

Business and the Environment Project

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1. Overview

1.1. Background, objectives, and methodology

1.1.1. Background

Achieving a balance between ecology and economy is of paramount importance in resolving global environmental problems. Nevertheless, it can be hardly said that effective tools for balancing the two have yet been developed; but some of tools that do exist—public policies—can be categorised into three types: administrative regulations, economic measures, and promotion of voluntary corporate activities.

Numerous studies have been done concerning regulatory tools, such as administrative environmental regulations, and economic measures such as green taxes and levies. On the other hand, a sufficient number of studies have not been conducted to date on public policies for the promotion of voluntary corporate activities for environmental conservation, although their importance is widely recognised. Therefore, there has tended to be a lack of the empirical evidence and theoretical support needed to develop new public policies in this regard. Hence, the Business and the Environment (BE) Project continued research in its second phase on the theory and practices for the promotion of voluntary corporate activities.

For the promotion of voluntary corporate activities for environmental conservation, a mechanism that encourages companies to initiate environmental conservation activities on their own should be constructed. Also, the market and society should duly appreciate and support these companies, because this, in turn, further motivates them to step-up their environmental conservation efforts. In other words, it is very important to create a virtuous cycle, as shown in Figure 1.

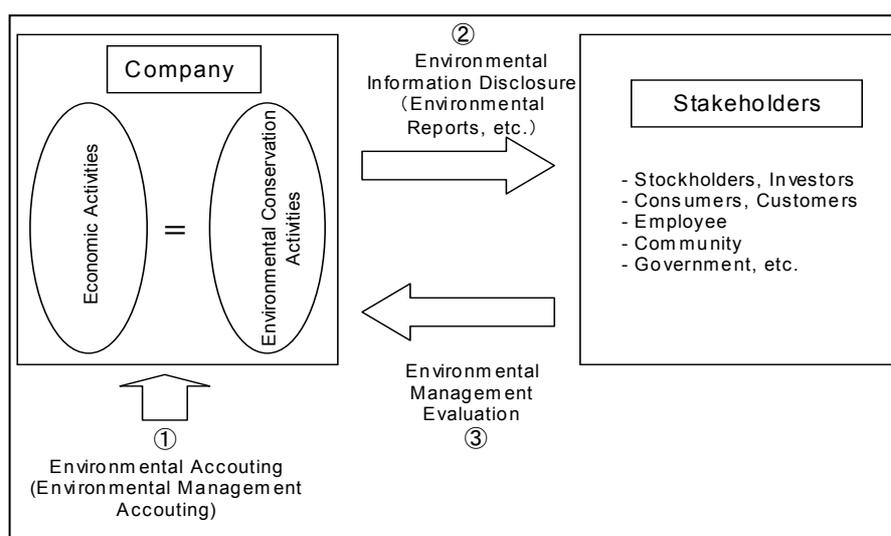


Figure 1. Research area of the BE Project and the interrelationships between research themes.

This cycle consists of three phases: first, a company should link its environmental conservation activities with its economic activities; second, the company should disclose information on its environmental conservation activities to the market and society; and third, the market and society should properly evaluate the eco-conscious activities of the company. The BE Project focuses on *environmental accounting* as a tool to link companies' environmental conservation activities with their economic activities, *environmental information disclosure* (for example, in the form of an environmental report) as a tool to provide environmental information to the market and society, and *environmental management evaluation* as a tool to evaluate the eco-consciousness of companies. The BP Project intends to contribute to the construction of a socio-economic system that promotes voluntary corporate activities for environmental conservation through practical studies of these three approaches.

Since the development of environmental management tools is an important issue for other Asian countries as well, we conducted investigations of the current circumstances of environmental management in the Asia-Pacific region through information collection and sharing.

Specific research objectives and methodologies as well as research findings in the Asia-Pacific region will be discussed below for each of the following four categories: environmental accounting, environmental information disclosure, environmental management evaluation, and environmental management.

1.1.2. Objectives and methodologies of research on environmental accounting

The objectives of the research on environmental accounting are to identify problems through detailed surveys of Japanese companies' environmental accounting practices and then propose what should be done to improve them.

Questionnaire surveys and analyses of environmental accounting information in Japanese companies' environmental reports were conducted to investigate the current state of environmental accounting practices. The surveys and analyses were intended to present a broad overview of Japanese environmental accounting practices and examine the influences of the Environmental Accounting Guidelines provided by Japan's Ministry of the Environment (MOE) in order to look into the effectiveness of the guidelines.

The surveys of the current state of Japanese companies' environmental accounting practices demonstrated that the development of environmental management accounting is an important issue. Therefore, research and development of environmental management accounting tools became the next theme to be addressed. From among various available environmental management accounting tools, the BE Project selected *material flow cost accounting* as the most useful method for business management. We conducted a test-introduction of material flow cost accounting in two Japanese companies with a view to enhancing the method's effectiveness.

Because environmental accounting progresses year by year, in the third year of the BE Project a large-scale questionnaire survey was carried out again on environmental accounting practices for the purpose of clarifying which direction to take in the future.

Considering that the primary objective of environmental accounting is contribution to business management, a study group consisting of researchers of the BE Project and business people was organised, and periodic meetings were held to report research findings and have discussions concerning concrete cases of corporate environmental accounting. We also carried out vigorous efforts to exchange information on environmental accounting methods with other Asian countries in order to strengthen cooperative relations with them.

1.1.3. Objectives and methodologies of research on environmental information disclosure

As in the case of research on environmental accounting, the objectives of research on environmental information disclosure were to identify problems through careful analysis of Japanese companies' practices and propose what

should be done for improvement. This research focused on environmental reports as instruments for environmental information disclosure.

For analyses of current Japanese business practices, we continued a content analysis of environmental reports for three years, interviewed environmental report compilers, and surveyed the needs of stakeholders. The research aimed to come up with policy proposals to encourage companies to publish environmental reports and also to clearly indicate which points should be improved in business practices.

In order to use environmental reports as a tool for environmental management evaluation, it is indispensable to assure comparability and credibility of the information disclosed in them. We decided to conduct separate studies on the two themes of *information comparability* and *information credibility*. For both themes, in-depth analyses were made from the viewpoint of actual environmental reporting practices with the goal of making recommendations for improvement in environmental reporting.

1.1.4. Objectives and methodologies of research on environmental management evaluation

Environmental management evaluation practices are not as popular as those of environmental accounting and environmental information disclosure. The research was designed to collect and analyse best practice samples and produce analysis findings to contribute to future business practices in environmental management evaluation.

One form of environmental management evaluation is external evaluation, or evaluation by the market or society. External evaluation should be reflected in internal evaluation. For this reason, research was done on two aspects: external evaluation and internal evaluation.

As for external environmental management evaluation, we explored what kind of evaluation criteria are used by domestic and overseas eco-funds and environmental rating organisations for their own analyses, and clarified their methodologies in a way to make the findings of the research useful in improving business practices.

In connection with internal environmental management evaluation, researchers interviewed companies that introduced a factor of environmental performance in their business evaluation systems in order to identify the best practices in environmental management evaluation.

There is strong demand that environmental management evaluation should be associated with environmental management indicators, whether external or internal. To meet this demand, it is important to assess environmental conservation effects in terms of monetary values. Regarding environmental management indicators, including eco-efficiency and monetary valuation of environmental conservation effects, best practice analyses used data that were included in environmental reports in order to propose better business practices in environmental management evaluation.

1.1.5. Objectives and methodologies of research on environmental management in the Asia-Pacific region

Environmental management in other Asian countries is a sub-theme of the BE Project. Basic research on the theme was made with the intent of checking to what extent the environmental management techniques of Japanese companies can be applied or be useful in other Asian countries.

In the first year of the project, surveys were conducted in nine countries (China, Taiwan, Korea, India, Indonesia, Malaysia, Thailand, the Philippines, and Vietnam) in order to get the whole picture of the reality of environmental management in these countries.

After the surveys, a study of the status of environmental management in four countries (Japan, Korea, the Philippines, and Indonesia), as well as a comparative study of two countries (Japan and Korea) and of three countries (Japan, China, and Korea), was carried out to distinguish the clear differences in business practices of environmental management between Japan and other Asian countries.

1.2. Review of achievements

1.2.1. Summary of research on environmental accounting

a. Analysis of the current status of environmental accounting information in environmental reports

First, research was carried out on the environmental accounting practices which Japanese companies were actually following. The research consisted of analysis of environmental accounting information disclosures in environmental reports and a questionnaire survey concerning environmental accounting practices.

External environmental accounting disclosures by the Japanese companies listed in the First Section of the Tokyo Stock Exchange were examined and analysed over three years. We requested the listed companies to send us their environmental reports in October of each year and then extracted environmental accounting information from the reports we received. As a result of our analysis, it was found that more than 80% of the companies publishing environmental reports disclosed environmental accounting information, suggesting that environmental accounting disclosures in environmental reporting are gradually spreading.

A detailed analysis of disclosed environmental accounting information was made to find how the companies categorised and measured their environmental conservation costs. The analysis results show that the influence of the MOE's Environmental Accounting Guidelines was very strong in terms of both categorisation and measurement methods (Reference [4]).

In terms of comparability of environmental accounting information, it is possible to compare numerical data among companies publishing environmental reports. But because they did not show the basis of calculation and there were significant differences in money amounts among even companies in one industrial field, we thought it difficult to properly compare the numerical data disclosed in the environmental reports. This problem is attributable to the fact that a standard calculation method for environmental accounting is not clearly defined. It is one of the main factors that seriously limits the external use of environmental accounting information and a major issue for the MOE's guidelines.

According to the MOE's guidelines, not only environmental conservation costs but also the benefits of environmental conservation activities and their economic benefits must be disclosed. The benefits of environmental conservation activities are measured quantitatively. In environmental accounting disclosures, the companies relied on not only the definitions of environmental conservation benefits given in the environmental accounting guidelines but also those in the environmental reporting guidelines and the environmental performance indicator guidelines. On the other hand, the economic benefits of environmental conservation activities are defined only in the environmental accounting guidelines.

The MOE's guidelines narrowly interpret the economic benefits of environmental conservation activities by limiting them to actual benefits such as energy cost savings and recycling revenues. Therefore, when the economic benefits versus environmental conservation costs are calculated in accordance with the MOE's guidelines, the calculated benefits appear small and do not adequately reflect the actual benefits of environmental conservation activities.

Despite this problem, some ambitious environmental accounting disclosures include both estimations of economic benefits and monetary valuation of the benefits of environmental conservation activities. In this respect,

best practice analysis was conducted to pursue future business practices of environmental accounting (Reference [1], Chapter 9).

b. Analysis of the actual status of Japanese companies' environmental accounting practices and problems

In order to illustrate the characteristics of Japanese companies' environmental accounting practices and shed light on their limitations, in October 2001 we carried out a questionnaire survey of 216 companies that had disclosed environmental accounting information in their environmental reports. This survey revealed various aspects of their environmental accounting practices. Especially, the following three findings brought about considerable influences on the subsequent stages of the BE Project (Reference [1] Chapter 8, [8] and [20]).

1. Regarding the objective of environmental accounting, the number of companies that placed priority on external disclosure (42.8%) was much larger than the number of companies that emphasised internal management (18.9%). Among the companies surveyed, 35.8% responded that they expected environmental accounting to be useful for both external disclosure and internal management.
2. Regarding the actual effects of environmental accounting, only 35.8% responded that it was useful for internal management. This implies that the effectiveness of environmental accounting for internal management is limited.
3. For the purpose of internal management, a majority of the companies surveyed used either an original form of publicised environmental accounting information (42.1%) or a modified form of publicised environmental accounting information (28.9%), while only 5.7% used environmental accounting information different from the publicised environmental accounting information.

It has been found that Japanese environmental accounting is mostly intended for external disclosure but is not effective for internal management.

The MOE expected their environmental accounting guidelines to be useful for both external disclosure and internal management. Nevertheless, it has become obvious that environmental accounting information intended for external disclosure has limitations in terms of effectiveness for internal management.

Considering that the MOE's guidelines are primarily designed for external disclosure, we thought that the limitations are unavoidable and that this problem can't be resolved by revising the guidelines. In external disclosure, comparability among companies is important, and it is thus necessary to standardise the method of measuring and calculating environmental conservation costs. On the other hand, environmental accounting for use in internal management should be designed depending on the purpose of decision-making.

As a consequence, we reached the conclusion that it is necessary to develop a new environmental accounting method (environmental management accounting) for internal management in order to overcome the above limitations. At present, there are various environmental management accounting tools; for example, the *Workbook of Environmental Management Accounting* (2002), published by Japan's Ministry of Economy, Trade and Industry (METI), describes six methods of environmental management accounting. Among these methods, we focused our research efforts on elaborating *material flow cost accounting*, which is thought to be the most effective for business management. The research is detailed below.

c. Research and development of environmental management accounting methods: test-introduction of material flow cost accounting

In material flow cost accounting, materials (flows of raw materials) are traced in terms of both physical units and monetary units, and the monetary value of material loss (waste) is accurately measured. While the value of waste was so far expressed only in physical units, in this method its value is also expressed in monetary units, permitting more rational selection of a waste reduction method.

Material flow cost accounting is based on an original concept developed by the IMU (Institut für Management und Umwelt). METI introduced the material flow cost accounting method into four Japanese companies on an experimental basis under an environmental management accounting project and demonstrated its effectiveness. Material flow cost accounting, however, is still in its growth stage and there is much to be improved. The proper way of introducing it into actual business management varies depending on the type of business or industrial field. Thus, it is important to carry out many case studies to get an accumulation of data on this method.

With the cooperation of the Nippon Paint Co., Ltd. and Shionogi & Co., Ltd., the BE Project experimentally introduced material flow cost accounting into these two companies (Reference [39]).

The Osaka factory of Nippon Paint paid special attention to energy loss in the experiment. In the context of material flow cost accounting, there are no prior case studies of capture of energy, even in Germany, and energy loss is a subject that attracts global attention. In the case of Nippon Paint, we developed a method of measuring the efficiency of utilisation of the electric power supplied to electrical equipment (this method uses power factor data). We also proposed a plan to improve the ways to reduce energy loss, which is one of the significant achievements of our research.

In the case of Shionogi, a pharmaceutical manufacturer, an attempt to estimate the emissions of carbon dioxide or other substances from chemical reactions in terms of monetary values was made. In the conventional approach of material flow cost accounting, it was impossible to get the result of chemical reactions between substances. In contrast, in Shionogi's case, we presented a solution to this problem. Furthermore, we were able to pave the way to improving their manufacturing process in a specific manner.

In February 2002, an international symposium on environmental accounting that focused on material flow cost accounting, titled "International Symposium on Environmental Accounting 2003: Cutting Edge of Environmental Accounting for Corporate Management and Environmental Conservation—Environmental Accounting in Japanese Corporate Management and Potentialities of Material Flow Cost Accounting," was successfully held with more than 200 participants (Reference [49]). Professor Bernd Wagner (University of Augsburg, Germany), who developed the material flow cost accounting method, was invited. At the symposium, we reported the findings of our research with a focus on the cases of Nippon Paint and Shionogi. When Professor Wagner visited the sites of the two companies, we confirmed the global importance of both case studies and had a discussion about the future of material flow cost accounting.

d. Analysis of future trends of environmental management accounting

We carried out a questionnaire survey about environmental accounting in general of the companies listed on the First Section of the Tokyo Stock Exchange in April 2003. In this survey we investigated how many companies had introduced environmental management accounting and conducted an analysis to identify which factors are important to increasing the effectiveness of environmental accounting for internal management (Reference [25]).

The survey result showed that the primary objective of environmental accounting for most companies was still external disclosure, but compared with the result of the survey of 2001, the recognition of environmental management accounting had increased and the effectiveness of environmental accounting for internal management had also improved.

As for factors that are relevant to the effectiveness of environmental accounting for internal management, we reached some statistically significant conclusions, as follows:

1. The stronger authority the environment department has, the more effective environmental accounting is for internal management.
2. The higher the in-house awareness of environmental accounting, the more effective environmental accounting is for internal management.

3. When a company adopts an environmental accounting system specially designed for internal management, environmental accounting is more effective for internal management.

Since environmental accounting requires the involvement of various departments, in order to introduce environmental accounting into a company, the authority of its environment department should be intensified and the awareness of environmental accounting within the company should be raised. These requirements are also important to increasing the effectiveness of environmental accounting for internal management.

The survey also demonstrated that the adoption of a special environmental accounting tool for internal management enhances its effectiveness for business management. Particularly, it has been proved that when the range of costs covered by environmental accounting is extended to all business costs, including material cost, then environmental accounting is more useful for business management. This implies the importance of material flow cost accounting.

The survey results also illustrated that the recognition and introduction of environmental management accounting are spreading. Specifically, it has become apparent that the introduction of environmentally conscious corporate performance evaluation is significantly correlated with improvement in environmental conservation effects in many aspects and is a contributory factor for the promotion of environmental conservation activities.

e. Constructing domestic and global networking on environmental accounting

We set up and managed the Study Group of Environmental Accounting for Corporate Management to provide opportunities to exchange information and views between environmental accounting researchers and business people. At each meeting of the study group, which focused on one topic at a time, a lecture was given on the latest theory related to the topic by a researcher, and a presentation was made by corporate staff carrying it out in actual practice, followed by a discussion among participating members of the group. This study group continued its activities for two years (first term: September 2001–July 2002; second term: September 2002–July 2003). Based on the outcome of its activities, a book entitled *The Front of Environmental Accounting* was compiled and published by The Energy Conservation Center, Japan, in March 2003 (Reference [1]).

In an effort to get a grip on the global trend of environmental accounting, the BE Project worked to establish the Environmental Management Accounting Network-Asia Pacific (EMAN-AP) under the umbrella of the Environmental Management Accounting Network (EMAN). This regional network intends to upgrade environmental management accounting methodologies and to promote the spread of environmental management accounting within the Asia-Pacific region. The members of this network, who are researchers specialised in environmental management accounting and company employees in charge of environmental management accounting, share information on the actual state of environmental management accounting through presentations of research findings and exchange of views. The BE Project thus helps develop cooperative relations between researchers and environmental accounting personnel in member countries (Reference [43]).

1.2.2. Summary of research on environmental information disclosure

a. Contents analysis of environmental reports

Since a main tool for corporate environmental information disclosure is the environmental report, it is imperative for an environmental report to provide sufficient and adequate information. The BE Project analysed the contents of environmental reports published by Japanese companies listed on the First Section of the Tokyo Stock Exchange for three years and explored the basic requirements for environmental reports to provide sufficient and adequate information (Reference [2] Chapter 2, [18]).

While the number of companies publishing environmental reports is increasing year by year (25% of the companies listed on the First Section of the Tokyo Stock Exchange published environmental reports in 2002), it

has become apparent that the percentage of companies publishing environmental reports varies depending on the industrial category. Thus it is obviously important to devise measures for promoting environmental information disclosure that are tailored to each industrial category. In terms of the items of disclosed information, the amount and quality of disclosed information were found to differ among environmental reports, even with regard to the items on which the MOE's Environmental Reporting Guidelines recommend information disclosure. For example, there were considerable discrepancies in disclosed information among industrial categories regarding such items as regulatory compliance, upstream environmental impact and reduction measures, and environmental impact related to transportation and reduction measures. Few companies disclosed information on cumulative soil contamination and similar environmental risks.

From the viewpoint of company size, it should be noted that in the manufacturing sector, the larger a company is, the more it discloses information on more items. Another point to note is that companies that had previously published environmental reports tend to provide information on more items in their reports than companies that published environmental reports for the first time. This fact tells that it is necessary to prepare guidance carefully designed for small-scale companies and companies inexperienced in environmental reporting.

Although various organisations conduct surveys of information disclosure in environmental reports, the analysis methods that they use are different, and there is some difficulty in using the findings of their surveys as objective evidence. The BE Project compiled a manual on a method of analysing environmental reports and successfully made an objective qualitative analysis of information in environmental reports in accordance with the method (Reference [2] Appendix).

b. Analysis of purposes of environmental reporting

A key factor that determines the purpose of environmental reporting is the intended audience of the environmental report. In Japan, no definite guideline has been given in this respect. Even in the MOE's Environmental Reporting Guidelines, all descriptions are given on the assumption that the readers are all kinds of stakeholders.

It is, however, beyond question that the type and content of environmental reports should be different, depending on whether the audience is either business people, such as investors and shareholders, or ordinary citizens such as end users. Arguments on environmental reports made so far have always concentrated just on whether reports should be either detailed or reader-friendly, without paying attention to this question of who the readers are.

In the BE Project, when the questionnaire survey of environmental accounting was conducted on the companies listed on the First Section of the Tokyo Stock Exchange in April 2003, we also investigated their purposes for publishing environmental reports. When asked which stakeholders were most important as readers of their environmental reports, 30% of the companies surveyed responded "shareholders and investors," 27% said "client companies," and 19% said "consumers" (Reference [2] Chapter 1).

It is possible that some shareholders or investors are non-professionals, while some consumers are professionals. Generally speaking, however, shareholders and investors who are recipients of environmental reports are very likely to be institutional investors or people who regularly attend general meetings of shareholders and read environmental reports with the same interest as asset securities reports. Client companies are supposed to be professional readers of environmental reports as the practice of green procurement continues to spread. By contrast, people that companies (publishers of environmental reports) consider as consumers are usually end users and not experts on environmental issues, though they include advisory specialists for consumers' affairs.

Therefore, it can be said that companies tend to design environmental reports primarily for business use by professional readers. Environmental reports intended for business use are different in nature from those for use by ordinary consumers. In the former type of environmental report, more emphasis is placed on disclosure

comprehensiveness or coverage and accuracy than on reader-friendliness. Needless to say, consumers are also important readers of environmental reports. Thus, it is a good idea to publish a simplified form of environmental reports for them.

In the BE Project, interviews were conducted with people in charge of publication of environmental reports of eleven companies in ten different industrial fields that are among the most environmentally conscious companies, in order to look into the actual practices which they followed in environmental report publication. From this, it has become clear that many people in charge of publication of environmental reports think it a challenge to improve the functionality of environmental reports as a communication tool (Reference [2] Chapter 5).

c. Research on comparability of environmental reports

In Japan, companies decide themselves whether or not to publish environmental reports. The MOE and METI have both published environmental reporting guidelines, but there are no standard methods of measuring various environmental performance indicators that are used in both guidelines. As in financial reports, information provided in environmental reports has to be comparable among companies so that environmental reports function socially as indicators showing the degree of eco-friendliness of business management.

The efforts to make public policies for the promotion of environmental reporting have been concentrated on increasing the number of companies that publish environmental reports. However, now that an increasing number of companies publish environmental reports, comparability of information is a looming issue.

In order to analyse the comparability of currently available environmental reports and develop measures to improve comparability, we selected a few companies from each of the three industries—automobiles (Toyota Motor, Nissan Motor, and Honda Motor), beer breweries (Kirin Brewery, Asahi Breweries, Sapporo Breweries, and Suntory) and chemicals (Sekisui Chemical, Asahi Chemical Industry, Mitsubishi Chemical, and Sumitomo Chemical)—and conducted a three-year trend survey (Reference [2] Chapter 5, [13], [14], [15], and [16]).

From the results of the survey, it was confirmed that many improvements were made in environmental reports published in these industries from 2000 to 2002 and that their comparability has increased. It was also found that the beer brewery industries progressed in comparability more than the other industries, indicating that the degree of improvement in comparability varies from one industry to another.

For the sake of enhanced comparability of environmental reports, their coverage must be clarified. In addition, if a company is engaged in different types of business, it should disclose not only performance data for the whole company but also performance data for each type of business and show the coverage by each department clearly. As an approach to increasing comparability in the manufacturing sector, it is recommended that manufacturers create flow charts showing inputs and outputs of their manufacturing processes and numerical measurement data of environmental impacts.

In addition to standardisation of measurement methods for environmental performance indicators, disclosure methods should be made uniform. However, the MOE's guidelines cannot cope with the need for standard measurement and calculation methods to provide detailed environmental performance information. It seems desirable that industrial associations take the initiative in developing standard methods that suit their different needs.

d. Research on credibility of environmental reports

Since publication of environmental reports is a voluntary corporate action, it is an important challenge to guarantee the credibility of information disclosed there. Credibility of disclosed information is an indispensable prerequisite for economic decision-making (investment and purchase), and this was examined based on an analysis of environmental reports published by companies and evaluation of their eco-consciousness.

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Under these circumstances, many companies have taken various measures to improve the credibility of their environmental reports. However, there are no guidelines or regulations pertaining to the credibility of environmental reports, and what kind of approach is effective in addressing this issue is not known yet. With this background, the BE Project collected and analysed all third-party opinions attached to the environmental reports published by the companies listed on the First Section of the Tokyo Stock Exchange from 1998 to 2003 (Reference [2] Chapter 4, and [6]).

The third-party opinions attached to environmental reports were classified by their nature into two types. The first is a third-party's statement that verifies the accuracy and consistency of disclosed information as a result of examination—like a statement of audit attached to a financial report (verification type). The second type is a statement included in the report that includes assessments or comments by people outside the company on its environmental conservation activities, as well as descriptions of the impressions which outsiders had during visits to their factory or store, or outsiders' remarks about the environmental report itself (remarks type).

In general, the first type is an opinion about the correctness of disclosed environmental information from an auditing firm (certified public accountant), which uses financial audit techniques. The second type is usually an evaluation or comment on the company's environmental performance from a non-profit organisation or academic expert. Auditing firms often offer remarks along with verifications.

Taking a look at the change over time, we found that third-party opinions of the verification type initially increased, then the pace of increase slowed down, and third-party opinions of the remarks type or of a combination type began to increase gradually. Probable reasons for this are that professional auditing of environmental reports is as costly as that for financial reports and that remarks from people outside companies are more reader-friendly.

Outsiders' remarks will be meaningful, however, only after the credibility of the disclosed information is guaranteed, which means that verification-type opinions and remarks-type opinions are not interchangeable with each other. Hence, clearly it is desirable that some kind of professional auditing be done on environmental reports, though it need not be as strict as in auditing of financial reports, and then outsiders' comments can be included.

e. Research on stakeholders' needs in environmental reports

One issue to be tackled for environmental reports is response to the information needs of readers.

We conducted a survey of three thousand citizens through the Internet in August 2003 to investigate the information needs of environmental report readers, and then classified their information needs according to the type of stakeholders (consumers, shareholders/investors, employees, researchers/students, etc.) (Reference [2] Chapter 6).

From the survey, it was found that the matters that all types of stakeholders are interested in are, first, products; second, business activities; and third, organisations/systems. Shareholders/investors and researchers/students are more concerned with business activities and organisations/systems than are consumers.

Readers of environmental reports in a specific industry showed special interest in a specific disclosure item; for example, readers in the construction industry have a special interest in waste reduction, and readers in the food industry are very concerned with chemical substances and product safety. For environmental reports published by electric appliance manufacturers, researchers and students are more interested in development of eco-friendly products than are consumers. In short, depending on the industry or the type of readers whom a company intends their environmental report to be read by, disclosure items should be emphasised differently. In social aspects, many readers had a special interest in safety and health protection related to products and services.

Many readers requested that one company's data be comparable with data from other companies in the same industry. In terms of the volume of information, many expected that information for disclosure should be carefully selected to make reports concise in content. There was a strong call for standardisation of report formats. As for attachment of third-party reviews as a means to enhance credibility, those who support verification by auditing firms for accuracy and correctness were on a par with those who are in favour of comments by academic experts, consumers, and/or non-profit organisations.

This outcome of the survey presented an outline of the needs of stakeholders in each industry and provided useful information for compilation of environmental reports that meet the needs of stakeholders.

1.2.3. Research on environmental management evaluation

a. Research on environmental management evaluation practices

Voluntary corporate activities for environmental conservation are most meaningful when they are properly evaluated by the market and society. Environmental information disclosed by companies has a social meaning only when stakeholders make good use of it; namely, when companies energetically work for environmental conservation and disclose their environmental information to the outside, and the market or society properly evaluates and supports their environmental management efforts, then a virtuous cycle which accelerates corporate environmental conservation activities will be established.

To that end, there should be a social mechanism that enables proper evaluation of environmental management. Today, in Japan, academic society and the mass media make assessments of the eco-consciousness of companies, and eco-funds select environmentally conscious companies, but no comparative studies of their evaluation methods have yet been made. With the expansion of the global financial market, not only assessments by domestic organisations but also ones by international organisations are becoming more and more influential on businesses.

In the BE Project, we collected and analysed domestic and overseas samples to see how Japanese companies are evaluated in various aspects, including the environmental aspect, and also to see what kind of considerations are necessary for a virtuous cycle of ecology and economy to be established, with the aim of looking at the situation from a broad perspective. For the collection of sample data, we accessed the Web sites of relevant organisations and companies and interviewed eco-funds and related organisations (Reference [30]).

Our research revealed several issues to be tackled in the future. Concerning corporate environmental evaluation tools, it is essential to develop indicators that integrate internal and external evaluation and for various countries to actively participate in formulating global guidelines. Regarding the evaluation implementing agency, the process for formulating evaluation criteria should be disclosed, and the feedback of evaluation results must be ensured. Socio-economic themes include further promotion of environmentally-conscious activities of the financial industry and fostering of the corporate evaluation industry, including environmental evaluation and non-profit organisation evaluation, which could lead to an appropriate balance between capital, product, and labor markets.

b. Research on the introduction of environmental accounting into corporate performance evaluation

Evaluation of the eco-consciousness of business management should be done both externally and internally. For internal evaluation of environmental management to be effective, it is necessary to introduce environmental performance indicators into corporate performance evaluation systems.

In Japan, the number of companies that introduced environmental performance indicators into divisional performance evaluation systems began to increase around 2000. In the BE Project, we collected and analysed

best practice samples in terms of the environmental consciousness corporate performance evaluation systems in Japanese companies.

In September 2001, we held a special session entitled “The Present Status and Problems of Environmental Management Evaluation” at the 2001 annual meeting of the Society for Environmental Economics and Policy Studies. Ricoh, Sony, The Industrial Bank of Japan, and Yasuda Research Institute made presentations, and participants had discussions to find common ground on methods of environmental consciousness evaluation and external evaluation (Reference [44]).

In 2003, based on the results of the questionnaire surveys on environmental accounting, interviews were conducted with several companies that had introduced an environmental consciousness corporate evaluation/eco-friendly performance assessment system to gain an understanding of the most advanced samples in this area (Reference [31]).

From this investigation, it was demonstrated that most of the environmental consciousness corporate performance evaluation methods used by the companies are limited to environmental performance indicators within the framework of divisional performance evaluation systems, and that they are very different from external evaluation methods designed to comprehensively analyse environmental management. There were some companies, however, trying to create indicators for comprehensive environmental management evaluation, suggesting the possibility in the future of integrating internal and external evaluation methods based on some common environmental management indicators.

There has been a strong demand for the creation of common environmental management indicators from both inside and outside companies, and we have realised again that this is a key research theme.

c. Research on monetary valuation of environmental conservation benefits and environmental management indicators

In a company’s decision-making processes, the cost-effectiveness of environmental conservation activities must be considered. But since the cost is expressed in terms of monetary units and the benefits in terms of physical units, it is difficult to compare them. As environmental valuation can be of help to monetary estimation of environmental impacts, we referred to available documents relating to environmental valuation to investigate the applicability of the methods to environmental accounting.

As a consequence of this investigation, there were few samples that seemed useful for environmental accounting and we recognised that the number of samples of environmental assessment should be increased. Therefore, we shifted our focus to analysis of samples of monetary valuations described in environmental reports and selection of best practice samples concerning eco-efficiency indicators.

As an effort in this direction, analysis was made of environmental reports published by the 328 companies listed on the First Section of the Tokyo Stock Exchange in 2002 (Reference [32]). As a result, it was found that among the companies disclosing environmental accounting information, 49 disclosed non-financial effects expressed in monetary units, including contribution of profits, monetary valuation of environmental impact, economic benefits for users, and risk aversion. Many manufacturers of electric appliances showed monetary valuation of environmental impacts, in most cases, carbon dioxide emissions.

Concerning eco-efficiency indicators, it was also found that some companies calculated indicators for evaluation, but they all used ratios for the calculation, and it was difficult to interpret numerical data obtained from the calculation. It has thus become obvious that both relative numerical data and some absolute numerical data are needed for use as indicators for environmental management evaluation.

1.2.4. Outline of research on environmental management in the Asia-Pacific region

a. Basic research on the current state of environmental information disclosure in the Asia-Pacific region

Surveys were conducted in nine countries (China, Taiwan, Korea, India, Indonesia, Malaysia, Thailand, the Philippines, and Vietnam) in order to investigate the current status of environmental accounting and regulations/guidelines for publishing environmental reports. In addition, information sources such as the Web sites of related organisations in respective countries were examined.

The survey was conducted by best utilising the group network of PricewaterhouseCoopers. Interviews with related organisations were successfully done and the necessary information was collected by telephone interview, publication review, and the Internet.

The research revealed the latest situation in Asian countries, including the fact that environmental reporting guidelines were released in May 2002 in Korea and that increasing attention is being paid to publishing environmental reporting guidelines in Taiwan. The study also observed growing concern in China about environmental accounting at the corporate level in addition to environmental accounting at the macro level (Green GDP).

b. Current circumstances and issues of corporate environmental/social activities of Asian companies: comparative study of Korea, the Philippines, and Indonesia

The primary goal of this research was to obtain accurate data and understanding of corporate environmental/social activities practiced by Asian companies. Three countries—Korea, the Philippines, and Indonesia—were selected as research targets for having similar scales of economy and because the BE Project had collaborating researchers in these countries.

As for methodologies, a questionnaire was sent to all the listed companies of the respective countries in October 2002, and then a comparative analysis was conducted between the three countries after rounding up the collected responses in January 2003. In an effort to optimise the comparison with Japan, the questionnaire was scrutinised based on the Environmentally Sound Corporate Activity Survey, which is conducted every year by Japan's Ministry of the Environment (MOE). Some other questions were added in an attempt to cover multinational business relationships and corporate social activities.

The answers were collected from 98 Korean companies (15% of response rate), 15 Philippine companies (6.1% of response rate), and 16 Indonesian companies (5.4% of response rate). The lower response rates of the Philippines and Indonesia suggests that the majority of corporations in these countries still perceive environmental information as confidential and thus are unwilling to disclose such information, but some corporations of these countries that did respond disclosed their pioneering efforts related to environmental and social activities (Reference [3]).

c. Comparative study of Japanese and Korean corporate environmental management

Of the above-mentioned results of the questionnaire survey of Korea, the Philippines, and Indonesia, the data from Korea was selected for comparison to Japanese data collected from an MOE survey on environmentally sound corporate activities. This study was conducted in collaboration with a Korean researcher.

Economic relations between Japan and Korea have been rapidly strengthened in recent years in an effort to conclude a free trade agreement (FTA). Under these circumstances, there is an emerging need of deepening understanding of the corporate environmental protection activities of other countries, and then strive to create best corporate practices by sharing the good practices of each nation. To this end, this research was targeted at identifying the differences and similarities between Japanese and Korean corporate environmental protection

activities in terms of actual practice and institutional framework. In spite of some similarities between the two, there seems to be considerable difference with regard to environmental policies and corporate management stance, as symbolised by the different keywords used. While Japanese companies often used the keyword *sustainability management*, companies in Korea used the keyword *environmental industry*.

For this reason, first of all, basic information on the environmental policy of each national government was collected and organised, including (1) the history of environmental administration, (2) the framework for environmental administration, and (3) the basic structure of environmental policies. After making a comparative analysis of the industrial trend in each country, careful analysis was made based on the survey results regarding corporate activities such as environmental policy, environmental management (e.g., environmental information disclosure and environmental accounting), environmental performance, business-to-business relationships, and relations with NGOs/the community (Reference [27] and [28]).

The study revealed that while more Korean companies perceived environment as “regulation,” more Japanese companies set environmental policies with concrete targets and are engaged in environmental industries. This may indicate that while Japanese companies have a view of more advanced environmental activities beyond pollution control, Korean companies are still in the process of industrialising antipollution measures. Also, the study shows the tendency of Korean companies to attach more importance to their relationship with the community and to disclose corporate information to particular parties. The research also discovered that many Japanese companies, which characteristically have corporate groups, provide some sort of guidance to affiliated companies regarding environment-conscious action in business activities. On the contrary, in Korea, this practice is not widely exercised, owing to the predominant *chaebol* business structure (family-owned business enterprises).

d. Comparative study on corporate sustainability management between China, Korea, and Japan

A comparative analysis of environmentally-conscious activities was made based on a questionnaire survey conducted from November through December 2003 in collaboration with researchers in China and Korea, with the intention of conducting comparative data analysis between China and Japan/Korea while comparing present Korean data to that of past years.

The questionnaire survey was sent to all the listed companies on the Shanghai and Shenzhen stock exchanges in China and the Seoul stock exchange in Korea. The questions asked in the survey were based on the Environmentally Sound Corporate Activity Survey, conducted by Japan’s Ministry of the Environment (MOE), in an effort to facilitate the comparison with the Japanese case.

Research findings will be delivered in both English and Japanese in the form of a data report. (We are presently in the process of collecting responses.)

1.3. Degree of attainment of the objectives

1.3.1. Final results of the research on environmental accounting

The objectives of the BE Project’s research on environmental accounting were to identify problems through detailed surveys of the environmental accounting practices of companies in Japan and to propose what should be done to improve their practices.

The BE Project’s analysis of corporate environmental reports and the results of two questionnaire surveys revealed that Japanese environmental accounting practices are biased towards external reporting, leaving a significant issue to be tackled with regard to internal management. It also clarified the direction of prospective revisions of the Environmental Accounting Guidelines issued by the Ministry of the Environment.

In addition, we conducted a test-introduction of material flow cost accounting into two Japanese companies with the aim of improving the effectiveness of environmental accounting for internal management, which has drawn global attention in terms of the development of a new tool for environmental management accounting.

All of these outcomes helped substantially to achieve our initial goals, particularly that of material flow cost accounting, which was remarkably effective beyond our expectations.

Still, there are some challenges left for future study, including developing other potential tools for environmental management accounting besides material flow cost accounting and conducting a feasibility study on the integration of corporate financial accounting and environmental accounting.

1.3.2. Final results of the research on environmental information disclosure

As in the case of research on environmental accounting, the objectives of our research on environmental accounting were to identify problems through careful analysis of Japanese companies' environmental information disclosure practices and propose what should be done for improvement.

The BE Project successfully came up with policy proposals for improving the business practice of publishing environmental reports, as a result of a three-year content analysis of environmental reports published by listed companies on the First Section of the Tokyo Stock Exchange. We were also able to present concrete ways to assure the comparability and credibility of environmental reports. All of these research outcomes fully achieved our initial objectives.

Furthermore, as a result of the survey on the needs of stakeholders, which is a rather new research area, we were successful in detailing a concrete direction for environmental reporting to move that meets the needs of information users.

Still, there are some issues left for future study, including developing other potential tools for environmental information disclosure, besides environmental reporting, and deeper examination of sustainability reports, which contain corporate social activities and have become more common to corporations.

1.3.3. Final results of the research on environmental management evaluation

As for our research on environmental management evaluation, we sufficiently accomplished our initial target, which was to clarify the latest trend of environmental management practices at Japanese corporations by performing a best practice analysis. The results obtained from this analysis will be of great significance for corporations to improve their environmental management evaluation.

The research was also successful in holding productive discussions with business people and in discovering prospective directions in the relationship between internal and external evaluation of environmental management systems.

Still, there are several issues to be tackled in future research. For instance, environmental management evaluation methods and environmental management indicators should be set in more concrete terms; we believe this requires present business practices to grow in maturity rather than simply being a matter of research methodologies.

1.3.4. Final results of the research on environmental management in the Asia-Pacific region

Research on environmental management in the Asia-Pacific region was conducted as a complementary research theme of the BE Project for the purpose of obtaining some basic information. The research results partly revealed

the present situation of environmental management in other Asian countries, very few of which have been unveiled through research so far, and to this extent we obtained the desired results.

Comparative study between Japan and other Asian countries was especially noteworthy, revealing Japan as the leading nation in Asia in every aspect of environmental management. These research results provide basic information and will be of great significance in examining possible contributions to other Asia countries.

Yet it still remains as a future issue to propose concrete measures regarding the application of Japanese companies' environmental management techniques to companies in other countries of Asia.

2. Self-evaluation

2.1. Evaluation of achievements

As the final results of respective research themes were discussed in the previous section, overall performance evaluation is to be made here from the viewpoint of the whole project.

The objectives of the BE Project were to develop practical tools for the promotion of voluntary corporate activities for environmental conservation and to propose future directions for such activities. To this end, the BE Project conducted research in three main fields—environmental accounting, environmental information disclosure, and environmental management evaluation—and it was able to achieve concrete results in each research field, including the development of practical tools in an effort to encourage corporate environmental management. With regard to environmental accounting and environmental information disclosure, we were particularly successful in publishing two books, mainly for business people—a fact that holds great significance in terms of research dissemination.

As for environmental accounting, the most notable achievement was our substantial contribution to the development of environmental management accounting with a central focus on material flow cost accounting. Also, the research result wiped out the preconceived idea in Japanese corporations that environmental accounting is a tool used only for external disclosure. For corporations that want to promote their environmental conservation activities, such activities must lead to profit the company in some way, and material flow cost accounting is a very effective tool in this regard. Concerning environmental management accounting, the research results contributed to changing the biased impression in Japanese corporations that environmental conservation activities are just money consuming. Armed with our concrete research findings, it has been proven that environmental management accounting is an effective tool for initiating environmental conservation activities in corporations.

As far as environmental information disclosure is concerned, our research achieved substantial results in terms of both the dissemination of environmental reports as a policy issue and assuring the comparability and credibility of environmental reports as a practical matter. This holds great significance in terms of both increasing the volume and improving the quality of environmental reports. Unlike past discussion on environmental reports, which used to be mostly biased toward an objective normative idea without any grounds, the research findings of this project were quite effective in making concrete proposals based on empirical evidence. The BE Project made its most remarkable contribution in indicating future development and improvement of environmental reports for the purpose of improving business practices.

Concerning environmental management evaluation, the research didn't go far enough in developing a concrete evaluation method, but the project successfully clarified the latest trend of practices in Japanese corporations by performing collective analysis of best practices. This will provide an effective guideline for companies to improve their environmental management evaluations. The research also revealed that environmental

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management evaluation is able to serve as an interface between the internal and external evaluation of environmental management systems, which is a significant finding in forming an environmentally-sound economic system in the future.

In this way, the BE Project has accomplished substantial research results in terms of developing practical tools for environmental corporate management. The project not only came up with individual tools but also demonstrated the role of the respective tools played in business practices and society—the most significant point of which lies in the analysis of the interrelation between these factors. In this regard, the BE Project deserves high credit for elaborating various tools for environmental corporate management and for achieving concrete results by performing research activities effectively, with the aim of forming a loop between the three research areas of environmental accounting, environmental information disclosure, and environmental management evaluation.

Still, since encouraging voluntary corporate activities for environmental conservation involves a wide range of issues, there are some others still to be tackled in the future. Similarly, many other environmental management tools need to be studied besides those we covered in this phase. The research achievements would have been even greater if more tools were studied, since the scheme of the BE Project was designed to be able to incorporate additional tools.

As well, some research areas, such as environmental evaluation, did not go far enough in coming up with concrete tools, since many aspects of environmental management are still in the process of being developed in practical terms. Due to our limited financial resources and research personnel, we were compelled to give up trying to develop concrete methods for such research areas as a main target. This is one of the issues to be tackled in the next phase.

2.2. Evaluation of project management

The BE Project was conducted over three years by three full-time researchers and eight visiting researchers from related companies and audit corporations of the Kansai Research Center. In addition, the project actively cultivated personnel exchanges with foreign research institutions and accepted two visiting researchers, namely, Mr. Jan-Dirk Seiler-Hausmann, of the Wuppertal Institute for Climate, Environment and Energy (Germany), for three months in FY2001 (December 2001–February 2002), and Dr. Mark Stoughton from the Tellus Institute (USA), for six months in FY2003 (October 2003–April 2004). Also, Mr. Yasuhiro Kanda, a research fellow from the Kansai Research Center, was sent to the Wuppertal Institute for three months in FY2002 (October 2002–December 2002). Furthermore, the project accepted two foreign interns: a German graduate student from Universiteit Maastricht (Netherlands) and a Chinese graduate student from Kyoto University.

In terms of the BE Project's research framework, the three full-time researchers were responsible for the three respective research themes, while the visiting researchers supported each full-time researcher. The research was performed in the most efficient order: first, by investigating current status, identifying the problem, and then making proposals for improvement. As a result, the project was able to achieve far more successful results than its initial goals, owing to the dedication and endeavors of each researcher. The main target of the project was to develop practical tools for environmental corporate management. It should be noted that the visiting researchers, participating companies, and auditing firms all played extremely important roles, especially considering that the close relationships with corporations were indispensable in attaining this goal.

Meanwhile, there are still some future issues left concerning the administration of the project. For one, while it is quite understandable that all research activities should be conducted within the allocated financial resources, future funding needs to be considered in order to conduct research on improving business practices. In addition, during this phase, study meetings on environmental accounting were held on a regular basis with the participation of business people, and such efforts should be systematically encouraged in future research efforts.

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Concerning the personnel exchanges with foreign research institutions and accepting interns from domestic and foreign universities, this proved quite effective not only in the research activities of the project but also in obtaining international insights and trends and expanding our international network. In some cases, however, it took considerable effort in making preparations and providing guidance and support during this period; a more effective system needs to be established to avoid such unnecessary efforts.

With regard to the dissemination of research results, they have been published in various forms such as academic papers, reports, academic journals, and the BE Project's own discussion papers. Most notably, two books were published on business practices. In addition to the publications, an international workshop titled "Business and the Environment" was held in FY2001, and an international symposium, "Business and the Environment," was held in FY2002 and FY2003. Other academic events such as symposiums, workshops, and study meetings were held on a regular basis for business people, related organisations, and the general public. With the participation of foreign and domestic experts and business people, the latest trends and future issues were actively discussed. All of these events were highly appreciated. Furthermore, the project organised the 2nd Tripartite Roundtable on Environmental Industries (China, Korea, and Japan) in FY2002 as a commission from Japan's Ministry of the Environment. Through this effort, we were able to contribute to formulating environmental policy by utilising our research achievements.

3. Conclusion

As stated in the summary, in order for corporations to promote voluntary activities for environmental conservation, it is indispensable that a mechanism that facilitates corporate environmental initiatives is formulated. In addition, the market and society need to provide proper evaluation and support to those companies engaged in environmental conservation activities. Then the proper evaluation given to these companies should likewise encourage further corporate environmental conservation activities—creating a virtuous cycle.

The research findings explored in this project in environmental accounting, environmental information disclosure, and environmental management evaluation are key measures for realising this goal. In order to further develop these tools, technological advance will be a prerequisite; however, the understanding and active involvement of top management for introducing and improving these environmental management tools is also an essential factor. According to our research results on environmental accounting, the more actively top management are involved in environmental accounting, the more effective results the company gets.

The development of environmental corporate management techniques has only a short history, and for the most part is still in the early stages of progress. It may turn out, however, to be not overly useful for improving business practices if only methodologies are highly elaborated. Environmental corporate management never improves without the active involvement of the whole company, including top management, and close relationships with stakeholders. Attaching great importance to these points, the BE Project has proposed a prospective direction for the improvement of environmental management tools. It is our sincere hope that our research achievements will be utilised and of assistance to as many relevant people and organisations as possible.

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