7.9.

Figure 7.1 summarizes the result that the subjects changed their level of attitude

of the four corporations in the negative direction when they were exposed to negative

CEPI of the four corporations, and that the subjects changed their attitude toward the four

corporations in the positive direction when they were exposed to positive CEPI of the

four corporations.

Figure 7.2

Stimuli Correlation of Attitude Change as Effect Size and Pattern

Effect Size (Attitude Change)

	1	2	3	4	5	6	7	8
■ Series1	.12	-.42	.30	-.23	.06	-.59	.33	-.34

Figure 7.2 shows that the extent of attitude changes in response to CEPI (stimuli effect size) varies depending on corporations and on the positive or negative of CEPI.

No pattern by corporation was found in attitude changes. However, subjects responded more sensitively to negative information than to positive information about Samsung and Nongsim. For Hyundai, subjects more sensitively responded to positive information than negative information.

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Figure 7.3. Probability of Effect in the Direction Predicted (Inference Probability)

Effect Direction (Attitude Change)

	1	2	3	4	5	6	7	8
Series1	.94	1.00	1.00	1.00	.76	1.00	1.00	1.00

Figure7.3 reveals two findings:

1. The probabilities that the population (i.e., the Korean university students) of subjects changes their attitude toward the four corporations in the negative direction are very high (100 %) for all cases when they are exposed to negative CEPI.

2. The probabilities that the population changes their attitude of the four corporations in the positive direction are very high (100 %) for three cases, high (76 %) for one case and moderate (76 %) for one case when they are exposed to positive CEPI.

No pattern by negative and positive CEPI was found in attitude changes.
However, subjects' showed a more discernable response to negative information than to
positive information.

CEPI Disclosure and Change of Corporate Credibility: H 2

The Hypothesis Two (H 2) is that CEPI disclosures change consumers' perception
of corporate credibility (CC) positively for non-polluting corporations and negatively for
polluting corporations.

Figure 7.4. Corporate Credibility Change and Effect Direction

D of Credibility

	1	2	3	4	5	6	7	8
■ Series1	.38	-.81	.62	-.57	.28	-1.21	.55	-.67

Raw Gain Score (y-axis: 3.00, 2.00, 1.00, .00, -1.00, -2.00, -3.00)

Figure 7.4 summarizes the result that subjects changed their perception of
credibility for four corporations to the negative direction when they were exposed to
negative CEPI of the four corporations, and subjects changed their perception of

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credibility for four corporations in the positive direction when they were exposed to

positive CEPI of the four corporations.

Figure 7.5. Stimuli Correlation of Credibility Change as Effect Size and Pattern

Effect Size (Credibility Change)

	1	2	3	4	5	6	7	8
Series1	.23	-.41	.38	-.28	.15	-.55	.33	-.33

Figure 7.2 shows that the extent of credibility changes in response to CEPI

(stimuli effect size) varies depending on the corporations and on the positive or negative

of CEPI.

No pattern by corporation was found in credibility changes. However, subjects

responded more sensitively to negative information than to positive information about

Samsung and Nongsim. For Hyundai, subjects more sensitively responded to positive

information than to negative information. This tendency of sensitivity by corporation

related to credibility change is consistent with the tendency of sensitivity related to

attitude change.

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Figure7.6. Probability of Effect in the Direction Predicted (Inference Probability)

Effect Direction (Credibility Change)

	1	2	3	4	5	6	7	8
Series1	1.00	1.00	1.00	1.00	.97	1.00	1.00	1.00

Figure 7.3 reveals two findings:

1. The probabilities that the population of subjects changes their attitude toward the four corporations in the negative direction are very high (100 %) when they are exposed to negative CEPI.

2. The probabilities that population changes their attitude toward the four corporations in the positive direction are very high (100 % or 97%) when they are exposed to positive CEPI.

No pattern or tendency by negative and positive CEPI was found in credibility changes.

CEPI Disclosure and Change of Purchase Intention toward Products: H 3.

The Hypothesis Three (H 3) is that CEPI disclosures increase consumer purchase intention for the products (PI) of non-polluting corporations and decrease consumer purchase intention for the products of polluting corporations.

Figure 7.7. Purchase Intention Change and Effect Direction

D of Purchase Intention

	1	2	3	4	5	6	7	8
■ Series1	.43	-.89	1.06	-.25	.15	-1.66	.53	-.70

Figure 7.7 summarizes the result that subjects changed their purchase intention toward the products of the four corporations in the negative direction when they were exposed to negative CEPI about the four corporations and their purchase intention toward the products of the four corporations in the positive direction when they were exposed to positive CEPI about the four corporations.

Figure 7.8

Stimuli Correlation of Purchase Intention Change as Effect Size and Pattern

Effect Size
(Puchase Intention Change)

	1	2	3	4	5	6	7	8
■ Series1	.18	-.28	.39	-.10	.06	-.53	.21	-.26

Figure 7.8 shows that the extent of purchase intention changes in response to

CEPI (stimuli effect size) varies depending on the corporations and on the positive or

negative of CEPI.

No pattern by corporation was found in attitude changes. However, subjects

responded more sensitively to negative information than to positive information about

Samsung and Nongsim. For Hyundai, subjects more sensitively responded to positive

information than to negative information. This subject's sensitivity by corporation related

to purchase intention is consistent with the subject's sensitivity related to attitude and

credibility change.

Figure 7.9

Probability of Effect in the Direction Predicted (Inference Probability)

**Effect Direction
(Purchase Intention Change)**

	1	2	3	4	5	6	7	8
Series1	.99	1.00	1.00	.89	.79	1.00	1.00	1.00

Figure 7.9 reveals two findings:

1. The probabilities that the population of subjects changes their purchase intention toward the products of the four corporations in the negative direction are very high (100 %) for three cases and high (89 %) for one case when they are exposed to negative CEPI.

2. The probabilities that population changes their purchase intention toward the products of the four corporations in the positive direction are mostly very high (100% for two cases and 99% for one case) and moderately high (79%) for one case when they are exposed to positive CEPI.

No pattern by negative and positive CEPI was found in attitude changes.

However, subjects' more discernable response to negative information than to positive

information is observed. This subject's sensitivity related to purchase intention and type of information is consistent with the subject's sensitivity related to attitude change.

Summary of Test of Hypothesis Four, Five and Six[1]

Hypotheses Four, Five, and Six are as follows:

H 4: Consumers who have strong environmental attitudes about pollution (EAP) will change the three dependent variables more than consumers who had weak EAP[2]. In other words, a positive relationship exists between EAP and the three dependent variables: attitude toward corporation (AC), corporate credibility (CC), and purchase intention (PI).

H 5: Consumers that are highly familiar with a corporation (CFC) change consumer attitude, corporate credibility, and purchase intention less than one with low familiarity. In other words, a negative relationship exists between CFC and the three dependent variables: attitude toward corporation (AC), corporate credibility (CC), and purchase intention (PI).

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[1] Correlations among three moderator variables related H 1, 2, and 3 are reported in Appendix C.
[2] In this research, environmental attitude specifies the environmental attitude about pollution because the research is related to industrial pollution. Thus, high EAP is defined as the status of a strong concern, awareness, and belief about pollution. Low EAP is defined as the status of a weak awareness, concern, and belief about pollution.

H 6: The greater the credibility of CEPI, the greater the effect of the CEPI rating

on the dependent variables. That is, a positive relationship exists between

CCI and the three dependent variables: AC, CC, and PI.

In brief, H 4 and H 6 are confirmed, while H 5 is disconfirmed.

Environmental Attitude and Effect of CEPI: H 4.

The Hypothesis Four (H 4) is that customers who have strong environmental

attitudes toward pollution (EAP) will change the three dependent variables more than

customers who have weak EAP. In other words, a positive relationship exists between

EAP and the three dependent variables: attitude toward corporation (AC), corporate

credibility (CC), and purchase intention (PI). Table 7.2 and Figure 7.10 summarize the

results of H 4.

Table 7.2. Summary of Test of Hypothesis Four

Environmental Attitude &	Group: CEPI	Attitude H4	Credibility H4	Purchase Intention H4
Samsung	A:+	C	F	C
Samsung	B: -	C	C	C
Hyundai	A: -	C	C	C
Hyundai	B:+	C	C	F
Nongsim	A:+	C	C	C
Nongsim	B: -	C	C	C
Binggrae	A: -	C	C	C
Binggrae	B:+	F	C	C

- A = Group A / B = Group B in the experiment.

- " - " = Negative CEPI
- " + "= Positive CEPI
- C = Confirmed
- F = Further Research is required

As Table 7.2 summarized, H 4 is confirmed in all cases except the following three cases: 1) Binggrae positive CEPI and credibility change, 2) Samsung positive CEPI and attitude change, and 3) Hyundai positive CEPI and purchase intention change. To draw a conclusion about these three cases, further researches are required because inference probabilities of these three cases fall between .333 and .667 (1/3 < IP < 2/3) and the sample size is not large enough to draw a conclusion.

Figure7.10. Summary of Inference Probability related to H 4

- Atti = Attitude toward Corporation
- Cred = Credibility of Corporation
- P. Inten = Purchase Intention toward Product

- These notes also apply to Figure 7.11 and 7.12.

Figure 7.10 shows that the probability that the correlation between Environmental Attitude toward Pollution (EAP) and 1) Attitude toward Corporation (AC), 2) Credibility of Corporation (CC) and 3) Purchase Intention toward Product (PI) is positive, are mostly very high. Thus, it is found that EAP is a moderator variable[3] for AC, CC and PI.

Familiarity with Corporation and Effect of CEPI: H 5

The Hypothesis Five (H 5) is that consumers that are highly familiar with a corporation (CFC) will change consumer attitude, corporate credibility, and purchase intention less than one with low familiarity. In other words, a negative relationship exists between CFC and the three dependent variables: attitude toward corporation (AC), corporate credibility (CC), and purchase intention (PI). Table 7.3 and Figure 7.11 summarize the results of H 5.

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[3] Moderator is defined as a variable that intervenes between independent and dependent variable and influences the intensity of effect in the dependent variable, but it is not an independent variable and also not a mediator variable. Masking variables are unknown variables that affect the defendant variable. Moderator variable is a special case of the masking variables. Meanwhile, Mediator variable is a middle variable located between the first and the final variable in the causal diagram so that mediator is both independent and dependent variable. For more details, see Chapter VII, p. 221.

Table 7.3. Summary of Test of Hypothesis Five

Familiarity	Group: CEPI	Attitude H 5	Credibility H 5	Purchase Intention H 5
Samsung	A:+	C	C	C
Samsung	B: -	N	N	N
Hyundai	A: -	C	F	C
Hyundai	B:+	F	C	F
Nongsim	A:+	C	C	C
Nongsim	B: -	N	F	F
Binggrae	A: -	N	F	N
Binggrae	B:+	C	C	C

- A = Group A / B = Group B in the experiment.
- " - " = Negative CEPI
- " + "= Positive CEPI
- C = Confirmed
- F = Further Research is required
- N = Not Confirmed

In summary, H 5 is disconfirmed. As Table 7.3 summarized, H 5 is confirmed in some cases. Some cases require further research to decide confirmation of H 5 test. But H 5 is not confirmed in other cases in which effects occurred in the opposite direction hypothesized.

Figure 7.11. Summary of Inference Probability related to H 5

Familiarity and Three Variables

Figure 7.11 shows that probability that the correlation between Familiarity with

Corporations (CFC) and 1) Attitude toward Corporation (AC), 2) Credibility of

Corporation (CC) and 3) Purchase Intention toward Product (PI) is negative, is very high

in some cases. However, the probability that the correlation between environmental

attitude toward pollution and 1) Attitude toward Corporation, 2) Credibility of

Corporation and 3) Purchase Intention toward Product is positive (i.e., reverse direction

of H 5), are also very high. Thus, it is found that CFC is severe contingency variable[4], not

a moderator variable for AC, CC and PI.

CEPI Credibility and Effect of CEPI: H 6.

The Hypothesis Six (H 6) is that: The greater the credibility of CEPI, the greater the

effect of the CEPI on the dependent variables. That is, a positive relationship exists

between CCI and the three dependent variables: AC, CC, and PI. As table 7.4

summarizes, H 6 is clearly confirmed in all cases.

Table 7.4. Summary of Test of Hypothesis Six

Information Credibility	Group: CEPI	Attitude H 6	Credibility H 6	Purchase Intention H 6
Samsung	A:+	C	C	C
Samsung	B: -	C	C	C
Hyundai	A: -	C	C	C
Hyundai	B:+	C	C	C
Nongsim	A:+	C	C	C
Nongsim	B: -	C	C	C
Binggrae	A: -	C	C	C
Binggrae	B:+	C	C	C

- A = Group A / B = Group B in the experiment.
- " - " = Negative CEPI
- " + "= Positive CEPI
- C = Confirmed

[4] Contingency variable is defined as a variable, of which effect occurs in both positive and negative direction. Contingency variable is a special case of moderator variable.

Figure 7.12. Summary of Inference Probability related to H 6

Information Credibility and Three Variables

Figure 7.12 shows that the probability that the correlation between Credibility of CEPI (CCI) and 1) Attitude toward Corporation (AC), 2) Credibility of Corporation (CC) and 3) Purchase Intention toward Product (PI) is positive (H 6), are mostly very high. Thus, it is found that CCI is a moderator variable for AC, CC and PI.

CEPI Disclosure and Consumer Attitude Change (H 1)

This study finds that CEPI damages or improves consumers' attitude toward corporations (i.e., favor to corporation) by the proof of the Hypothesis One (H 1) that CEPI disclosures change consumer attitude toward corporations (AC) positively for non-polluting corporations and negatively for polluting corporations. In other words, this study proves two facts: 1) information regarding corporate environmental performance influences consumers' attitude toward corporation (AC), and 2) CEPI disclosure is one

cause of diverse causes for consumer attitude change. This finding about consumer attitude change by CEPI disclosure can be interpreted that CEPI influences consumer purchase behavior through attitude change.

Consumer attitude toward corporation is a consumer's psychological tendency that is expressed by evaluation of corporations (e.g., Samsung Electronics, Hyundai Electronics, Nongsim, and Binngrae) with favor or disfavor. Therefore, the causal relationship between CEPI disclosure and attitude change means that positive CEPI generates consumers' psychological tendency to favor non-polluting corporations and negative CEPI generates consumers' psychological tendency to disfavor polluting.

Attitude change by CEPI seems to be preceded by change of corporate image or reputation. Most advocators for Public Information Disclosure as a Pollution Control Tool (PID) believe that CEPI influences corporate image or reputation.[5] Environmental information about polluting corporations damages their image and reputation while environmental information of non-polluting corporations improves their image and reputation. Wheeler and Afsah, (1996) stated, "Public knowledge of environmental performance has important implications for reputaionally sensitive companies" (p. 2). Thus, it is inferred that CEPI generates bad or good image or reputation about corporations, and these bad or good corporate reputations or images generate consumers' psychological tendency to favor or disfavor corporations. However, this inference about causal order among three variables (i.e., CEPI disclosure → image or reputation change → attitude change) scientifically is not proven .

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[5] About relationship between CEPI disclosure and reputational incentives to polluters, refer to Chapter III, p. 62.

This research provides evidence supporting the assertion that environmental information especially influence attitude. It is generally accepted that information influences attitude, but there could be controversy to the assertion that environmental information influences attitude. A great deal of anecdotal and scientific evidence suggests that political information influences constituents' attitude. Information about a certain presidential candidate (i.e., sexual scandal) produced negative voter attitude toward that candidate. Advertising information also influences attitudes of audiences. Social scientists often divide attitude into the three categories: cognition, affection, and behavior. The cognitive category encompasses thoughts that people have about the attitude object (e.g., Samsung Electronics). The affective category consists of feelings or emotions that people have in relation to the attitude object. The behavioral category contains people's actions with respect to the attitude object (Eagly & Chaiken, 1993). Yi (1990) conducted an experiment to investigate cognitive and affective priming of the context for print advertisements. The cognitive context primed certain attributes of a product and the affective context triggered emotional reactions among the audience. He found that the both cognitive and affective context influenced consumers' evaluations of the advertised brand, but in a different process. That is, cognitive priming effects operated mainly through attitude toward the brand, whereas affective priming effects worked primarily via attitude toward the advertisement. That is, Yi (1990) found that advertise information has influence on forming consumers' attitudes, even though the process of attitude change by advertised information is diverse (e.g., cognitive process, affective process, or behavioral process). Yi's finding is consistent of the finding of this

research, even thought the findings are about different information: advertising

information and environmental information.

Meanwhile, subjects' attitude changes are processed through different

psychological routes. Cognitive Response Theory claims that cognitive responses

mediate the effect of persuasive messages on attitude change. Messages that evoke

predominantly favorable recipient-generated thoughts (e.g., valence or subject

agreement) should be persuasive, whereas those that evoke mostly unfavorable thoughts

(e.g., counterargument) should be unpersuasive (Eagle & Chaiken, 1993).

Petty and Cacioppo (1981 a,1986 a, and 1986 b) provides another explanation of

the process of attitude change using the term of "elaboration likelihood" that refers to the

extent to which people think about issue-relevant arguments contained in persuasive

message. In the Elaboration Likelihood Model (ELM) of Petty and Cacioppo, when the

elaboration likelihood is high, the probability is high that recipients will follow the

central route (e.g., systematic process or argument based thinking) to persuasion; and

when the elaboration likelihood is low, the probability is high that recipients will follow

the peripheral route to persuasion.

Therefore, when subjects spend much time thinking about the CEPI presented

(e.g. Samsung Electronics is a severely polluting corporation), it is probable that the

process of attitude change seems likely to follow the central route. If subjects spend little

time thinking about the CEPI presented, the process of attitude change follows the

peripheral route. When subjects spend moderate time for thinking, the cognitive process

of attitude change would follow both central and peripheral route (i.e., concurrent or

interactive process of both). However, ELM did not make it clear for the case of moderate elaboration.

Also, it is not clear about what routes (i.e., central or peripheral routes) subjects adopted as the process of attitude change? According to the ELM, attitude changes that result mostly from the central route would show greater temporal persistence, greater prediction of behavior, and greater resistance to counter-persuasion than attitude changes that result mostly from the peripheral route. However, this argument has not been proven yet. So the remaining question for further study is whether the attitude change through the central route really has greater temporal resistance or not.

Attitudes directly influence behavior or influence behavior through intentions[6]. According to Eagly and Chaiken (1993), "An attitude toward a specific behavior directed toward a given target in a given context at a given time should predict the specific behavior quite well because this attitude exactly corresponds to the specific behavior" (p. 167). Even though it is not attitudes toward a specific behavior[7], attitude toward targets (i.e., corporations) also could strongly influence the behavior of purchasing products of corresponding corporations. Winters (1989) suggests that consumers' attitude toward a corporation has a direct effect on brand purchasing. Therefore, it is assumed that attitude toward corporations (i.e., attitude toward target), even thought it is not attitude toward behavior, also influences purchase behavior. In this respect, it is assumed that a positive relationship exists between attitude toward corporations and purchase behavior (or intention) toward products of the corresponding corporations. Based on this assumption,

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[6] The theory of reasoned action asserts that intentions have a direct effect on behavior and attitudes have a direct effect only on behavioral intentions, not on behavior. About the reasoned action, refer to Fishbein (1967 and 1980) and Ajzen(1988 and 1991).
[7] Attitude toward behavior (e.g., buying Samsung Cellular phone) is a distinctly different class of attitude than the attitude toward targets (e.g., Samsung Co.).

the finding related to consumer attitude change by CEPI disclosure is interpreted that CEPI influences consumer purchase behavior through attitude change. That is, positive CEPI influences positively consumer purchase behavior and negative CEPI influence negatively consumer purchase behavior.

CEPI Disclosure and Consumer's Perception of Corporate Credibility (H 2)

This study finds that CEPI damages or improves corporate credibility by the confirmation of the Hypothesis Two that CEPI disclosures change consumer's perception of credibility of corporation (CC) positively for non-polluting corporations and negatively for polluting corporations. In other words, this study finds two facts: 1) information of corporate environmental performance influences consumer's CC, and 2) CEPI disclosure is one cause of diverse causes for consumer's perceptional change about credibility. The finding about credibility change by CEPI can be interpreted that CEPI influences on consumer purchase behavior.

This study provides evidence supporting the PID advocates' assertion that CEPI damages or improves corporate image or reputation, and consequently, creates repuational incentives for corporate pollution performance. The finding that CEPI damages or improves corporate credibility is compatible with the assertion of PID advocates that CEPI creates reputational incentives for pollution reduction because environmental information of polluting corporations damages their image and reputation and environmental information of non-polluting corporations improves their image and reputation. The terms "reputation" or "image" are conceptually very similar to the term of credibility. "Corporate credibility" is defined as the perceived expertise, truthfulness,

and/or honesty of the firm (Mackenzie & Lutz, 1989). Image is defined as the concept of someone or something that is held or projected by the public and reputation is the general estimation by which one is held by the public (Newell, 1993). Hence, the term "credibility" seems to be definitionally more specific than either of the terms "image" or "reputation," and image and reputation, on the other hand, seem to be much broader in scope, and encompass many other dimensions including credibility (Newell, 1993). Thus, change of corporate image or reputation can be considered as change of corporate credibility. Therefore, PID advocators' assertion that CEPI damages or improves corporate image and reputation is simultaneously proved by this study's confirmation of Hypothesis Two that CEPI disclosures change consumer's perception of credibility about corporation positively for non-polluting corporations and negatively for polluting corporations.

Meanwhile, corporate credibility seems to influence attitude toward corporation and purchase behavior (or intention) of the products of the corresponding corporations. Newell (1993) found that corporate credibility had a positive effect on attitude toward brands (i.e., corporations). Fombrun (1996) asserted that high corporate credibility is important in producing positive attitude changes toward the advertisement and toward the brand as well as in influencing purchase intentions. Lafferty & Goldsmith's (1999) experiment also proved that corporate credibility or reputation influences consumers' attitudes toward brand and purchase intentions. In this respect, the finding about credibility change by CEPI can be interpreted like that CEPI influence consumer purchase behavior. That is, positive CEPI influence positively consumer purchase behavior and negative CEPI influence negatively consumer purchase behavior.

CEPI Disclosure and Consumer Purchase Intention Change (H 3)

This study finds that CEPI influences consumer purchase intention (PI) by the confirmation of the Hypothesis Three that CEPI disclosures increase consumer purchase intention for the products of non-polluting corporations and decrease consumer purchase intention for the products of polluting corporations. This study also proves that CEPI disclosure is one of many causes to change purchase intention.

The finding about PI implies that CEPI influences consumer purchase behavior because purchase intention is considered to be identical to the purchase behavior in this study. Intention is a psychological construct distinct from attitude. Intention represents the person's motivation or conscious plan to exert effort to carry out a behavior and purchase intention has an effect on the purchase behavior (Eagly & Chaiken, 1993). As mentioned in Chapter IV, purchase behavior can be well predicted from purchase intention. Thus the finding about PI can be interpreted that CEPI influences consumer purchase behavior. That is, positive CEPI influences consumer purchase behavior for the products of non-polluting corporations and negative CEPI influences negatively consumer purchase behavior for the products of polluting corporations.

Environmental Attitude and Sensitivity to CEPI (H 4)

This study finds that a consumer with high environmental attitude is more sensitive to information of corporate environmental performance information than a consumer with low environmental attitude. This study proved the Hypothesis Four that a customer who has high environmental attitudes toward pollution (EAP) changes the three

dependent variables more than a customer who has low EAP[8]. In other words, a positive

relationship exists between EAP and the three dependent variables: attitude toward

corporation (AC), corporate credibility (CC), and purchase intention (PI).

This finding means that the extent of changes in consumers' purchase behavior by

CEPI disclosure varies depending on the intensity of consumers' environmental attitude

toward pollution because the extent of changes in consumers' AC, CC, and PI varies

depending on the intensity of consumers' environmental attitude.

The finding about the positive correlation between purchase behavior and

environmental attitude is consistent with Chan's (1996) finding that respondents who

were more concerned about environmental issues tended to purchase more

environmentally friendly goods. The finding about the correlation between purchase

behavior and environmental attitude also supports the Roper Organization Inc.'s (1990)

finding that consumers with higher level of environmental attitude have stronger

tendency to "avoid buying products from companies not environmentally responsible,"

compared to consumer of total public. The finding about environmental attitude and

purchase behavior is helpful in explaining why the movements for green consumerism or

boycotts have been initiated mostly by environmentalists who apparently have high

environmental attitude. People who have high level of environmental attitude are mostly

much concerned with environmental issues or information. People with high

environmental attitude are very much in accordance with their attitude (Roper

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[8] In this research, environmental attitude specifies the environmental attitude toward pollution (EAP) because the research is related to industry pollution. Thus, high EAP is defined as the status of a strong concern, awareness, and belief about pollution. Low EAP is defined as the status of a weak awareness, concern, and belief about pollution.

Organization Inc., 1990). Response to CEPI starts from concern about environmental information.

The finding about the positive correlation between purchase behavior and environmental attitude leads to the following interpretation that the public's environmental attitude toward pollution influences the effectiveness of the public information disclosure as a pollution control tool. However, according to Roper Organization Inc. (1990), the real story is more complex one than research interpretation. They asserted that in general, there is a large gap between attitude and behavior about the environment. In the real world, consumers purchase behavior is some times not consistent and sometimes consistent with environmental attitude in terms of willing to pay more for green products. That is, some consumers with high environmental attitude are not willing to pay more for green products. Thus, this study limits the interpretation of the confirmation of Hypothesis Four as to that environmental attitude is a factor influencing effectiveness of public information disclosure as a pollution control tool.

Corporate Familiarity and Sensitivity to CEPI (H 5)

The researcher hypothesized that subjects who had prior knowledge about the corporation (i.e., corporate familiarity) resist changing their attitude more than subjects who have little knowledge about the corporation, based on the familiarity theory that the less information possessed by an individual, the greater the change induced by any new piece of information (Eagle and Chaiken, 1993). For instance, the less familiar a consumer is with Samsung Electronics, the more unstable and easy to change the attitude

toward Samsung Electronics. A familiarity about Samsung Electronics is defined as a proximate of the amount of stored information or knowledge about Samsung Electronics.

However, this study disconfirmed the Hypothesis Five that consumers with high familiarity with a corporation (CFC) change consumer attitude, corporate credibility, and purchase intention less than one with low familiarity. In other words, this study could not find any relationship between CFC and the three dependent variables: attitude toward corporation (AC), corporate credibility (CC), and purchase intention (PI). For example, subjects exposed to positive Samsung CEPI showed negative relationship between corporate familiarity and three variables (i.e., confirmation of H 5) but subjects exposed to negative Samsung CEPI exhibited positive relationship between them (i.e., disconfirmation of H 5). It means that subjects with high familiarity of Samsung Electronics showed both large and small change of AC, CC and PI and subjects with low familiarity of Samsung Electronics also showed both large and small change of AC, CC and PI. Thus, this finding implies that corporate familiarity is not a moderator variable (i.e., severe contingency variable[9]) so that corporate familiarity is not a variable influencing effectiveness of public information disclosure as a pollution control tool.

It is uncertain why the hypothesis about familiarity (H 5) was rejected in Korea. It could be argued that because Korean peoples' awareness and concern about environmental problems are sufficiently strong[10] that they may override their corporate familiarity and its affect on corporate attitude. If this argument were true, all subjects should show large degrees of attitude change. However, subjects also showed only small

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[9] Contingency variable is defined as a variable, of which effect occurs in both positive and negative direction. Contingency variable is a special case of the moderator variable.

[10] The observed environmental attitude toward pollution of Korean university students was moderately strong (M = 3.8, SD = 0.43 in 5-point scale).

degrees of attitude change. Thus, this argument would not be true. For a better explanation about the rejection of H 5, further study is needed.

Because corporate familiarity is not a moderator variable (i.e., little relationship between corporate familiarity and consumers' change of attitude, credibility, and purchase intention), PID could be workable for even less known brands or corporations. In other words, whether the corporation is well known or not (i.e., large or small corporation), CEPI disclosure would influence consumers' attitude, perception of corporate credibility, and purchase intention. Therefore, the target of PID program need not be limited to famous and large corporations.

This finding about familiarity is inconsistent with the social psychological theory of familiarity: The less information possessed by an individual, the greater the change induced by any new element of information. The familiarity theory says that the amount of stored information or knowledge that is available and accessible to people moderates attitude-behavior correspondence (Eagle & Chaiken, 1993). Lavine, Huff, Wagner and Sweeney (1998) also assert that one with more information has a stronger and a more stable attitude than one with less information. For example, many consumers do not change their purchase behavior even though they are exposed to information of corporate environmental performance because they already have strong familiarity (or preferences) for specific products or brands. That is, the familiarity theory implies that consumers with much knowledge or information about corporation are not sensitive to CEPI for changing their attitude or credibility toward corporation and consumers with much knowledge or information about a certain product is not sensitive to CEPI for changing their purchase intention toward a corresponding product. However, data revealed that subjects with low

familiarity were sensitive or not sensitive to CEPI and subjects with high familiarity were sensitive or not sensitive to CEPI. Familiarity theory asserts a relationship between consumers' familiarity with corporations and consumers' purchase attitude and/or behavior changes. However, this study did not find any relationship between corporate familiarity and change of attitude, credibility and purchase intention. Thus, it is apparent that familiarity theory does not work well for the case of CEPI disclosure and purchase behavior change, even though the clear explanation about why familiarity theory does not work well in the case of CEPI disclosure and purchase behavior change is not found.

Instead of familiarity theory, discrepancy theory provides some inference about CEPI disclosure and purchase behavior change. Discrepancy in this theory means a positional discrepancy between of message or information newly received and message or information initially possessed. Discrepancy theory says that the greater the positional discrepancy of a message, the more attitude change the message will produce (Kaplowitz & Fink, 1997). A long time ago, Brock and Becker (1965) demonstrated that regardless of overall prestige, a communicator was more persuasive when arguing against rather than in accord with his self-interest. Hunter, Danes and Cohen (1984)[11] asserted that the greater the discrepancy between the message sent to a person and the person's attitude, the greater the amount of change one would observe, keeping other factors constant. Eagly and Chaiken (1993) also asserts that unexpected messages are more persuasive than expected ones. This positional discrepancy theory is similar to cognitive dissonance theory. Kaplowitz and Fink (1997), and Aronson, Turner and Carlsmith (1963) proposed that the greater the discrepancy of the message from the receiver, the greater the

[11] They describe their assertion as "information processing" theory. Also, Hunter, Levine and Sayres (1984) dealt with a model that was based on the discrepancy theory in situation where one attitude also affected other attitudes.

cognitive dissonance. The dissonance created by a discrepant message may be resolved

by changing one's opinion or by derogating the message source (taking away the

message), denying the information or message itself. As discrepancy increases, source

derogation, rather than opinion change is employed to resolve one's dissonance. The

theory of discrepancy and dissonance are also consistent with the inoculation theory.

McGuire (1964) reasoned that attitudes and beliefs are vulnerable to persuasive attack by

opposing arguments, and reasoned that protection against such attack may be achieved by

exposing people to weakened forms of the attacking message. A relatively weak attack

should encourage people to develop defenses against such attacks while not changing

their attitudes or beliefs. Application of discrepancy theory to this study is that the CEPI

of experimental stimuli was a high discrepant information to subjects who strongly

changed their attitude but it was a low discrepant information to subjects who changed

little their attitude. For example, when subjects previously possessed information that

Samsung Electronics was a non-polluting corporation but they were given to the CEPI

that Samsung Electronics was a severely polluting corporation, the CEPI is highly

discrepant information to them so that subject in this case would largely change their

attitude. As a reverse example, when subjects previously thought that Samsung

Electronics was a non-polluting corporation but they were given to the CEPI that

Samsung Electronics was a great corporation in terms of corporate environmental

performance, the CEPI is little discrepant information so that subjects would not change

their attitude. In belief, the discrepancy theory (or the dissonance or inoculation theory)

implies that consumers with more positional discrepancy between new information of

corporate environmental performance gained and the prior environmental information

possessed change their attitude more. Thus, based on this discrepancy theory, it can be inferred that a positive relationship exists between CEPI discrepancy and AC, CC and PI change.

However, this study cannot investigate the inference about CEPI discrepancy because it does not contain sufficient data. Familiarity observed in this study is about the general information about corporation, not about specific information about corporate environmental performance. Regretfully, our data cannot answer whether subjects possessed much prior information or little prior information of Samsung Electronics, Hyundai Electronics, Nongsim and Binggrae because the experimental questionnaire is designed to measure the amount of general knowledge about the four corporations.

Another inference based on the discrepancy theory is that Korean subjects have little environmental performance information of the Korean four corporations: Samsung Electronics, Hyundai Electronics, Nongsim, and Binggrae. This inference is based on three points. The first point; it is assumed that subjects have almost an equal amount of stored CEPI of Samsung, Hyundai, Nongsim, or Binggrae regardless of whether group A or B in the pre-test that is before subjects gain the new information of the four corporations. Subjects have almost equal corporate familiarity of the four corporations regardless of whether they were in Group A or B[12] so that it is assumed that subjects have almost an equal amount of stored information about the four corporations. The second point is that Group A subjects and Group B subjects had the same quality of information: positive or negative CEPI. For example, subjects of both Group A and B have almost same information that Hyundai is a polluting corporation or non-polluting corporations.

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[12] Mean familiarity difference between group A and B is not statistically significant at $\alpha = .05$ and two-tailed test: Samsung ($t = .234$, $p = .815$), Hyundai ($t = .722$, $p = .471$), Nongsim ($t = 2.531$, $p = .012$) and Binggrae ($t = 1.838$, $p = .067$).

The third point; it is assumed that subjects have little amount of CEPI of the four corporations. The first and second point implies that both Group A and Group B subjects might have little amount of CEPI, or the same and much amount of CEPI. If both groups had the greater amount of CEPI, one group would clearly change AC, CC or PI because of high discrepancy while another group would change little them because of little discrepancy. For example, in the case that 1) both Group A and Group B have information about Samsung that Samsung is a non-polluting corporation, and that 2) Group A subjects are given to the positive CEPI that Samsung is a non-polluting corporation and 3) Group B subject are given to the negative CEPI that Samsung is a severely polluting corporation, Group B subjects will experience high discrepancy between stored Samsung CEPI (non-polluting corporation) and new Samsung CEPI (polluting corporation), consequently, would change their AC, CC and PI. However, Group A subjects would not change their AC, CC and PI because they experience little discrepancy between stored Samsung CEPI (non-polluting corporation) and new Samsung CEPI (non-polluting corporation).

Meanwhile, data analysis showed that regardless of Group A or B, both groups clearly changed their AC, CC and PI for the four corporations. It means that subjects may had little amount of CEPI of the four corporations. For example, subjects have little information about Samsung's environmental performance with the result that any new information (whether it is positive or negative) is highly discrepant. Consequently, subjects were sensitive to both positive and negative CEPI of Samsung. But if subjects have a great deal of the same information about Samsung environmental performance, it is impossible for both groups to clearly change their AC, CC and PI because both groups

have the same information (i.e., one of positive or negative information). The inference that Korean subjects might have little information of the four corporations' environmental performances is understandable because Korean government has not disclosed any environmental information about individual corporations to the Korean public.

The last inference based on the discrepancy theory is that the environmental reputations of Samsung, Nongsim, and Binggrae are positive and of Hyundai is both positive and negative. A pattern is found from the test of Hypothesis Five (Refer to Table 7.3).

Table 7.3[13]

Summary of Test of Hypothesis Five

Familiarity	Group:	Attitude	Credibility	Purchase Intention
	CEPI	H 5	H 5	H 5
Samsung	A:+	C	C	C
Samsung	B: -	N	N	N
Hyundai	A: -	C	F	C
Hyundai	B:+	F	C	F
Nongsim	A:+	C	C	C
Nongsim	B: -	N	F	F
Binggrae	A: -	N	F	N
Binggrae	B:+	C	C	C

- A = Group A / B = Group B in the experiment.
- " - " = Negative CEPI
- " + "= Positive CEPI
- C = Confirmed
- F = Further Research is required

[13] For reader's convenience, the same Table 7.3 located in the previous page is brought again.

- N = Not Confirmed

Table 7.3 reveals a pattern that for Samsung, Nongsim and Binggrae, H 5 is confirmed in the case of positive CEPI and it is disconfirmed in the case negative CEPI. However, for Hyundai, H 5 is confirmed in the case of both positive and negative. For example, when subjects were exposed to the positive Samsung CEPI that Samsung is a non-polluting corporation, subjects with much knowledge or information about Samsung did not change their AC, CC and PI much while subjects with little knowledge or information about Samsung changed their AC, CC and PI a great deal.

This pattern can be explained by the discrepancy theory. For example, assuming that Samsung's environmental reputation is basically positive so that subjects believed that Samsung is a non-polluting corporation, when subjects were exposed to positive CEPI stimuli, there was no discrepancy between subjects' stored knowledge (i.e., non-polluting corporation) and new information of stimuli. Consequently, subjects did not change their AC, CC and PI much because there was no discrepancy in environmental information. When the subjects were exposed to negative CEPI stimuli, there was high discrepancy so that they changed their AC, CC and PI. The case of Binggrae and Nongsim can be explained by the same reasoning with the case of Samsung. The case of Hyundai is a mixed case: the same case of Samsung in the change of CC and PI but the reverse case with Samsung in AC change. Thus, it is inferred that Hyundai's environmental reputation is both positive and negative.

Therefore, the environmental reputations of Samsung, Nongsim, and Binggrae

would be more positive than Hyundai. This point can be supported by data of attitude and

credibility toward the four corporations.

Table 7.5. Attitude and Credibility toward Four Corporations before Stimuli

	Samsung	Hyundai	Nongsim	Binggrae
Mean				
Attitude	5.33	3.92	5.59	4.18
Credibility	5.18	3.99	5.33	4.19
Std. of Deviation				
Attitude	0.97	1.04	0.84	0.95
Credibility	0.83	0.93	0.81	0.86

Figure 7.13. Attitude and Credibility for Four Corporations

Table 7.5 and Figure 7.13 show that the credibility and attitude of Samsung, Nongsim and Binggrae is higher than Hyundai's. Corporate environmental reputation or image influences corporate attitude and credibility.[14] That is, there is a positive relationship between corporate environmental reputation and corporate credibility and attitude. Thus, higher credibility and attitude means higher environmental reputation. Hyundai's credibility and attitude is relatively lower than other three corporations. Thus, it is inferred that environmental reputation or image of Samsung, Nongsim, and Binggrae are more positive than Hyundai's.

CEPI Credibility and Effectiveness of CEPI Disclosure (H 6)

This study finds that CEPI credibility influences effectiveness of CEPI disclosure on consumer purchase behavior because the credibility of CEPI moderates the change of consumer attitude, corporate credibility, and purchase intention. Test confirmed the Hypothesis Six that the greater the credibility of CEPI (CCI), the greater the effect of the CEPI on the dependent variables. That is, there is a positive relationship between CCI and the three dependent variables: AC, CC, and PI.

This finding supports the theory of credibility that source credibility moderates the intensity of attitude change (Eagle & Chaiken, 1993). Aronson, Turner and Carlsmith (1963) found that for messages from a high credibility source, there was a substantial increase in opinion change but when the source had only a moderate level of credibility, opinion change decreased. Credibility of information source is identical to credibility of information because information credibility is depending on credibility of information

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[14] Regarding this assertion, refer to discussion about credibility and attitude in Chapter VII: p. 190 and p. 194.

source such as the U.S. EPA. Thus, this study measured information credibility, instead of information source credibility. In general, the credibility theory is highly acceptable because it is a kind of truth (i.e., truism). The U.S. EPA or the Korean Ministry of Environment (KME) is a source of environmental information. When the U.S. EPA or KME[15] is highly credible to their public, the public will believe information of corporate environmental performance provided by them. People do not accept knowledge that is not credible. This is the reason why BAPEDAL (Indonesia's National Pollution Control Agency) and NIPR (the New Ideas in Pollution Regulation: a group of the World Bank) who initiated the program PROFER, made considerable efforts to increase the credibility of information of Indonesian corporate environmental performance. To increase the credibility of CEPI, they based the grading system upon multiple sources of data, conducted independent inspections, developed a user friendly computer program for analyzing the data, and designed a multiple step process for reviewing proposed grades before disclosing CEPI to the public. Therefore, credibility of CEPI or credibility of source of CEPI will be a critical element for effectiveness of PID (Public Information Disclosure for Pollution Control).

In summary, this study observed credibility of information rather than credibility of information source and data confirmed the Hypothesis Six. Thus, this study found that credibility of CEPI directly influence effectiveness of CEPI disclosure on consumer purchase behavior change.

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[15] Credibility of information provided by KME was rated as 4.58 based on 7-point scale (M = 4.58 and SD = 1.10). The 4.58 means slightly credible.

CEPI Disclosure and Consumer Purchase Behavior Change

This study concludes that corporate environmental performance information (CEPI) influences consumer purchase behavior, based on the points that attitude and credibility of corporations and purchase intention toward corresponding corporate products predicts consumer purchase behavior toward the products. Thus, it is predicted that 1) positive CEPI increases consumer purchase behavior and 2) negative CEPI decreases consumer purchase behavior. These conclusions are proven by the confirmation of the Hypothesis One, Two and Three: 1) positive CEPI changes positively consumer attitude and credibility of corporations and purchase intention toward corporate products and 2) negative CEPI changes negatively consumer attitude and credibility of corporations and purchase intention toward corporate products. Attitude and credibility of corporations directly influence consumers purchase behavior and purchase intention is considered to be comparable to purchase behavior because behavior can be well predicted from intention. Based on this relationship between attitude, credibility, purchase intention, and purchase behavior, this study concludes that CEPI is a cause influencing consumers to change their purchase behavior toward products of polluting or non-polluting corporations.

This study's findings are in accordance with Wheeler (1997)'s assertion that environmental reputation does matter to corporations whose expected costs or revenues are affected by judgments of environmental performance by customers, suppliers, and stockholders. This study's findings also supports Lanoie, Laplante and Roy (1997)'s assertion that collective information, which compares firms with bad performance to

those with good performance, is more likely to allow consumers to switch away from the products produced by the firms with bad environmental performance.

This study also found that the extent of purchase behavior change is influenced by consumer's environmental attitude and credibility of information, but not by consumer's corporate familiarity because the extent of attitude, credibility toward the corporations, and of purchase intention toward products are influenced by consumer's environmental attitude and credibility of information, but not by consumer's corporate familiarity.

Effect Pattern by Type of Corporation and Information

No pattern was founded from negative and positive information disclosure as it relates to the magnitude of change in the three dependent variables of attitude, credibility, and purchase intention. However, it was found that subjects showed a more discernable response to negative CEPI than to positive CEPI. This can be understood by realizing that peoples have a behavioral tendency to severely punish polluting behavior because of their perception of a direct health impact from pollution.

No pattern by type of corporation (food or electronics) was found in the three variables. Two corporations (Samsung and Hyundai) are companies that produce electronics equipment (e.g., cellular phones); other two corporations (Nongsim and Binggrae) are corporations that produce food (e.g., instant noodle). Thus, it is possible to infer that consumers are more sensitive to CEPI of food corporations than to CEPI of electronics corporations, assuming that peoples are very sensitive to environmental materials affecting on human health. However, data about the four corporations (Samsung, Hyundai, Nongsim, and Binggrae) did not support this inference.

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Meanwhile, it was found that subjects responded more strongly to negative information about Samsung and Nongsim, but they responded more strongly to positive information about Hyundai for all three variables. This can be explained by the discrepancy theory that the greater the positional discrepancy of a message, the more change in attitude the message will produce (Kaplowitz & Fink, 1997). Initial levels of attitude and credibility for Samsung and Nongsim were relatively higher than for Hyundai[16]. Negative CEPI of Samsung and Nongsim seems to produce greater positional discrepancy due to subject's relatively positive attitude and perception of credibility for Samsung and Nongsim. Positive CEPI of Hyundai also seems to produce greater positional discrepancy due to relatively negative attitude and credibility toward Hyundai.

However, the conclusions about the effect pattern by the nature of corporation and information need to be delayed. The inferences about the effect pattern by nature of corporation and information were investigated by only four cases of corporations. The four cases are too small as a sample size to draw a conclusion. Therefore, further research with a larger sample is required to draw a conclusion about effect pattern by nature of corporation and information.

Theory Test and Application of Results

Calder, Phillips and Tybout (1981) identified two types of application of consumer behavioral research: effects application research and theory application research. The goal of effect research is to obtain findings that can be generalized directly to a real world situation of interest. The goal of theory research is to obtain scientific

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[16] Average intensity of attitude and credibility measured before stimuli (i.e., in pre-test) are as follows: Samsung – 5..33 (attitude), 5.18 (credibility), Nongsim - 5.59, 5.33, and Hyundai – 3.92, 3.99 based on the 7-point scale. Refer to Table 7.5 and Figure 7.13.

theory that can be generalized through the design of theory-based interventions that are available in the real world. Thus, effect research adopts a research method of random sampling to represent statistically the real world population so that samples are heterogeneous because of heterogeneity of population. Theory research prefers experimental designs and homogenous subjects because they allow the strongest theory test. For theory test, it is not necessary that a test setting should be an accurate representation of the real world situation but it is important that the test setting allow observing a particular event (e.g., causational relationships among factors involved in the operationalization of theory) at research issue.

A goal of this study was to test a theory of PID (Public Information Disclosure for Pollution Control) that CEPI disclosure generates reputational incentives for corporations, and as a result, leads to their voluntary reduction of pollution. In other words, a purpose of this study was to investigate whether CEPI disclosure causes consumers to change their purchase behavior away from or toward the products of polluting or non-polluting corporation. To observe the causal relationship between CEPI disclosure and purchase behavior change, this study employed an experimental test with a homogenous subject of Korean university students.

The population to which findings of this study can be applied, could be 1) all Korean university students, 2) all university students of the world (e.g., American university students), 3) all Korean consumers, or 4) all consumers of the world (e.g., American consumers). However, random sampling was not employed with the result that participants of Korean university students (Group A: 154 and Group B: 152) of this experiment could not be representatives of the real world populations. Thus, knowledge

from the results of this study cannot be applied to a general population in a same way applicable to effect research such as a survey research sample.

This study observed subjects' response to CEPI of only four corporations - Samsung and Hyundai (electronic corporations), Nongsim and Binggrae (food corporations), and observed purchase behavior change toward only two kinds of products - cellular phone and instant noodle. If CEPI of other corporations (i.e., Daewoo Co., Kia Car Co., etc.) and other products (i.e., golf clubs, TV, shoes, clothing, etc.) were presented to subjects, it is not certain that subjects would response with the same results as were the cases in this study. Thus, the study's findings cannot be generalized to all of corporations or all of products.

One example can help us to understand how to apply the results of the experiment to a general population. Suppose that a new pain relief medicine such as Tylenol was tested with one hundred and fifty Korean university students and clear effect of pain relief was observed in the direction predicted. Of course, individual participants showed the wide variety range of effect size (i.e., the intensity of pain relief). Can the results of this experiment be generalized to all university student of Korea, America and the world, and all people of Korea, America and the world? The answer is 'Yes' because human body of Korean students responded to a new Tylenol with clear effect of pain relief. All individuals have a different body conditions and groups of people in terms of nationality, race, gender, age, etc. have a different body conditions so the individual or group's responses to a new Tylenol will be diverse in them of effect size (e.g., Tylenol works well for some body but is not effective for every body). However, all people regardless age (i.e., university student or not) and nationality are the same human beings in terms of

the human body. Thus, if the new Tylenol works well for Korean university students, we can conclude that the new Tylenol effects well for all people regardless of age and country. Only for more reliable and valid knowledge about efficacy of the new Tylenol, the new Tylenol needs to be tested with a variety group of peoples (i.e., American) who have a distinctly different body condition.

Using the same logic of the example of the new Tylenol, this study generalizes its findings to populations. All individuals are different in terms of purchase behavior regardless of age and country but they are also the same consumer in terms of human system. A group of Korean university students is homogenous with other groups (e.g. adults consumer, American consumer) because they are all human beings, but it is heterogeneity with them in terms of consuming pattern, preference, or sensitivity to environmental information. Thus, effectiveness of CEPI disclosure may differ among individuals and consumer groups. But as consumers, they are also the same as human being so that it is assumed that they have common psychological tendencies (i.e., attitude, credibility and purchase intention) related to their purchase behavior. Therefore, there would be no problem to generalize the findings of this study to the population (i.e., Korean and American university student, Korean and American consumers, and all world consumers), basically acknowledging a wide variety of individual differences and consumer groups' differences.

Different Consumer Group and Generalization of the Study Results

Roper Organization Inc. (1990) classified consumers into five groups by the criteria of pro-environmental activities such as willingness to pay more for green

products or supporting environmental regulations, based on data from 1989 survey: 1) The True-Blue Greens (11 %), 2) The Greenback Greens (11 %), 3) The Sprouts (26 %), 4) The Grousers (24 %) and 5) The Basic Browns (28 %). The detailed identification of the five consumer groups is as follows:

1. The True-Blue Greens are the committed environmentalists. They believe that individual actions can make a difference in protecting the environment. Their behavior is very much in accordance with their attitudes. They are well educated and have the highest median household income of any of the five groups.

2. The Greenback Greens are a little less committed environmentalists that the True-Blue Greens. They believe strongly in the primacy of protecting the environment over economic development. They attribute their not doing more for the environment to their busy lifestyles. They have the highest proportion of working people (70 % are employed) as well as more full-time workers than others (55%).

3. The Sprouts are the swing group in a movement toward a green consumer society. They have adopted some pro-environmental behavior but they are far behind the Greenback Greens in their willingness to make personal economic sacrifices for the environment. They are quite well educated and have higher than average household incomes.

4. The Grousers are usual consumers who are indifferent to environmental protection and are pursuing convenience. They show a low level of pro-

environmental behavior and a low level of interest in paying higher prices for green products. They are relatively poorly educated and have below-average household incomes.

5. The Basic Browns are indifferent to environmental protection and believe that there is nothing an individual can do about most environmental problems, consequently, they are not carrying out any pro-environmental activities. This group is the least exposed to information about environment and they are mostly socially and economically disadvantaged group of the five (i.e., the lowest household income and the least educated).

Referring to Roper Organization Inc.'s study, let us generalize the Inference Probability (IP) of this study. Data from three hundred and six Korean university students revealed that IP was 1.00 for attitude change toward Samsung. The first population for generalization of IP is a group of all Korean university students. It is assumed that sample students and population students are generally the same consumer group in terms of consumption patterns, preferences, environmental attitude, etc. Thus, if other Korean university students participate in an experiment of exactly the same condition and the same time (the experiment was conducted May and June, 2001), it is inferred that we could get almost the same results (i.e., IP = 1.00 or a little less). Thus, interpretation of IP for attitude change is that the probability that Korean university students sensitively respond to CEPI of the four corporations, and consequently, change their attitude negatively for polluting corporations and positively for non-polluting corporations, would be almost 100%.

However, for groups of all Korean consumers, all American university students or consumers, the generalization should be carefully stated. It is because there is a wide variety of consumer groups, and each consumer group has a different consumption pattern, preference, and different level of environmental attitude so that they have different sensitivities to CEPI and will show different intensity of response to positive and negative CEPI. Thus, even if an experiment were conducted for different consumer groups, the results of IP for attitude change by CEPI would be not the same (e.g., IP = 1.00 for some group, IP = .95 for some group, IP = .90 for some groups). However, it is also possible to infer that there will be little opposite results to this study's because they are almost the same consumer in terms of living in the modern consumption society and they are facing almost the same nature of domestic or global environmental problems. Thus, Hypothesis One (i.e., attitudes change in response to CEPI) would be confirmed for other consumer groups (i.e., Korean consumer and American university consumer), even though the intensity of effect by CEPI disclosure would be different for each group. The generalization of IP (Inference Probability) about the variables of Credibility, Purchase Intention, Environmental Attitude and Information Credibility can be done in the same way with the generalization of IP for the variable of Attitude.

In this respect, the application of findings of this research is that CEPI disclosure can influence Korean university students to change their attitude toward corporations and perception of credibility of corporations, and to change purchase intention toward products. As a result, one can expect them to change their purchase behavior of products of non-polluting or polluting corporations.

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One thing required for more valid and reliable generalization of this study's findings is further experimental tests with diverse groups of consumers.

The Real World and Interpretation of Consumer's Sensitivity to CEPI

In the real world, consumers' purchase behavior is more complex than the theory of PID suggests because multiple and diverse factors are involved in the process of purchase decision. Consumers decide on their product purchase based on quality, price, previous experience, individual preference, brand reputation, etc. In general, there is a large gap between consumers' attitude and behavior about the environment. According to the poll conducted by the Pew Center for the People and the Press at the end of 1997, 73 percent of American respondents said they would pay five cents more for a gallon of gasoline if the higher price would "significantly reduce global warming." When the suggested price increase was raised to 25 cents per gallon, 60 percent of American respondents said they would be willing to pay (Gerstenzang, 1997). Rosendahl (1990) also found similar results from 1989 survey. That is, 77 percent of American respondents said that a company's environmental reputation affected what they buy, 89 percent said they were concerned about the environmental impact of products purchased, and 78 percent said they were willing to pay more for recyclable or biodegradable packaging. However, a survey by the Roper Organization Inc. (1990) showed a large gap between consumers' attitude and behavior about the environment. For example, only 16 percent of the respondents selected "avoiding buying products from companies they consider not environmentally responsible" compared to 54 percent of a consumer group of The True-Blue Greens who are the committed environmentalists. A great deal of anecdotal

evidence exists to show that the majority of consumers do not avoid buying the products from some high polluting corporations, and consumers' avoidance of buying products of polluting corporation is mostly temporary.

According to the theory of reasoned action, the "subjective norm"[17] that is influenced by the personal preferences and opinions of significant others (e.g., consumers' parents, kids, lovers, friends, teachers, boss, etc.), directly influence consumers' final purchase decision (Fishbein, 1967; Fishbein, 1980; Ajzen, 1988; Ajzen 1991). Subjects of this study also showed a diverse pattern of change in attitude toward the four corporations and credibility of the four corporations and purchase intention toward the four corporate products. Some subjects were sensitive to CEPI information, but others were not. Some subjects responded to CEPI in the reverse direction predicted. Therefore, it is not valid to interpret the findings of this study that all subjects or all consumers will change their purchase behavior in the direction hypothesized, in response to CEPI. That is, individual differences are present.

This research found high probability that a majority of subjects change their purchase behavior in the direction predicted, responding to CEPI of the four corporations. Thus, it is appropriate to interpret the finding that *significant number of consumers tends to respond to CEPI and to change their purchase behavior and CEPI is a factor influencing consumer purchase behavior.* More precise interpretation of this finding is that *CEPI has become a critical factor influencing consumers' purchase decision when all other critical factors for purchase behavior (e.g. price and quality of products, brand reputations and preferences, etc.) are the same.*

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[17] Subjective norm is a person's belief about whether significant others think that he or she should engage in the behavior. Significant others are individuals whose preferences about a person's behavior in this domain are important to him or her (Eagle & Chaiken, 1993, p. 169).

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Lessons from Moderator Study for PID Policy Design

This study investigated three moderator variables: environmental attitude toward pollution, familiarity with corporation, and information credibility. The moderator variable is a special case of the masking variables that are unknown variables affecting the dependent variable. Knowledge of moderator variables for CEPI and purchase behavior is practically valuable for pollution policy designers because the primary goal of pollution policy designers is to develop a cost-effective pollution control tool. Moderator study for effectiveness of CEPI disclosure will provide ideas and knowledge for pollution policy makers for more effective and more inexpensive pollution control programs of PID.

Study for Moderator of Effectiveness of PID

Moderator is defined as a variable that intervenes between independent and dependent variable and influences the degree of dependent variable. For example, CEPI causes consumer attitude change. Highly credible CEPI changes consumer attitude a great deal toward the corporation and little credible CEPI changes their attitude toward corporations very little. Thus, credibility of CEPI influences the intensity of attitude change. However, it is neither an independent variable nor an independent variable for attitude. The independent variable is "CEPI." Refer to Figure 7.14.

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Figure 7.14. Moderator Variable

High Credibility of CEPI ⟶ Much Change

CEPI ⟶ **Attitude**

Low Credibility of CEPI ⟶ Little Change

The mediator variable is a middle variable located between the first and the last variable in the causal diagram so that the mediator is both independent and dependent variable. For example, CEPI changes consumer purchase behavior. Change of purchase behavior changes corporate environmental performance - pollution reduction. So purchase behavior is located between CEPI and pollution reduction because it is an independent variable in relation to corporate pollution reduction and a dependent variable for CEPI. CEPI is not a direct causation for corporate pollution reduction. Direct causation for pollution reduction is a purchase behavior. Thus, purchase behavior is defined as a mediator variable. Refer to Figure 7.15.

Figure 7.15. Mediator Variable

Purchase Behavior

CEPI

Pollution Reduction

This study found that environmental attitude and information credibility are moderator variables while corporate familiarity is not. However, data revealed a possibility that there are many moderator variables. Table 6.23[18] shows that all Stimuli by Subject Interaction of raw score of standard deviation and standard score standard deviation are statistically significant at the level of one-tailed and α = .05. The fact that standard deviation is not a zero and statistically significant, means that 1) masking variables that are unknown variables affecting the intensity of influence of CEPI on purchase behavior, 2) situational random factors (e.g., hearing news about Samsung Electronics' bad behavior just before administration of post-test), or 3) random functioning of human psychology (e.g., participants' varying thought or emotion during the experiment). It was very difficult to control randomly functioning variables of the situational factors and the human psychology in the experiment because of the feature of their randomness. However, unknown masking variables can be investigated if the theory about masking variables are developed.

Lessons from Moderator Study for PID Policy Design

This study found that information credibility and environmental attitude were critical elements for the effectiveness of PID because people who had a high level of environmental attitude responded more sensitively to CEPI by changing their purchase behavior than people who had a low level of environmental attitude, and people responded more sensitively to highly credible CEPI by changing their purchase behavior

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[18] Go back at p. for Table 6.23.

than to little credible CEPI. Meanwhile, most advocates for PID emphasize the readability of CEPI because the public is able to read information in the easily understood format.

CEPI in the PID system works in the following sequence: 1) peoples' concern about information, 2) their acceptance of information, and 3) their response to information. Thus, environmental attitude, information credibility, and readability are involved in these processes as follows:

1. One's awareness of environmental issues is involved in the process of concern about environmental information. People with high environmental awareness, as committed environmentalists, possess strong concerns about environmental information, compared to people with low environmental awareness (i.e., environmental attitude).

2. Information credibility is essential to the process of accepting information. Informed people accept only credible information and reject information that is not credible.

3. Another element involved in acceptance of information is the presentation of information. The public may not accept or understand information in the format of statistical data, scientific methods, academic writings, etc. because they may not comprehend the information. PID is a pollution control strategy that provides information about corporate environmental performance to the common people. Thus, CEPI should be presented in a format that is easily read and understood.

The effectiveness of PID related to products market varies, depending on the following elements: 1) the public's environmental awareness and attitude, 2) the credibility and the presentation of information, 3) corporations and 4) their products. When the public is highly concerned about environmental issues and environmental information, PID is expected to be highly effective. Even though people are attentive to CEPI presented by government, if it is not understandable and credible, information will not be employed in the cognitive processes of many people. The degree of change of consumers' purchase behavior in response to positive or negative CEPI also varies, depending on the corporations and their products because of individual differences in their preference to a certain corporation or products.

The public's environmental awareness and attitude might be beyond a concern of policy designers because changing public attitudes takes long time and could be costly. The elements of the products and the corporation also would be out of a concern of policy makers because environmental regulatory authority cannot discriminate the disclosure of CEPI in terms of policy implementation. When the CEPI of some corporations is disclosed and that of other corporations is not disclosed, credibility of CEPI will weaken and government will face strong objections from corporations whose negative CEPI is made public. Basically the proposed PID is to disclose fairly the environmental information of all corporations within its societal boundary.

However, the quality of information is a controllable element for policy designers. Thus, this study emphasizes the point that quality of information is a critical element for high effectiveness of PID. The designers of PROPER (Program for Pollution Control,

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Evaluation and Rating: a PID program developed in Indonesia in 1995) had already

perceived the importance of credibility and readability of information so that they put

much effort in order to increase credibility and readability of environmental information

about Indonesian corporations. As PID advocates indicated, this study also points out that

in order to achieve a strong effectiveness of PID for pollution control, policy designers of

PID need to exercise a high level of care to assure a high level of credible and readable

information.

As a last finding from the moderator study, the relationship between corporate

familiarity and purchase behavior change, points out that the target of PID program is not

necessarily limited to well known and large corporations because PID could be workable

for even less known brands or corporations.

This finding refutes the previously argued limitation[19] that PID will not be

effective for pollution reduction of the reputationallly insensitive corporations. Some less

known small corporations do not care about maintaining their reputation, even though

most large corporations seem to be very sensitive to their image or reputation. Small

corporations seem to have less sense of social responsibility for a clean environment. PID

would not be effective for these small corporations because they are indifferent to

corporate images or reputations.[20] However, according to the finding about the

relationship between the degree of effectiveness of CEPI disclosure and corporate

familiarity, PID could be workable for even these small corporations, based on the

assumption that less known corporation are comparable to small corporations indifferent

to their reputations. When reputationally insensitive small corporations experience a

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[19] Refer to Ch. II Limitations of PID, p. 35.
[20] Refer to Ch. II Limitations of PID, p. 35.

reduced market share and decreased profits caused by CEPI disclosure, there would be no way but for even less sensitive small corporations to reduce amount of pollution emission. Thus, it is inferred that CEPI disclosure encourages even less known and reputationally insensitive corporations to become sensitive to their environmental reputation.

A question remains about the numerous small corporations that have no public image or recognition because they are simply suppliers to the large corporations. In this case, CEPI disclosure could also influence the small suppliers to reduce their pollution. The large corporations are buyers that are in fact a type of consumer. Some large buyers started to equate small supplier corporations' environmentally risky operation with increased cost of business (Hoffman, 2000 a). For example, Levi Strauss & Company developed strict sourcing guidelines for selecting contractors that are different than the traditional guidelines about price, quality, and delivery time (Hoffman, 2000 b). Thus, the large corporations could consider their suppliers' environmental performance as criteria for whether they are good or bad business partners. If negative CEPI of small suppliers generate negative attitude among buyer corporations toward small suppliers, suppliers will have incentives to reduce their pollution in terms of their long-term profit maximization. However, it is inferred that the efficacy of CEPI disclosure for the small suppliers would not be strong at this time because only small numbers of large buyers are starting to consider the environmental performance of their suppliers (Hoffman, 2000a).

Influence of PID on Long Term Business Strategy

This study demonstrates that consumers change their attitude, perception of corporate credibility and purchase intention in a negative direction against polluting corporations and in a positive direction for non-polluting corporations. Although this study is based on a sample of Korean university students, it is believed that the results might also hold true for the general public.

The changed attitude, corporate credibility and purchase intention of consumers could influence corporations to adopt environmentally safe practices and to change their traditional business norms and strategies, which are based on profit maximizing and unlimited resource use. The potential of decrease of stock value, market shares and the potential of increase of managemental business costs for polluting corporations[21], which are generated by negative CEPI disclosure, forms a new business environment. That new environment will definitely disadvantage the polluting corporations and advantage the non-polluting corporations. For polluting corporations to survive in a new business environment, they need to adopt environmentally safe practices and to change their traditional business norms and strategies. Thus, PID could contribute to constructing a new business environment disadvantaging polluting corporations and to pressing them to adopt environmentally friendly business norms and strategies.

This study acknowledges that the contribution of CEPI disclosure to the new business environment would not be large in the short term. Transitioning from the traditional business environment to the new environment, disadvantaging polluting corporations, is already beginning in the real world (Hoffman, 2000a). It is also inferred

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[21] Refer to Ch. III, p. 65-67.

that the transition would proceed very slowly because change in individual attitude takes time. The time required to retain environmental information varies depending individual, but it tend to be temporary. That means, effectiveness of CEPI disclosure could also be temporary. Thus, CEPI disclosure would be only one event contributing to changing polluting corporations' traditional business norms and strategies toward more socially sustainable business norms and strategies.

Policy Applications of Study Findings: Implementation of PID and Suggestions for Enhancing Effectiveness of PID

CEPI appears to be a critical factor influencing consumers' purchase decision in our modern society when all other critical factors affecting purchase behavior (e.g. price and quality of products, brand reputations and preferences, etc.) are the same. CEPI disclosure would be effective for voluntary pollution reduction of corporations. Based on this potential effectiveness of PID, this study strongly suggests that governments could employ PID as a supplementary or complementary tool to CAC (command-and-control) for pollution control tool.

There is, however, a high probability of opposition or resistance from industry to government's adoption of PID because polluting corporations have strong incentives not to disclose their negative information of environmental performance. It is known that industry or businesses traditionally lobbied to lower national environmental standards and to reduce environmental law enforcement.

Evidence from this study can be used to deter anti-PID adoption activities by industry. This evidence can be used as a scientific foundation for persuading and

empowering politicians, government officials and pollution policy makers or designers to employ PID as a pollution control tool.

PID programs could be employed at diverse levels of government at the local or small city level. Most PID programs were employed in the national level of government. The Philippines launched EcoWatch in 1997, Mexico is developing PEPI (Public Environmental Performance Indicators), and Colombia also started a public disclosure program to complement its pollution charge system.[22] Therefore, it is believed that PID could also be employed for pollution control at the state level. Even lower level of government such as local or small city could employ PID programs for local pollution control because when the government is capable of generating credible and easily-understood information, PID programs would be persuasive and workable. Even though local media systems or community level NGOs may not be capable of disseminating the disclosed information, the local government can directly disseminate CEPI to the public. Therefore, application of PID is not necessarily limited to national levels of government. However, for determining at which level of government PID will work more cost-effectively for pollution control, more scientific research is required.

In PID programs, corporations have a responsibility to provide true information about their environmental performances or they need to review the accuracy of government information about their environmental performance (i.e., checking the record on their compliance with national environmental standards). Corporate participation in PID (i.e., providing their environmental performance information to government or reviewing government's evaluation) will be done on a voluntary basis[23] or it could be

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[22] The results from those PROPER-type programs have not appeared yet (Wheeler, 1999).
[23] In the case of PROPER, information was collected on the semi-voluntary basis. BAPEDAL

enforced by law (e.g., Toxic Release Inventory in the U.S.). Non-polluting corporations have incentives for voluntarily participating in PID program because CEPI disclosure will benefit to them. The advantages gained by non-polluting corporations from a PID program could encourage polluting corporations to participate. But, if it is apparent that polluting corporations do not want to participate in a PID program, enforcement of a corporation's participation in PID may be required in some cases.

To force corporations to provide information about their pollution emission to the public or governments, legislation may be necessary. In the case of TRI (Toxic Release Inventory), the U.S. Congress passed in 1986 the Emergency Planning and Community Right to Know Act (EPCRA) that includes the TRI designed to provide information to the public on the release of toxic substances into the environment. EPCRA required manufacturing establishments with certain threshold sizes of chemical emissions to disclose publicly the quantity and type of toxic chemicals released into the environment. Just in case that government cannot obtain necessary data for CEPI disclosure and the PID program due to strong resistance from industry, the enabling legislation for PID program will be needed.

Primary roles of Government in PID program are 1) checking the truth of the information provided by corporations and 2) transferring raw CEPI into easily readable information like PROPER's color-grading system, and 3) effectively disseminating the CEPI. This study already strongly emphasized the need for maintaining high credibility

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(Indonesia's National Pollution Control Agency) surveyed initially 350 facilities participating in PROKASIH, a semi-voluntary program for controlling the discharge of industrial pollution in waterways initiated in 1989, formally labeled the Clean River Program. Through the survey, BAPEDAL judged that 176 facilities had sufficient data to be graded. BAPEDAL invited facilities not included in PROKASIH to volunteer to be graded. As a result, the initial number of participants in the grading system was 187 facilities.

of environmental protection authorities and also advised the authorities to exercise a high level of care to assure a high level of credible information, because the more credible is CEPI is, the more effective PID is. Even though the environmental authorities retain a high level of credibility, to enhance effectiveness of PID they need to make an effort to enhance the credibility of CEPI disclosed.

Another important responsibility of government is to decide on an appropriate corporation size. In other words, at what point will small corporations will be excluded from CEPI disclosure. When all small corporations are included in CEPI disclosure, too much information will confuse the individual consumers. Consumers are not capable of memorizing a lot of information at one time. As a result, the effectiveness of information disclosure could be severely weakened. Government's capacity for dealing with information is also limited. Thus, an appropriate corporation size for an effective PID program will vary depending on social conditions because each society has a different industrial context and governmental capacity. To solve this issue, more specific investigations are needed in particular social contexts.

Government needs to make an effort to involve primary stakeholders of PID in the conduct of PID programs. Internal stakeholders of PID program are government and corporations. When government involves the related corporations from the beginning of the process (i.e., before announcement of CEPI), a more effectiveness of PID can be expected. Thus, it is recommended that government encourage corporate participation in the whole process of PID program development and implementation. In the case of Indonesia, PROPER teams involved corporations in the process of collecting data and assessing the accuracy and level of their environmental performance so that corporations

had enough time to think about the potential impacts of CEPI disclosure on their businesses. As a result, significant improvement in compliance status was achieved before the announcement of CEPI.

Important external stakeholders are NGOs, communities and mass media (i.e., the press). In the case of PROPER, in order to ensure that press reports on the rating system were accurate, BAPEDAL arranged for officers involved in the project to visit the offices of major local newspapers, to explain the system, and to demonstrate the computer program. Afsah, Laplante and Wheeler (1997) asserted that PROPER embodied a power strategy for strengthening relationships with NGOs, communities, and the press. These three groups were empowered to pressure polluting corporations to reduce pollution following release of corporate environmental performance information (CEPI). NGOs and communities can review data of corporate pollution, monitor progress of the PID program and evaluate the success of PID program. Representatives of government, corporations, NGOs, communities and the press can work together in an advisory board of PID program. Thus, for added success of the PID program, it is suggested that government make these stakeholders cooperators in the PID program and work together with them throughout the whole process of PID program.

It is inferred that some polluting corporations will not reduce their pollution even though disclosure of their CEPI damages their businesses. These corporations are likely to be small, less known and reputationally insensitive. However, this study provides evidence that PID may also be effective for pollution reduction of the reputationallly insensitive corporations. That is, according to the finding about the relationship between the degree of CEPI disclosure and corporate familiarity, PID could be workable for even

these small corporations indifferent to their reputations. When CEPI disclosure is periodically (e.g., annually) conducted, negative impacts on polluting corporations' business will be accumulated. Then, even corporations that do not reduce their pollution emission in the first or second years of CEPI disclosure, will likely reduce their amount of pollution in later years.

Corporate compliance rate with national environmental standards can be used to evaluate success of the PID program. Government can measure corporate compliance rates before and after CEPI disclosure. For example, PROPER teams reported increases of color-grades of corporations after disclosing the names and grades of facilities as an evidence for success of PROPER.

Cost-savings can also be expected in the administration of a PID program, compared with CAC (command-and-control). The supporting data or evidence for cost-effectiveness of PID is not available. However, it is inferred that PID would be a less expensive and more easily implemented pollution control approach, compared to both CAC and MBI (market-based instruments).[24] Costs for designing, implementing, and monitoring PID would be smaller than CAC and MBI. Data for CEPI is mostly already available from the database of pollution regulatory authority. The cost for information collection, aggregation and dissemination is also decreasing (Tietenberg & Wheeler, 1998). All social drivers (e.g., mass media, grassroots organizations, NGOs, financial markets, products markets, courts, etc.) are also freely available for PID implementation.

In order to develop more sophisticated targeting strategies, PID program designers need to collect data about, or know the extent of environmental attitude of, diverse consumer groups. This study found that a positive relationship exists between the

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[24] Refer to Advantages of PID in Ch. II, p. 37.

extent of effectiveness of CEPI disclosure and environmental attitude of consumers. Korean undergraduate students show a slightly high degree of environmental attitude (M = 3.82, SD = .43 in the 5-point scale). Different groups would have different degrees of environmental attitude. According to the positive correlation related to environmental attitudes, effectiveness of CEPI disclosure would not be large for groups with weak environmental attitudes, but it would be high for groups with strong degrees of environmental attitudes. From this perspective, it is strongly suggested that governments make a long-term plans to improve the public's environmental attitude, if it is practically and politically possible.

This study also suggests some additional as ways for enhancing the effectiveness of PID program. Government need to conduct more aggressive information dissemination to the public such as 1) performing public advertisement about PID programs on the national level of newspaper, TV media and cable channels, using government funds, and 2) developing a more readable and humorous format. Rather than only relying on mass media or social NGO's information dissemination, government needs to develop its own system for information dissemination, especially in situations where systems of mass media and NGOs are not well established for dissemination of information.

And finally, this study suggests that PID program designers develop ideas for sustaining the effectiveness of CEPI disclosure for a longer period of time. Several anecdotal cases showed that public environmental activities such as consumers' avoidance of buying products from polluting corporation are mostly temporary. Therefore, as an idea for sustaining the efficacy of CEPI disclosure for an extended period of time, this study suggests that government must disclose CEPI periodically,

perhaps annually, because consumers' repeated exposure CEPI could help them to

remember the information.   Also, an easily readable and humorous information format

(e.g., graphical or visual symbols, and images or color grades like PROPER's) will help

lengthen the public's memory.

CHAPTER VIII

SUMMARY, CONCLUSIONS AND LIMITATIONS

Summary

The primary goal of this study is to investigate the efficacy of PID (Public

Information Disclosure for Pollution Control), especially in Korea. Effectiveness of PID

is investigated through testing a theory of PID that disclosure of CEPI (Corporate

Environmental Performance Information) will influence consumers to change their

purchase behavior in the negative direction for polluting corporations and in the positive

direction for non-polluting corporations. It is based on the assumption that purchase

behavior change generates market incentive or pressure on corporations to reduce

pollution voluntarily.

PID can be an information-based strategy to encourage industries to limit their

pollution emissions. It is an Information Oriented Approach to pollution control. The idea

of Information Oriented Approach to pollution control is very simple. That is, an

environmental regulatory authority such as the U.S. EPA (Environmental Protection

Agency) or KME (Korean Ministry of Environment) provides reliable and easily

understood information about corporate environmental performance to the public, the

social actors driving corporate environmental practices. Then, social actors such as

environmental or social NGOs, the media, the courts, community or grassroots

organizations, and the product or the financial market begins to press corporations to

adopt environmentally safe practices and to change their traditional business strategies of

maximizing profit without regard to environmental impact.

Pre and post experimental tests were conducted to investigate the first claim of PID that consumers respond to CEPI and change their purchase behavior regarding products of polluting and non-polluting corporations. This study strongly confirmed H1 that CEPI disclosures change consumer attitude toward corporations (AC) positively for non-polluting corporations and negatively for polluting corporations, H 2 that CEPI disclosures change the consumers' perception of corporate credibility (CC) positively for non-polluting corporations and negatively for polluting corporations, H 3 that CEPI disclosures increase consumer purchase intention (PI) for the products of non-polluting corporations and decrease consumer purchase intention for the products of polluting corporations, H 4 that customers who have strong environmental attitudes about pollution (EAP) will change the three dependent variables of AC, CC, and PI more than customers who have weak EAP[1], and H 6 that The greater the credibility of CEPI (CCI), the greater the effect of the CEPI rating on the three dependent variables. Data did not clearly confirmed H 5 that consumers with high familiarity about a corporation (CFC) change AC, CC and PI less than one with low familiarity.

Conclusion

This study found that CEPI disclosure changes 1) consumers' attitude toward the corporation, 2) perception of credibility of the corporation and 3) purchase intention toward products of the corporation in the positive direction for non-polluting corporations and in the negative directions for polluting corporations. These findings show that

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[1] In this research, environmental attitude specifies the environmental attitude toward pollution (EAP) because the research is related to industry pollution. Thus, high EAP is defined as the status of a strong concern, awareness, and belief about pollution. Low EAP is defined as the status of a weak concern, awareness and belief about pollution.

modern consumers tend to respond to CEPI, and consequently, change their pu

behavior. Thus, CEPI can become a critical factor that influences the consume

purchasing decision on the condition that all other critical factors for making purchase

decisions - price and quality of products, their brand reputations and preferences - are

constant.

This study also found 4) a positive correlation between consumer's environmental

attitude about pollution and the effect of CEPI and 5) a strong positive correlation

between information credibility and the effect of CEPI. These findings mean that

consumers' environmental attitudes and CEPI credibility are critical elements that

influence the degree of the effectiveness of PID.

This study did not find 6) a correlation between familiarity with corporation and

the effect of CEPI. Little relationship between corporate familiarity and purchase

behavior change means that the target of PID program is not necessary to limit to famous

and large corporations because PID could be workable for even less known brands or

corporations.

Based on an assertion that purchase behavior can be well predicted from attitude,

credibility, and purchase intention, this study predicts that *there is a high probability that*

CEPI disclosure influences consumers to change their purchase behavior in the negative

direction for polluting corporations and in the positive direction for non-polluting

corporations.

CEPI changes consumers' purchase behavior negatively against the polluting

corporations, and thus causes a decline in the demand for their products. Decreased

product demand results in a loss of market share and, consequently, a reduction of profit.

Corporations are profit-maximizing entities that make decisions based on self-interest. Corporate managers' concern with corporate pollution is deprived in part from concern about profits and costs. Thus, a reduction in profit by CEPI disclosure becomes a market concern. In other words, the loss of market motivates corporations to reduce their total volume of pollution in order to maximize their total profits. As a result, consumers' purchase behavior change generates market incentive or pressure for corporations to voluntarily reduce pollution. Based on these findings about purchase behavior change by CEPI disclosure, this study predicts a high probability that *Public Information Disclosure (PID) can be an effective approach for pollution control. Although this study is based on a survey of Korean university student, it is believed that the results might also hold true for the general public.*

Limitation and Further Research

This study reveals important findings regarding the influence of Public Information Disclosure (PID) on consumer purchasing behavior and its use for pollution control. However, there are several limitations that warrant further discussion and implications for future studies.

Policy Implications of Public Information Disclosure

In order to implement a PID (Public Information Disclosure for pollution control) policy or program, societies or countries need to examine the practical effectiveness of the PID approach. The purpose of this study was limited to testing a theory that disclosure of CEPI (Corporate Environmental Performance Information) influences

consumers' purchase behavior and that such purchase behavioral change could influence corporate polluting behavior. This study proved the causal relationship between CEPI disclosure and purchase behavior change and investigated theoretical effectiveness of PID.

However, this study did not investigate the actual effectiveness of PID policy and it did not focus on policy applications of PID. That is, this study is not making the argument as to how well PID would operate in Korea. Even though the theory of PID is valid, this does not ensure PID will be effective in the real world. The effectiveness of PID will vary in different societies because each nation has a distinctive social environment affecting the use and effectiveness of PID. In order to predict the actual effectiveness of PID applications, additional survey research would be required in particular social and cultural settings.

More Tests for More Reliable PID Theory

The PID theory test of this study is limited to Korean society, two Korean universities, four Korean corporations and their products. The sensitivity of consumers to CEPI depends on 1) consumers' environmental concern with or attitude toward environmental conditions, 2) the credibility and readability of CEPI, 3) relevant corporations and 4) relevant products. The effectiveness of PID related to the product market depends on consumers' sensitivity to CEPI and social environment surrounding implementing PID policy. A wide variety of consumer groups and each consumer group have different consumption patterns, preferences and different levels of environmental attitude and hence different sensitivities to CEPI. They will, thus, show different

intensities of response to positive and negative CEPI. Thus, if an experiment were conducted under the same experimental conditions under which this study was conducted but with different Korean consumer groups or with consumer groups of different countries, the results might be different from the results of this study.

Thus, in order to gain more reliable knowledge about PID theory, an additional experimental testing for PID theory is required under the conditions of diverse groups of consumers, diverse corporations, and diverse products, and in diverse societies.

Study for Moderator of Effectiveness of PID

This study investigated three moderator variables: environmental attitude toward pollution, familiarity toward corporation, and information credibility. The moderator variable is a special case of the masking variables that are unknown variable affecting the dependent variables. It is defined as a variable that intervenes between the independent and dependent variable and influences the intensity of effect in the dependent variable. Knowledge of moderator variables for CEPI and purchase behavior is practically valuable for pollution policy designers. The primary goal of pollution policy designers is to develop a cost-effective pollution control tool. Studies for moderator variables for CEPI and purchase behavior will provide ideas and knowledge for pollution policy makers for more effective and more inexpensive pollution control programs of PID. Therefore, additional study about moderator variables for effectiveness of PID is recommended.

APPENDICES

Appendix A. QUESTIONNAIRE FOR EXPERIMENTAL TESTS

Pre-Test Questionnaire

* Please write down your student identification number here (   )

* Circle one of the numbers to describe your thoughts or feelings about the following corporations:

1. Indicate your thoughts or feelings about Samsung Electronics Cellular Phone Co.

Overall low- Quality products	1	2	3	4	5	6	7	Overall high- quality products
Not at all good At manufacturing	1	2	3	4	5	6	7	Very good at manufacturing
Not at all Dependable	1	2	3	4	5	6	7	Very Dependable
Low respect for The customer	1	2	3	4	5	6	7	High respect for the customer

2. Indicate your thoughts or feelings about Hyundai Electronics Cellular Phone Co.

Overall low- Quality products	1	2	3	4	5	6	7	Overall high- quality products
Not at all good At manufacturing	1	2	3	4	5	6	7	Very good at manufacturing
Not at all Dependable	1	2	3	4	5	6	7	Very Dependable
Low respect for The customer	1	2	3	4	5	6	7	High respect for the customer

3. Indicate your thoughts or feelings about Nongsim Ramyeun Co.

Overall low- Quality products	1	2	3	4	5	6	7	Overall high- quality products
Not at all good At manufacturing	1	2	3	4	5	6	7	Very good at manufacturing
Not at all Dependable	1	2	3	4	5	6	7	Very Dependable
Low respect for The customer	1	2	3	4	5	6	7	High respect for the customer

4. Indicate your thoughts or feelings about Binggrae Ramyeun Co.

Overall low- Quality products	1	2	3	4	5	6	7	Overall high- quality products
Not at all good At manufacturing	1	2	3	4	5	6	7	Very good at manufacturing
Not at all Dependable	1	2	3	4	5	6	7	Very Dependable
Low respect for The customer	1	2	3	4	5	6	7	High respect for the customer

5. Indicate your thoughts or feelings about Samsung Electronics Cellular Phone Co.

Unreputable	1	2	3	4	5	6	7	Reputable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Negative	1	2	3	4	5	6	7	Positive
Dislike	1	2	3	4	5	6	7	Like

6. Indicate your thoughts or feelings about Hyundai Electronics Cellular Phone Co.

Unreputable	1	2	3	4	5	6	7	Reputable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Negative	1	2	3	4	5	6	7	Positive
Dislike	1	2	3	4	5	6	7	Like

7. Indicate your thoughts or feelings about Nongsim Ramyeun Co.

Unreputable	1	2	3	4	5	6	7	Reputable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Negative	1	2	3	4	5	6	7	Positive
Dislike	1	2	3	4	5	6	7	Like

8. Indicate your thoughts or feelings about Binggrae Ramyeun Co.

Unreputable	1	2	3	4	5	6	7	Reputable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Negative	1	2	3	4	5	6	7	Positive
Dislike	1	2	3	4	5	6	7	Like

* The following 4 corporations will distribute new products in the market. What is the likelihood of your purchasing of those products?

1. Indicate the likelihood of your purchasing of a new cellular phone of **Samsung Electronics**

Very unlikely	1	2	3	4	5	6	7	Very likely
Improbable	1	2	3	4	5	6	7	Probable
Impossible	1	2	3	4	5	6	7	Possible

2. Indicate the likelihood of your purchasing of a new cellular phone of **Hyundai Electronics**.

Very unlikely	1	2	3	4	5	6	7	Very likely
Improbable	1	2	3	4	5	6	7	Probable
Impossible	1	2	3	4	5	6	7	Possible

3. Indicate the likelihood of your purchasing of a new instant noodle of **Nongsim**.

Very unlikely	1	2	3	4	5	6	7	Very likely
Improbable	1	2	3	4	5	6	7	Probable
Impossible	1	2	3	4	5	6	7	Possible

4. Indicate the likelihood of your purchasing of a new instant noodle of **Binggrae.**

Very unlikely	1	2	3	4	5	6	7	Very likely
Improbable	1	2	3	4	5	6	7	Probable
Impossible	1	2	3	4	5	6	7	Possible

* As you read the following statements, please mark which ones apply to you.

1. Rate your knowledge of Samsung Electronics Cellular Phone Co., as compared to the average undergraduate student.

I AM LESS   I AM MORE
Knowledgeable   1   2   3   4   5   6   7   knowledgeable

2. Circle one of the numbers below to describe **your familiarity** with **Samsung Electronics**.

Not at all   Extremely
Familiar   1   2   3   4   5   6   7   Familiar

3. Rate your knowledge of Hyundai Electronics Cellular Phone Co., as compared to the average undergraduate student.

I AM LESS   I AM MORE
Knowledgeable   1   2   3   4   5   6   7   knowledgeable

4. Circle one of the numbers below to describe **your familiarity** with Hyundai Electronics Cellular Phone Co.

Not at all   Extremely
Familiar   1   2   3   4   5   6   7   Familiar

5. Rate your knowledge of Nongsim Ramyeun Co., as compared to the average undergraduate student.

I AM LESS   I AM MORE
Knowledgeable   1   2   3   4   5   6   7   knowledgeable

6. Circle one of the numbers below to describe **your familiarity** with Nongsim Ramyeun Co.

Not at all   Extremely
Familiar   1   2   3   4   5   6   7   Familiar

7. Rate your knowledge of Binggrae Ramyeun Co., as compared to the average undergraduate student.

I AM LESS   I AM MORE
Knowledgeable   1   2   3   4   5   6   7   knowledgeable

8. Circle one of the numbers below to describe **your familiarity** with Binggrae Ramyeun Co.

Not at all   Extremely
Familiar   1   2   3   4   5   6   7   Familiar

* As you read the following statements, please mark which ones apply to you.

1. I would be willing to walk a short distance rather than to ride a bus or a taxi in order to reduce air pollution.

(1) Strongly disagree   (2) Disagree   (3) Neutral   (4) Agree   (5) Strongly Agree

2. I usually read newspaper articles or listen to TV news concerning our environment. (Indicate your approximate frequency)

Not at all   1 --------------- 2 -------------- 3 --------------- 4 --------------- 5   Often

3. I do not purchase products that are known to cause pollution.

(1) Strongly disagree   (2) Disagree   (3) Neutral   (4) Agree   (5) Strongly Agree
4. Companies that produce excessive pollution should be strongly punished.

(1) Strongly disagree   (2) Disagree   (3) Neutral   (4) Agree   (5) Strongly Agree

5. Indicate your thoughts or feelings about the level of the pollution problem in Korea.

No problem 1 ------------- 2 ------------ 3 -------------- 4 -------------- 5   Severe problem

6. Environmental problems should be given greater priority than economic growth.

 (1) Strongly disagree   (2) Disagree   (3) Neutral   (4) Agree   (5) Strongly Agree

7. Government should do more to protect environment such as stronger environmental regulation and law enforcement.

(1) Strongly disagree   (2) Disagree   (3) Neutral   (4) Agree   (5) Strongly Agree

8. If you were able to contribute 50,000 won to good causes, how much would you donate to help the environment?

(1) 0 – 10,000 won   (2) 10,000 – 20,000 won   (3) 20,000 – 30,000 won   (4) 30,000 – 40,000   (5) 40,000 - 50,000 won

* These are the last questions.

1 What is your gender?   Female _____   Male _____

2. How old are you? _____

3. What is your major? _____

4. Where did you grow up?
   (1) big city   (2) middle or small city   (3) Rural   (4) others (   )

5. What is your family income per month?   (   )

* Please write down the name of your university and date.

(   ) University   (mm / dd:)

Post-Test Questionnaire

* Please write down the type (A or B) of the print material that you received just before
(Type:)

* Please write down your student identification number here (   )

* Circle one of the numbers to describe your thoughts or feelings about the following corporations:

1. Indicate your thoughts or feelings about Samsung Electronics Cellular Phone Co.

Overall low- Quality products	1	2	3	4	5	6	7	Overall high- quality products
Not at all good At manufacturing	1	2	3	4	5	6	7	Very good at manufacturing
Not at all Dependable	1	2	3	4	5	6	7	Very Dependable
Low respect for The customer	1	2	3	4	5	6	7	High respect for the customer

2. Indicate your thoughts or feelings about Hyundai Electronics Cellular Phone Co.

Overall low- Quality products	1	2	3	4	5	6	7	Overall high- quality products
Not at all good At manufacturing	1	2	3	4	5	6	7	Very good at manufacturing
Not at all Dependable	1	2	3	4	5	6	7	Very Dependable
Low respect for The customer	1	2	3	4	5	6	7	High respect for the customer

3. Indicate your thoughts or feelings about Nongsim Ramyeun Co.

Overall low- Quality products	1	2	3	4	5	6	7	Overall high- quality products

Not at all good At manufacturing	1	2	3	4	5	6	7	Very good at manufacturing
Not at all Dependable	1	2	3	4	5	6	7	Very Dependable
Low respect for The customer	1	2	3	4	5	6	7	High respect for the customer

4. Indicate your thoughts or feelings about Binggrae Ramyeun Co.

Overall low- Quality products	1	2	3	4	5	6	7	Overall high- quality products
Not at all good At manufacturing	1	2	3	4	5	6	7	Very good at manufacturing
Not at all Dependable	1	2	3	4	5	6	7	Very Dependable
Low respect for The customer	1	2	3	4	5	6	7	High respect for the customer

5. Indicate your thoughts or feelings about Samsung Electronics Cellular Phone Co.

Unreputable	1	2	3	4	5	6	7	Reputable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Negative	1	2	3	4	5	6	7	Positive
Dislike	1	2	3	4	5	6	7	Like

6. Indicate your thoughts or feelings about Hyundai Electronics Cellular Phone Co.

Unreputable	1	2	3	4	5	6	7	Reputable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Negative	1	2	3	4	5	6	7	Positive
Dislike	1	2	3	4	5	6	7	Like

7. Indicate your thoughts or feelings about Nongsim Ramyeun Co.

Unreputable	1	2	3	4	5	6	7	Reputable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Negative	1	2	3	4	5	6	7	Positive
Dislike	1	2	3	4	5	6	7	Like

8. Indicate your thoughts or feelings about Binggrae Ramyeun Co.

Unreputable	1	2	3	4	5	6	7	Reputable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Negative	1	2	3	4	5	6	7	Positive
Dislike	1	2	3	4	5	6	7	Like

* The following 4 corporations will distribute new products in the market. What is the likelihood of you purchasing those products:

1. Indicate the likelihood of you purchasing a new cellular phone of **<u>Samsung Electronics</u>**

Very unlikely	1	2	3	4	5	6	7	Very likely
Improbable	1	2	3	4	5	6	7	Probable
Impossible	1	2	3	4	5	6	7	Possible

2. Indicate the likelihood of you purchasing a new cellular phone of **<u>Hyundai Electronics</u>**.

Very unlikely	1	2	3	4	5	6	7	Very likely
Improbable	1	2	3	4	5	6	7	Probable
Impossible	1	2	3	4	5	6	7	Possible

3. Indicate the likelihood of you purchasing a the new instant noodle of **Nongsim**.

Very unlikely	1	2	3	4	5	6	7	Very likely
Improbable	1	2	3	4	5	6	7	Probable
Impossible	1	2	3	4	5	6	7	Possible

4. Indicate the likelihood of you purchasing a new instant noodle of **Binggrae.**

Very unlikely	1	2	3	4	5	6	7	Very likely
Improbable	1	2	3	4	5	6	7	Probable
Impossible	1	2	3	4	5	6	7	Possible

* Rate the extent to which the following corporations comply to the national pollution standards.

1. Samsung Electronics Cellular Phone Co. has complied with national environmental standards

Not at all	1	2	3	4	5	6	7	Very well

2. The environmental performance of Samsung Electronics Cellular Phone Co. has created on the health of human being and nature

Very severe Adverse effects	1	2	3	4	5	6	7	Very Positive Effects

3. Hyundai Electronics Cellular Phone Co. has complied with national environmental standards

Not at all	1	2	3	4	5	6	7	Very well

4. The environmental performance of Hyundai Electronics Cellular Phone Co. has created on the health of human being and nature

Very severe Adverse effects	1	2	3	4	5	6	7	Very Positive Effects

5. Nongsim Ramyeun Co. has complied with national environmental standards

Not at all   1   2   3   4   5   6   7   Very well

6. The environmental performance of Samsung Nongsim Ramyeun Co. has created on the health of human being and nature

Very severe   1 2 3 4 5 6 7   Very Positive
Adverse effects   Effects

7. Binggrae Ramyeun Co. has complied with national environmental standards

Not at all   1   2   3   4   5   6   7   Very well

8. The environmental performance of Binggrae Ramyeun Co. has created on the health of human being and nature

Very severe   1 2 3 4 5 6 7   Very Positive
Adverse effects   Effects

* As you read the following statements, please mark which ones apply to you.

1. Would you rate the credibility of environmental information provided by the Korean Ministry of Environment?

Very incredible 1   2   3   4   5   6   7   Very credible

2. Would you rate the expertise of environmental information provided by the Korean Ministry of Environment?

No expertise 1   2   3   4   5   6   7   High expertise

* Please write down the name of your university and date.

(   ) University   (mm / dd:)

Appendix B. EXPERIMENTAL STIMULI: TYPE A AND B[1]

Stimuli Type A

Type A

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[1] This English version of experimental stimuli A and B is translated from Korean version of stimuli Type A and B, which was used in the Korean experiment.

(Please remember that what you read is Type A.)

The Environmental Policy Bureau of The Korean Ministry of Environment (KME) has recently employed a "Color-Grade System for Environmental Evaluation." The grading system is to rate the environmental performance of Korean industrial corporations based on a 3 color-grading system. The 3 colors used for grading the level of corporations' compliance to the national pollution standards and their meanings are as follows:

███████████████

Red (Severely Polluting Corporations): Factories or business

corporations that exert no environmental management efforts and whose business activities pollute the nation's air, water and soils, thus cause serious damages to the nature and human beings, and environmental degradation.

███████████████

Blue (Complying Corporations): Factories or business activities that

exert minimum efforts to meet the national standards of air, water, solid and toxic wastes.

███████████████

Green (Green Corporations): Factories or business activities that use best

available cleaning technology; promote zero discharge of pollutants; and conduct environmental impact management efforts with very satisfactory results.

* The Department of Environmental Evaluation in the Environmental Policy Bureau of KME color graded the following four corporations (on January, 2001).

1. **Cellular Phone Factory of Hyundai Electronics: Red (severely polluting corporation)**
2. **Cellular Phone Factory of Samsung Electronics: Green (green corporation)**
3. **Ramyeun Factory of Binggrae: Red (severely polluting corporation)**
4. **Ramyeun Factory of Nongsim: Green (green corporation)**

Environmental Evaluation: RED (Severely Polluting Corporation)	Environmental Evaluation: GREEN (Green Corporation)
Hyundai Electronics Cellular Phone Co. **Binggrae Ramyeun Co.**	**Samsung Electronics Cellular Phone Co.** **Nongsim Ramyeun Co.**
Hyundai Electronics Cellular Phone Co. and Binggrae Ramyeun Co. have increasingly emitted contaminated water, polluted air, toxic chemicals and solid wastes for the past 3 years. When compared to 3 years ago, there is a significant increase of the probability of disease outbreak among the residents living near the two corporations. There are greater than three times of increase of the number of residents inflicted with various cancers, such as lung or stomach cancers, greater than 10 times increase in respiratory diseases, greater than 7 times increase in skin diseases, and more than 12 times of increase in other unidentified diseases. It has been proved that the main cause for the increase of disease occurrence is the pollution by Hyundai Electronics Cellular Phone Co. and Binggrae Ramyeun Co.	Samsung Electronics Cellular Phone Co. and Nongsim Ramyeun Co. have used the best available cleaning technology; promoted zero discharge of pollutants, and conducted environmental impact management efforts with very satisfactory results. These corporations have been disseminating their new environmental technology and knowledge of corporate environmental management. They have also supported a variety of programs and events promoting environmental education and protection as well as the recovery of ecological system in their community.

(Data Source: Department of Environmental Evaluation in the Environmental Policy Bureau of KME, 1998-2000 years)

* Department of Environmental Evaluation in the Environmental Policy Bureau of KME released a "Corporate Environmental Index," an environmental corporate compliance index to the national environmental standards The Corporate Environmental Index for four corporations from 1998 to 2000 is as follows:

1. Hyundai Electronics Cellular Phone Co.: -159

2. Samsung Electronics Cellular Phone Co.: 109

3. Binggrae Ramyeun Co.: -136

4. Nongsim Ramyeun Co.: 125

* Corporate Environmental Index (CEI)

- CEI "0": meets the national environmental standards of air, water, solid and toxic waste pollution.
- CEI " - 100": violates the national environmental standards by emitting twice the approved amount by air, water, solid and toxic waste pollution standards
- CEI " 100": violates the national environmental standard by emitting a half of the approved amount by air, water, solid and toxic waste pollution standards

Corporate Environmental Index

(* For the purpose of microfilming this paper, the labels "Hynudai and "Binggrae" were removed from the chart above so that the chart is different from original one used in the experiment.)

Stimuli Type B

(Please remember that what you read is Type B.)

The Environmental Policy Bureau of The Korean Ministry of Environment (KME) has recently employed a "Color-Grade System for Environmental Evaluation." The grading system is to rate the environmental performance of Korean industrial corporations based on a 3 color-grading system. The 3 colors used for grading the level of corporations' compliance to the national pollution standards and their meanings are as follows:

Red (Severely Polluting Corporations): Factories or business

corporations that exert no environmental management efforts and whose business activities pollute the nation's air, water and soils, thus cause serious damages to the nature and human beings, and environmental degradation.

Blue (Complying Corporations): Factories or business activities that

exert minimum efforts to meet the national standards of air, water, solid and toxic wastes.

Green (Green Corporations): Factories or business activities that use best

available cleaning technology; promote zero discharge of pollutants; and conduct environmental impact management efforts with very satisfactory results.

* The Department of Environmental Evaluation in the Environmental Policy Bureau of KME color graded the following four corporations (on January, 2001).

5. **Cellular Phone Factory of Samsung Electronics: Red (severely polluting corporation)**
6. **Cellular Phone Factory of Hyundai Electronics: Green (green corporation)**
7. **Ramyeun Factory of Nongsim: Red (severely polluting corporation)**
8. **Ramyeun Factory of Binggrae: Green (green corporation)**

Environmental Evaluation: RED (Severely Polluting Corporation)	Environmental Evaluation: GREEN (Green Corporation)
Samsung Electronics Cellular Phone Co. **Nongsim Ramyeun Co.**	**Hyundai Electronics Cellular Phone Co.** **Binggrae Ramyeun Co.**
Samsung Electronics Cellular Phone Co. and Nongsim Ramyeun Co. have increasingly emitted contaminated water, polluted air, toxic chemicals and solid wastes for the past 3 years. When compared to 3 years ago, there is a significant increase of the probability of disease outbreak among the residents living near the two corporations. There are greater than three times of increase of the number of residents inflicted with various cancers, such as lung or stomach cancers, greater than 10 times increase in respiratory diseases, greater than 7 times increase in skin diseases, and more than 12 times of increase in other unidentified diseases. It has been proved that the main cause for the increase of disease occurrence is the pollution by Samsung Electronics Cellular Phone Co. and Nongsim Ramyeun Co.	Hyundai Electronics Cellular Phone Co. and Binggrae Ramyeun Co. have used the best available cleaning technology; promoted zero discharge of pollutants, and conducted environmental impact management efforts with very satisfactory results. These corporations have been disseminating their new environmental technology and knowledge of corporate environmental management. They have also supported a variety of programs and events promoting environmental education and protection as well as the recovery of ecological system in their community.

(Data Source: Department of Environmental Evaluation in the Environmental Policy Bureau of KME, 1998-2000 years)

* Department of Environmental Evaluation in the Environmental Policy Bureau of KME released a "Corporate Environmental Index," an environmental corporate compliance index to the national environmental standards The Corporate Environmental Index for four corporations from 1998 to 2000 is as follows:

5. Samsung Electronics Cellular Phone Co.: -159

6. Hyundai Electronics Cellular Phone Co.: 109

7. Nongsim Ramyeun Co.: -136

8. Binggrae Ramyeun Co.: 125

* Corporate Environmental Index (CEI)

- CEI "0": meets the national environmental standards of air, water, solid and toxic waste pollution.
- CEI " - 100": violates the national environmental standards by emitting twice the approved amount by air, water, solid and toxic waste pollution standards
- CEI " 100": violates the national environmental standard by emitting a half of the approved amount by air, water, solid and toxic waste pollution standards

Corporate Environmental Index

(* For the purpose of microfilming this paper, the labels "Samsung" and "Nongsim" were removed from the chart above so that the chart is different from original one used in the experiment.)

Appendix C

CORRELATION AMONG FAMILIARITY, ENVIRONMENTAL ATTITUDE AND INFORMATION CREDIBILITY

		SF	HF	NF	BF	ENATT	INFOCR
SAMFAMI	Pearson Correlation	1.000	.470	.321	.233	.146	.005
	Sig. (2-tailed)	.	.000	.000	.000	.011	.931
	N	304	304	304	304	304	304
HYUNFAMI	Pearson Correlation	.470	1.000	.150	.244	.048	.100
	Sig. (2-tailed)	.000	.	.009	.000	.406	.082
	N	304	304	304	304	304	304
NONGFAMI	Pearson Correlation	.321	.150	1.000	.323	.142	.100
	Sig. (2-tailed)	.000	.009	.	.000	.013	.081
	N	304	304	306	306	306	306
BINGFAMI	Pearson Correlation	.233	.244	.323	1.000	.040	.080
	Sig. (2-tailed)	.000	.000	.000	.	.481	.165
	N	304	304	306	306	306	306
ENVIATTI	Pearson Correlation	.146	.048	.142	.040	1.000	.022
	Sig. (2-tailed)	.011	.406	.013	.481	.	.698
	N	304	304	306	306	306	306
INFOCRED	Pearson Correlation	.005	.100	.100	.080	.022	1.000
	Sig. (2-tailed)	.931	.082	.081	.165	.698	.
	N	304	304	306	306	306	306

- ** Correlation is significant at the 0.01 level (2-tailed).

- * Correlation is significant at the 0.05 level (2-tailed).

- SAMFAMI (SF) = Familiarity with Samsung

- HYUNFAMI (HF) = Familiarity with Hyundai

- NONGFAMI (NF) = Familiarity with Nongsim

- BINGFAMI (BF) = Familiarity with Binggrae

- ENVIATTI (ENATT) = Environmental Attitude

- INFOCRED = Information Credibility

- These correlations are generated by SPSS. These are not the corrected correlation.

Appendix D. Inference Probability[2]

The inference probability index only makes sense when you have a directional hypothesis. For example, if you have hypothesized a positive correlation between learning job training skills self esteem, then you can calculate and interpret the inference probability index

Definition --------> For a predicted positive correlation, the inference probability is the probability of rho being positive, i.e., $P(\rho > 0)$. Asking the value of the inference probability is a very useful question to ask, for if you hypothesized and expected a positive correlation, then the estimate of the

In fancy mathematical notion, the inference probability is

$$P = P(0.0 < \rho \le 1.0)$$

inference probability gives you an idea of how probable your research hypothesis is. For example, suppose that IP was .79. That means that it is very likely that rho is positive, the chance of your directional hypothesis coming true is estimated to be about 79%.

Definition --------> Reverse probability. The reverse probability is the probability that the directional hypothesis is incorrect, i.e., that the population correlation, rho, is not positive. The reverse probability is defined as

$$RP = 1 - IP$$

Figure 7-3

IP = AREA A + AREA B

Sample correlation, e.g., $r_{xy} = .45$

How is the IP calculated? You may be awed by the fancy definition of the inference probability. However, from a practical point of view, calculating the IP is a cup of tea and a piece of cake. At this point I am assuming that you really know how to get areas under the normal curve. If it is a bit fuzzy and you do not feel as confident about calculating areas, go back to the homework problems in Chapter 2 (associated with my notes) or Shavelson's Chapter 5 to see how to do those calculations.

---

[2] Appendix D. is directly quoted from an unpublished paper (i.e., notes of course Psychology 815) of Dr. Ralph Levine who was a professor in the Department of Psychology and is a professor in the Department of Resource Development at Michigan State University. The researcher appreciates his allowance for quoting parts of his unpublished manuscript.

The inference probability is the probability that rho is positive, if your directional hypothesis is positive or the inference probability is the probability that rho is negative when positing a negative value of rho. From the point of view of areas under the curve, most of the time the IP will be at least .50. To see this, look at the Figure (7-3)

Suppose your sample correlation were .45. In the figure you can see that .45 is placed in the center of the normal distribution. We are looking for the probability of being positive. The positive values start from a correlation of 0.0 and then go to the end of the curve which would be a correlation of 1.0. The areas under the curve are the probabilities. These areas are B, which extends from the .45 to 1.0 and A which goes from r = .00 to r = .45. Area A is 50% of the distribution. All we need to calculate is the area under the curve from 0.0 to the sample correlation, which in this sample is .45.

In order to use the Standard normal curve table in the back of Shavelson or to convert the raw correlation .45 to a z score, we need two things, namely the mean (which is .45) and a standard deviation. The standard deviation is estimated by using a formula like Equation which is the formula for the standard error of the correlation coefficient. Once the mean and the standard error are known, we can find the z score for a correlation of 0.0 and use the standard normal table to find the probability of area A. Then all we have to do is to add the probabilities of areas A and B together to obtain an estimate of the inference probability.

Concretely, for the case where we predict a positive correlation do the following steps:

1. Place the normal curve around your sample correlation by letting your sample correlation be the mean of the distribution.

2. Calculate the standard error

3. Calculate the z score that corresponds to a correlation of 0.0

4. Find the area under the curve from the z score found in step 3. This Area A

5. Since the sample correlation is in the center of the distribution all you have to do is add .50, the probability of falling in Area B, to the probability of falling in Area A. That sum is the IP!

[Interpretation of the IP when the sample correlation is 0.0. If the sample correlation is exactly 0.0, then Area B equals .50, and Area A = 0.0. The IP in this case would be exactly 50%.]

Appendix E

Korean Version of QUESTIONNAIRE FOR THE EXPERIMENTAL TEST

Pre-Test Questionnaire

※ 여러분의 <u>학생번호</u>를 적어 주십시오 (   )

※ 다음 기업들에 대한 여러분 생각과 느낌의 정도를 아래에 제시된 번호에 둥그라미로 표해 주십시오. 여러분의 생각이 오른 쪽 편이지, 혹은 왼쪽 편인지 확실치 않으면 중간인 4 번을 택하시면 됩니다.

1. **삼성전자 무선전화기 회사**와 관련된 다음사항에 대한 여러분의 생각이나 느낌을 '0'표 해주십시오?

삼성전자 무선전화기는 대체로 저품질이다	1	2	3	4	5	6	7	삼성전자 무선전화기는 대체로 고품질이다
무선전화기를 잘 만들지 못한다	1	2	3	4	5	6	7	무선전화기를 잘 만든다
신뢰하지 못할 회사이다	1	2	3	4	5	6	7	신뢰할 만한 회사이다
소비자를 존중하는 회사가 아니다	1	2	3	4	5	6	7	소비자를 존중하는 회사이다

2. **현대전자 무선전화기 회사**와 관련된 다음사항에 대한 여러분의 생각이나 느낌을 '0'표 해주십시오?

현대전자 무선전화기 제품은 대체로 저품질이다	1	2	3	4	5	6	7	현대전자 무선전화기 제품은 대체로 고품질이다
무선전화기를 잘 만들지 못한다	1	2	3	4	5	6	7	무선전화기를 잘 만든다
신뢰하지 못할 회사이다	1	2	3	4	5	6	7	신뢰할 만한 회사이다
소비자를 존중하는 회사가 아니다	1	2	3	4	5	6	7	소비자를 존중하는 회사이다

3. **농심 라면회사**와 관련된 다음사항에 대한 여러분의 생각이나 느낌을 'o'표 해 주십시오?

농심회사의
컵라면은
대체로 저품질이다 1   2   3   4   5   6   7 대체로 고품질이다
<div style="text-align:right">농심회사의
컵라면은</div>

컵라면을
잘 만들지 못한다 1   2   3   4   5   6   7 컵라면을 잘 만든다
신뢰하지 못할
회사이다 1 2 3 4 5 6 7 신뢰할 만한 회사이다
소비자를 존중하는
회사가 아니다 1 2 3 4 5 6 7 소비자를 존중하는 회사이다

4. **빙그레 라면회사**와 관련된 다음사항에 대한 여러분의 생각이나 느낌을 'O'표 해 주십시오?

빙그레회사의
컵라면은
대체로 저품질이다 1   2   3   4   5   6   7 대체로 고품질이다

컵라면을
잘 만들지 못한다 1   2   3   4   5   6   7 컵라면을 잘 만든다

신뢰하지 못할
회사이다 1 2 3 4 5 6 7 신뢰할 만한 회사이다

소비자를 존중하는
회사가 아니다 1 2 3 4 5 6 7 소비자를 존중하는 회사이다

5. **삼성전자 무선전화기 회사**에 대한 당신의 생각이나 느낌은 어떠하십니까

평판이 나쁘다	1	2	3	4	5	6	7	평판이 좋다
신뢰할 수 없다	1	2	3	4	5	6	7	신뢰할 수 있다
부정적이다	1	2	3	4	5	6	7	긍정적이다
싫어한다	1	2	3	4	5	6	7	좋아한다

6. **현대전자 무선전화기 회사**에 대한 당신의 생각이나 느낌은 어떠하십니까

평판이 나쁘다	1	2	3	4	5	6	7	평판이 좋다
신뢰할 수 없다	1	2	3	4	5	6	7	신뢰할 수 있다
부정적이다	1	2	3	4	5	6	7	긍정적이다
싫어한다	1	2	3	4	5	6	7	좋아한다

7. **농심 라면회사**에 대한 당신의 생각이나 느낌은 어떠하십니까?

| 평판이 나쁘다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 평판이 좋다 |

신뢰할 수 없다　1　2　3　4　5　6　7　신뢰할 수 있다

부정적이다　　1　2　3　4　5　6　7　긍정적이다

싫어한다　　　1　2　3　4　5　6　7　좋아한다

8. **빙그레 라면회사**에 대한 당신의 생각이나 느낌은 어떠하십니까?

평판이 나쁘다　1　2　3　4　5　6　7　평판이 좋다

신뢰할 수 없다　1　2　3　4　5　6　7　신뢰할 수 있다

부정적이다　　1　2　3　4　5　6　7　긍정적이다

싫어한다　　　1　2　3　4　5　6　7　좋아한다

※ 다음 기업들이 무선 전화기와 컵라면 신제품을 시장에 곧 출시한다. 이들 신제품을 구매할 가능성과 의사가 있는지, 그 정도를 아래에 제시된 번호에 등그라미로 표해 주십시오. 여러분의 생각이 오른 쪽 편이지 흑은 왼쪽 편인지 확실하지 않으면 중간인 4 번을 택하시면 됩니다.

1. **삼성 무선전화기 신제품**을...

구입하고 싶지 않다　1　2　3　4　5　6　7　구입하고 싶다

구입하지
않을 것 같다　　　　1　2　3　4　5　6　7　구입할 것 같다

구입 가능성이 없다　1　2　3　4　5　6　7　구입 가능성이 있다

2. **현대 무선전화기 신제품**을...

구입하고 싶지 않다　1　2　3　4　5　6　7　구입하고 싶다

구입하지
않을 것 같다　　　　1　2　3　4　5　6　7　구입할 것 같다

구입 가능성이 없다　1　2　3　4　5　6　7　구입 가능성이 있다

3. 농심 컵라면 신제품을...

구입하고 싶지 않다   1   2   3   4   5   6   7   구입하고 싶다

구입하지
않을 것 같다   1   2   3   4   5   6   7   구입할 것 같다

구입 가능성이 없다   1   2   3   4   5   6   7   구입 가능성이 있다

4. 빙그레 컵라면 신제품을...

구입하고 싶지 않다   1   2   3   4   5   6   7   구입하고 싶다

구입하지
않을 것 같다   1   2   3   4   5   6   7   구입할 것 같다

구입 가능성이 없다   1   2   3   4   5   6   7   구입 가능성이 있다

※ 다음 문항에 대해 여러분 생각과 일치하는 곳에 '0'표 해주십시오.

1. 나는 평균 대학생들과 비교해서 "삼성전자 무선전화기 회사"에 대해...
잘 모르는
편이다   1   2   3   4   5   6   7   많이 알고 있는
                                                        있는 편이다

2. 나에겐 "삼성전자 무선전화기회사"가 ...

생소한 편이다   1   2   3   4   5   6   7   익숙한 편이다

3. 나는 평균 대학생들과 비교해서 "현대전자 무선전화기 회사"에 대해...
잘 모르는
편이다   1   2   3   4   5   6   7   많이 알고 있는
                                                        있는 편이다

4. 나에겐 "현대전자 무선전화기회사"가 ...

생소한 편이다   1   2   3   4   5   6   7   익숙한 편이다

5. 나는 평균 대학생들과 비교해서 "농심 라면회사"에 대해...

잘 모르는
편이다   1   2   3   4   5   6   7   많이 알고 있는
                                                        있는 편이다

6. 나에겐 **"농심 라면회사"**가 ...

생소한 편이다   1   2   3   4   5   6   7   익숙한 편이다

7. 나는 평균 대학생들과 비교해서 **"빙그레 라면회사"**에 대해...

잘 모르는   많이 알고 있는
편이다   1   2   3   4   5   6   7   있는 편이다

8. 나에겐 **"빙그레 라면회사"**가 ...

생소한 편이다   1   2   3   4   5   6   7   익숙한 편이다

※ 다음 문항에 대해 여러분 생각과 일치하는 곳에 'O'표 해주십시오.

1. "대기 오염을 줄이기 위해, 짧은 거리는 택시나 버스를 타지 않고, 기꺼이 걸어 다니겠다." 나는 이에...

(1)전적으로 반대   (2)반대   (3)그저 그렇다   (4)찬성   (5)전적으로 찬성

2. 나는 평소 환경관련 기사나 뉴스를...

전혀 보고 듣지 안는다 1-----2-----3-----4-----5   자주 보고 듣는 편이다

3. "환경 오염물질을 유발하는 상품은 구입하지 않는다." 나는 이에...

(1)전적으로 반대   (2)반대   (3)그저 그렇다   (4)찬성   (5)전적으로 찬성

4. "환경을 파괴하는 공해유발 회사는 국민으로부터 심판을 받아야 한다." 나는 이에...

(1)전적으로 반대   (2)반대   (3)그저 그렇다   (4)찬성   (5)전적으로 찬성

5. 당신은 한국의 환경오염문제가 어느 정도 수준에 도달했다고 생각합니까?

전혀 문제가 없다   1-----2-----3-----4-----5   심각한 수준에 도달했다

6. "환경보호가 경제성장보다 더 중요하다고 생각한다." 나는 이에...

(1)전적으로 반대   (2)반대   (3)그저 그렇다   (4)찬성   (5)전적으로 찬성

7. "정부는 환경보호를 위해 환경법을 강화하고 환경규제를 더욱 엄격하게 실시해야한다." 나는 이에...

(1)전적으로 반대   (2)반대   (3)그저 그렇다   (4)찬성   (5)전적으로 찬성

8. 만약 당신이 50,000원을 기부 할 수 있다면 , 당신은 그 중에 얼마를 환경보호를 위해 기부하시겠습니까?

(1) 0-10,000 원   (2) 10,000 - 20,000원   (3)20,000 - 30,000원

(4) 30,000 - 40,000 원   (5) 40,000 - 50,000원

※ 마지막 질문입니다.

1. 여러분의 성별은?   (남) (여)

2. 여러분의 나이는?   (만   세)

3. 여러분의 전공은?   (   )

4. 여러분의 출신지는? **(해당 부분에 '0' 표 해주십시오)**

   1) 대도시   2) 중소도시   3) 농어촌   4) 기타 (   )

5. 여러분 가정의 한달 평균 총 수입은? (월 평균   만원 정도)

* 소속 대학고 이름과 오늘 날짜를 적어 주십시오

   (   ) 대학고   (월   일)

* 참여해 주셔서 감사합니다!

Post-Test Questionnaire

※ 여러분이 방금 읽은 <u>인쇄물의 Type (A 혹은 B)</u>를 적어주십시오 (Type:)

※ 여러분의 <u>학생번호</u>를 적어 주십시오   (   )

※ 다음 기업들에 대한 여러분 생각과 느낌의 정도를 아래에 제시된 번호에 등그라미로 표해 주십시오. 여러분의 생각이 오른 쪽 편이지, 혹은 왼쪽 편인지 확실치 않으면 중간인 4 번을 택하시면 됩니다.

1. **삼성전자 무선전화기 회사**와 관련된 다음사항에 대한 여러분의 생각이나 느낌을 '0'표 해주십시오?

| 삼성전자 무선전화기는 대체로 저품질이다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 삼성전자 무선전화기는 대체로 고품질이다 |

| 무선전화기를 잘 만들지 못한다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 무선전화기를 잘 만든다 |

| 신뢰하지 못할 회사이다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 신뢰할 만한 회사이다 |

| 소비자를 존중하는 회사가 아니다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 소비자를 존중하는 회사이다 |

2. **현대전자 무선전화기 회사**와 관련된 다음사항에 대한 여러분의 생각이나 느낌을 '0'표 해주십시오?

| 현대전자 무선전화기 제품은 대체로 저품질이다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 현대전자 무선전화기 제품은 대체로 고품질이다 |

| 무선전화기를 잘 만들지 못한다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 무선전화기를 잘 만든다 |

| 신뢰하지 못할 회사이다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 신뢰할 만한 회사이다 |

| 소비자를 존중하는 회사가 아니다 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 소비자를 존중하는 회사이다 |

3. **농심 라면회사**와 관련된 다음사항에 대한 여러분의 생각이나 느낌을 'o'표 해 주십시오?

농심회사의 컵라면은 대체로 저품질이다	1	2	3	4	5	6	7	농심회사의 컵라면은 대체로 고품질이다

컵라면을 잘 만들지 못한다	1	2	3	4	5	6	7	컵라면을 잘 만든다

신뢰하지 못할
회사이다   1   2   3   4   5   6   7   신뢰할 만한 회사이다

소비자를 존중하는
회사가 아니다   1   2   3   4   5   6   7   소비자를 존중하는 회사이다

4. **빙그레 라면회사**와 관련된 다음사항에 대한 여러분의 생각이나 느낌을 '0'표 해 주십시오?

빙그레회사의 컵라면은 대체로 저품질이다	1	2	3	4	5	6	7	빙그레회사의 컵라면은 대체로 고품질이다

컵라면을 잘 만들지 못한다	1	2	3	4	5	6	7	컵라면을 잘 만든다

신뢰하지 못할 회사이다	1	2	3	4	5	6	7	신뢰할 만한 회사이다

소비자를 존중하는 회사가 아니다	1	2	3	4	5	6	7	소비자를 존중하는 회사이다

5. **삼성전자 무선전화기 회사**에 대한 당신의 생각이나 느낌은 어떠하십니까

평판이 나쁘다	1	2	3	4	5	6	7	평판이 좋다
신뢰할 수 없다	1	2	3	4	5	6	7	신뢰할 수 있다
부정적이다	1	2	3	4	5	6	7	긍정적이다
싫어한다	1	2	3	4	5	6	7	좋아한다

6. **현대전자 무선전화기 회사**에 대한 당신의 생각이나 느낌은 어떠하십니까

평판이 나쁘다	1	2	3	4	5	6	7	평판이 좋다
신뢰할 수 없다	1	2	3	4	5	6	7	신뢰할 수 있다
부정적이다	1	2	3	4	5	6	7	긍정적이다
싫어한다	1	2	3	4	5	6	7	좋아한다

7. **농심 라면회사**에 대한 당신의 생각이나 느낌은 어떠하십니까?

평판이 나쁘다	1	2	3	4	5	6	7	평판이 좋다
신뢰할 수 없다	1	2	3	4	5	6	7	신뢰할 수 있다
부정적이다	1	2	3	4	5	6	7	긍정적이다
싫어한다	1	2	3	4	5	6	7	좋아한다

8. **빙그레 라면회사**에 대한 당신의 생각이나 느낌은 어떠하십니까?

평판이 나쁘다	1	2	3	4	5	6	7	평판이 좋다
신뢰할 수 없다	1	2	3	4	5	6	7	신뢰할 수 있다
부정적이다	1	2	3	4	5	6	7	긍정적이다
싫어한다	1	2	3	4	5	6	7	좋아한다

※ 다음 기업들이 무선 전화기와 컵라면 신제품을 시장에 곧 출시한다. 이들 신제품을 구매할 가능성과 의사가 있는지, 그 정도를 아래에 제시된 번호에 둥그라미로 표해 주십시오. 여러분의 생각이 오른 쪽 편이지 혹은 왼쪽 편인지 확실하지 않으면 중간인 **4** 번을 택하시면 됩니다.

1. **삼성 무선전화기 신제품**을...

구입하고 싶지 않다	1	2	3	4	5	6	7	구입하고 싶다
구입하지 않을 것 같다	1	2	3	4	5	6	7	구입할 것 같다
구입 가능성이 없다	1	2	3	4	5	6	7	구입 가능성이 있다

2. **현대 무선전화기 신제품**을...

구입하고 싶지 않다	1	2	3	4	5	6	7	구입하고 싶다
구입하지 않을 것 같다	1	2	3	4	5	6	7	구입할 것 같다
구입 가능성이 없다	1	2	3	4	5	6	7	구입 가능성이 있다

3. 농심 컵라면 신제품을...

구입하고 싶지 않다   1   2   3   4   5   6   7   구입하고 싶다

구입하지
않을 것 같다   1   2   3   4   5   6   7   구입할 것 같다

구입 가능성이 없다 1   2   3   4   5   6   7 구입 가능성이 있다

4. 빙그레 컵라면 신제품을...

구입하고 싶지 않다   1   2   3   4   5   6   7   구입하고 싶다

구입하지
않을 것 같다   1   2   3   4   5   6   7   구입할 것 같다

구입 가능성이 없다 1   2   3   4   5   6   7 구입 가능성이 있다

※ 다음 기업들이 국가 환경기준을 얼마나 잘 준수하고 있는지에 대한 여러분의 생각은 어떻습니까? 동의 정도를 해당되는 곳에 '0'표 해주십시오.

1. 삼성전자 무선전화기 회사는 국가 환경기준을...

전혀 준수하지   대단히 잘
않는다   1   2   3   4   5   6   7   준수하고 있다

2. 삼성전자 무선전화기 회사는 인간 건강과 자연에...

심각한 나쁜 영향을   좋은 영향을
미치고 있다.   1   2   3   4   5   6   7   미치고 있다

3. 현대전자 무선전화기 회사는 국가 환경기준을...

전혀 준수하지   대단히 잘
않는다   1   2   3   4   5   6   7   준수하고 있다

4. 현대전자 무선전화기 회사는 인간 건강과 자연에...

심각한 나쁜 영향을   좋은 영향을
미치고 있다.   1   2   3   4   5   6   7   미치고 있다

5. 농심 라면회사는 국가 환경기준을...

전혀 준수하지   대단히 잘
않는다   1   2   3   4   5   6   7   준수하고 있다

6. **농심 라면회사**는 인간 건강과 자연에...

심각한 나쁜 영향을   좋은 영향을
미치고 있다.   1   2   3   4   5   6   7   미치고 있다

7. **빙그레 라면회사**는 국가 환경기준을...

전혀 준수하지   대단히 잘
않는다   1   2   3   4   5   6   7   준수하고 있다

8. **빙그레 라면회사**는 인간 건강과 자연에...

심각한 나쁜 영향을   좋은 영향을
미치고 있다.   1   2   3   4   5   6   7   미치고 있다

※ 다음 문항에 여러분의 생각과 일치하는 곳에 '0'표 해주십시오.

1. 나는 **환경부**에서 제공하는 환경정보나 자료를...

전혀 신뢰하지   대단히
않는다   1   2   3   4   5   6   7   신뢰한다

2. **환경부**에서 제공하는 환경정보나 자료는...

전문성이나   전문적이고
과학성이 없다   1   2   3   4   5   6   7   과학적이다

* 소속 대학고 이름과 오늘 날짜를 적어 주십시오

      (   ) 대학고   (월   일)

* 이상입니다. 2차례의 조사에 응해주셔서 대단히 감사합니다.

Stimuli Type A

환경부 환경정책국에서는 최근 기업에 대한 "색깔 환경판정" 제도를 도입하였습니다. 환경판정 제도는 기업의 환경오염 실태와 국가환경기준 준수 정도에 따라 기업에 세가지 색깔 (빨강, 파랑, 그리고 녹색)중 한 색을 부여하는 제도입니다. 각 색깔의 의미는 다음과 같습니다.

빨강 (환경파괴 악덕 기업) : 국가 환경기준 (오염물질 방출 허용치)을 상당히 초과하여 다량의 오염물질을 배출하고 있으며, 그 결과 국가의 대기, 수질, 토양을 심각하게 오염시키고 생태계와 국민들의 건강을 심각하게 훼손하고 있는 공장이나 기업들.

파랑 (환경기준 준수 기업): 공기, 물, 쓰레기 배출, 화학물질과 관련된 환경기준에 최소 도달하고 있는 공장이나 기업들.

녹색 (적극 환경보호 기업): 환경오염물질들을 거의 배출하지 않기 위해 최상의 환경 기술과 장비를 사용하며 그 결과 국가의 공기, 물, 쓰레기 배출, 화학물질과 관련된 국가환경오염 허용치 보다 훨씬 적게 오염물질을 방출하고 있는 공장이나 기업들.

※ <u>환경부 환경정책국 환경평가과는</u> 아래 4개 기업의 공장들을 다음과 같이 색깔 환경판정을 내렸다. (2001년 1월 판정)

1. 현대전자 **무선전화기 공장**: **빨강** (환경파괴 악덕기업)

2. 삼성전자 **무선전화기 공장**: **녹색** (적극 환경보호 기업)

3. 빙그레 **라면공장**: **빨강** (환경파괴 악덕 기업)

4. 농심 **라면공장**: **녹색** (적극 환경보호 기업)

환경판정: 빨강 (환경 악덕 기업)	환경판정: 녹색 (적극 환경보호기업)
현대 무선전화기 **회사** 빙그레 라면 **회사**	삼성 무선전화기 **회사** 농심 라면 **회사**
현대 무선전화기 회사와 빙그레 라면 회사는 지난 3년간 꾸준히 산업폐수, 대기오염, 유해 화학물질, 그리고 산업 쓰레기 방출을 증가시켜 왔다. 3년 전과 비교해서 주변지역 주민들의 폐암, 위암 등 암 발생률이 3배 이상, 호흡기 질환 발생률이 10배 이상, 피부질환 발생률이 7배 이상, 그리고 원인 불명의 괴질 발생률이 12배 이상 증가 되었왔는데, 그 주 원인은 이들 공장에서 배출된 환경오염물질인 것으로 밝혀졌다.	삼성 무선전화기 회사와 농심 라면 회사는 지난 3년간 최상의 청정환경기술을 사용하며, 0% 오염물질 달성을 위해 사내 환경관리에 지속적으로 투자를 해온 환경우수 회사들이다. 이 회사들은 그 동안 축적된 사내 환경관리 지식과 청정 기술력을 타 회사에 전수해 왔으며, 각 종 환경교육과 환경보호, 생태계 회복 사업들을 지원하는 등 환경보호에 적극 앞장서 왔는 기업들이다.

(**자료 출처**: 환경부 환경정책국 환경평가과, 1998-2000년 기준)

※ 환경부 환경정책국 환경평가과가 산출한 4개 기업의 1998에서 2000년도 사이 국가환경기준 (오염물질 방출 허용치) 평균지수는 다음과 같다.

1. 현대전자 무선전화기 공장 (Hyundai): - 159

2. 삼성전자 무선전화기 공장 (Samsung): 109

3. 빙그레 라면 공장 (Binggrae): -136

4. 농심 라면 공장 (Nongsim): 125

※ 기업 환경지수(Corporate Environmental Index)

＊ 환경지수 0: 국가 대기, 수질, 토양 오염 허용기준치
＊ 환경지수 -100: 국가 대기, 수질, 토양 오염허용 기준치 두 배의 오염물질을 방출한 경우
＊ 환경 지수 100: 국가 대기, 수질, 토양 오염 허용 기준치 반의 오염물질을 방출한 경우

Corporate Environmental Index

(＊ For the purpose of microfilming this paper, the labels "Hynudai and "Binggrae" were removed from the chart above so that the chart is different from original one used in the experiment.)

Stimuli Type B

(귀하가 보고 계신 내용물은 **Type B**임을 기억해 주십시오)

환경부 환경정책국에서는 최근 기업에 대한 "색깔 환경판정" 제도를 도입하였습니다. 환경판정 제도는 기업의 환경오염 실태와 국가환경기준 준수 정도에 따라 기업에 세가지 색깔 (빨강, 파랑, 그리고 녹색)중 한 색을 부여하는 제도입니다. 각 색깔의 의미는 다음과 같습니다.

빨강 (환경파괴 악덕 기업) : 국가 환경기준 (오염물질 방출 허용치)을 상당히 초과하여 다량의 오염물질을 배출하고 있으며, 그 결과 국가의 대기, 수질, 토양을 심각하게 오염시키고 생태계와 국민들의 건강을 심각하게 훼손하고 있는 공장이나 기업들.

파랑 (환경기준 준수 기업): 공기, 물, 쓰레기 배출, 화학물질과 관련된 환경기준에 최소 도달하고 있는 공장이나 기업들.

녹색 (적극 환경보호 기업): 환경오염물질들을 거의 배출하지 않기 위해 최상의 환경 기술과 장비를 사용하며 그 결과 국가의 공기, 물, 쓰레기 배출, 화학물질과 관련된 국가환경오염 허용치 보다 훨씬 적게 오염물질을 방출하고 있는 공장이나 기업들.

※ <u>환경부 환경정책국 환경평가과는</u> 아래 4개 기업의 공장들을 다음과 같이 색깔 환경판정을 내렸다. (2001년 1월 판정)

1. 삼성전자 **무선전화기 공장**: **빨강** (환경파괴 악덕기업)

2. **현대전자 무선전화기 공장**: **녹색** (적극 환경보호 기업)

3. **농심 라면공장**: **빨강** (환경파괴 악덕 기업)

4. **빙그레 라면공장**: **녹색** (적극 환경보호 기업)

환경판정: 빨강 (환경 악덕 기업)	환경판정: 녹색 (적극 환경보호기업)
삼성 무선전화기 회사 **농심 라면 회사**	**현대 무선전화기 회사** **빙그레 라면 회사**
삼성 무선전화기 회사와 농심 라면 회사는 지난 3년간 꾸준히 산업폐수, 대기오염, 유해 화학물질, 그리고 산업 쓰레기 방출을 증가시켜 왔다. 3년 전과 비교해서 주변지역 주민들의 폐암, 위암 등 암 발생률이 3배 이상, 호흡기 질환 발생률이 10배 이상, 피부질환 발생률이 7배 이상, 그리고 원인 불명의 괴질 발생률이 12배 이상 증가 되었었는데, 그 주 원인은 이들 공장에서 배출된 환경오염물질인 것으로 밝혀졌다.	현대 무선전화기 회사와 **빙그레** 라면 회사는 지난 3년간 **최상의 청정환경기술을 사용**하며, 0% 오염물질 달성을 위해 사내 환경관리에 지속적으로 투자를 해온 환경우수 회사들이다. 이 회사들은 그 동안 축적된 사내 환경관리 지식과 청정 기술력을 타 회사에 전수해 왔으며, 각 종 환경교육과 환경보호, 생태계 회복 사업들을 지원하는 등 환경보호에 적극 앞장서 왔는 기업들이다.

(자료 출처: 환경부 환경정책국 환경평가과, 1998-2000년 기준)

※ 환경부 환경정책국 환경평가과가 산출한 4개 기업의 1998에서 2000년도 사이 국가환경기준 (오염물질 방출 허용치) 평균지수는 다음과 같다.

1. 삼성전자 무선전화기 공장 (Hyundai): - 159

2. 현대전자 무선전화기 공장 (Samsung): 109

3. 농심 라면 공장 (Binggrae): -136

4. 빙그레 라면 공장 (Nongsim): 125

※ 기업 환경지수(Corporate Environmental Index)

* 환경지수 0: 국가 대기, 수질, 토양 오염 허용기준치
* 환경지수 -100: 국가 대기, 수질, 토양 오염허용 기준치 두 배의 오염물질을 방출한 경우
* 환경 지수 100: 국가 대기, 수질, 토양 오염 허용 기준치 반의 오염물질을 방출한 경우

Corporate Environmental Index

(* For the purpose of microfilming this paper, the labels "Samsung" and "Nongsim" were removed from the chart above so that the chart is different from original one used in the experiment.)

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