H-5 Studies on Environmental Accounting and Environmental Policy Measures Leading to Technological and Managerial Innovation

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1. Introduction

For business corporations in Japan, activities that respond to environmental requirements and environmentally related reputational and competitive issues are a necessary part of business as usual. Environmental activities have been expanding over time as regulatory and policy requirements have increased, and this trend promises to continue. Given the prospect of stricter policy regimes in the future—including stronger policies to limit greenhouse gas emissions—some revolutionary changes in business activities are needed.

Traditionally, environmental economics has held that compliance with environmental regulations and actions to improve environmental performance inevitably increases private sector costs. Thus, economic- and information-based policy measures rather than direct regulations have been preferred as more cost-effective, resulting in both static and dynamic efficiency benefits.

This traditional view was challenged and debate stirred, however, when Professor Michael Porter of Harvard University argued in 1990 and 1991 that environmental requirements enhance the international competitiveness of businesses. The assertion by Porter and van der Linde (1995), stating that environmental requirements drive technological innovation and improves corporate profits, further intensified the controversy.

To the existing debates as to whether or not environmental requirements drive technological innovation, and whether economic and information-based policy measures are more of a motivational force behind technological innovation than direct regulation,

has been added the question of whether environmental policy improves, rather than damages, business profits by stimulating "innovation offsets" —that is, situations in which the beneficial effects of innovation-offsets increased costs of compliance.

This latter debate continues to be discussed both theoretically and empirically today. It is important to identify combinations of policy instruments, industrial sectors, and underlying factors are more conducive to make environmental policy and technological innovation mutually supportive to realize sustainable development.

In recent years, combining managerial and policy innovations with technological innovation has been increasingly recognized as critical to encouraging and improving the effectiveness of business responses to environmental problems. In particular, in order to realize technological and managerial innovation via information-sharing with numerous corporate stakeholders, environmental management tools such as systems of external environmental accounting and environmental management accounting must be improved and more widely adopted and integrated. Also, environmental policy measures that can better promote such kind of corporate innovation must be developed.

Against this background, our research has covered the following areas:

Sub-theme 1: Environmental accounting as a means of promoting environmental innovation

a) Assessment of environmental management accounting as a tool for promoting environmental innovation
b) Assessment of the effects of external environmental accounting on environmental innovation

Sub-theme 2: Environmental policy measures and environmental innovation

a) Case studies on environmental innovation
b) Categorization of environmental innovations
c) Identification of enabling environmental policy measures

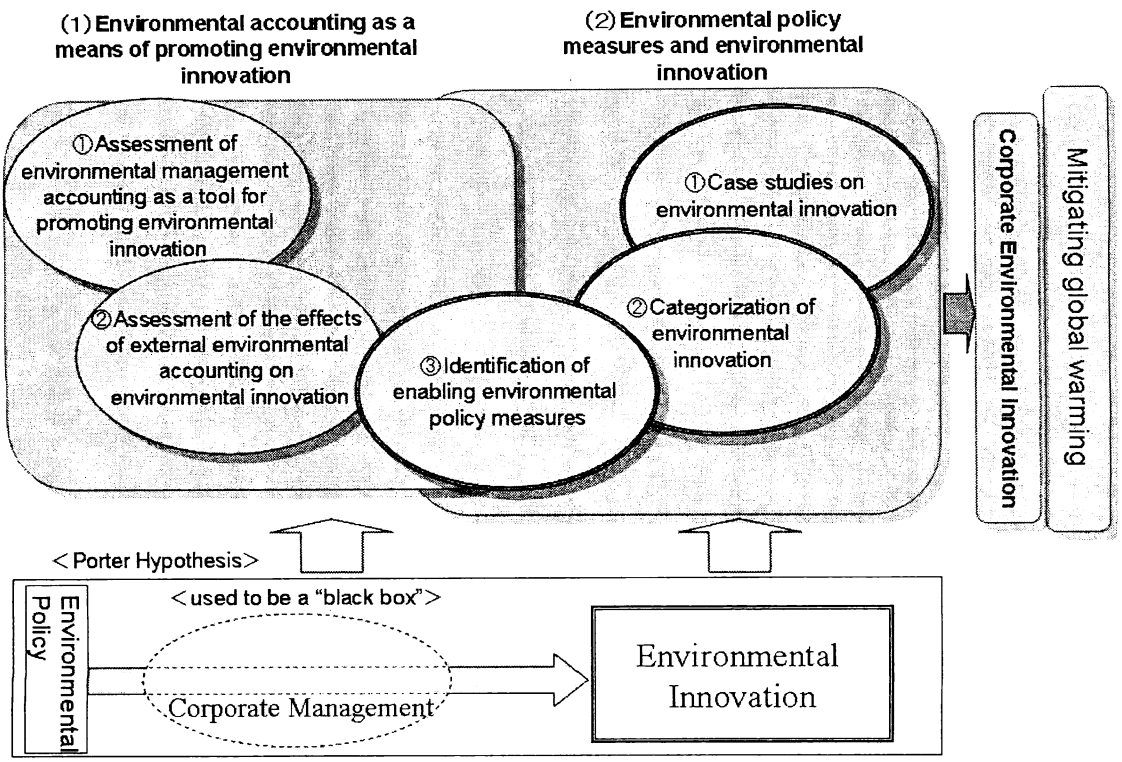

Figure-1: Relationships between research themes

2. Research Objective

In this research we view "environmental innovation" broadly. Specifically, environmental innovation includes both "technological and managerial innovations" which help businesses improve their environmental performance and "policy innovations" by governments. With the cooperation of researchers who specialize in fields such as "corporate management decision-making" and "creation and development of environmental industries," we undertook a collaborative research effort, closely coordinating research under the two sub-themes in order to better understand the requirements for environmental policies that promote managerial and technological innovations as well as to remove barriers to the adoption of these innovations.

From a survey of theoretical and empirical literature on environmental policy and environmental innovation (especially on Porter Hypothesis and Porter-Linde Assertion), three approaches were identified from which to assess the positive and negative impacts that environmental policies may have on environmental innovation. The first was studies of the internal decision-making processes for response to environmental requirements and of external environmental accounting in relation to the disclosure of environmental information by businesses. The second was an interview study concerning the categorization of environmental innovations and the implication of environmental policies. The third was statistical analyses of the financial performance and

environmental performance of Japanese listed companies that shed light on the role of recent environmental policies attempting to materialize the virtuous circle of economy and the environment.

Through these analyses, environmental policies were examined to gain ideas about possible avenues that would contribute to environmental innovations and specifically integrated technological and managerial innovations for mitigating adverse effects of climate change.

3. Research Findings

(1) Sub-theme 1: Environmental accounting as a means of promoting environmental innovation

- Assessment of Environmental accounting as a tool for promoting environmental innovation
  - Environmental management accounting promotes process/product innovation.
  - External environmental accounting promotes environmental management assessment.- Material cost flow accounting (MFCA) was proven effective in promoting environmental innovation in manufacturing processes.- Environmental target costing was proven effective as a means for promoting environmental innovation.
- Economic evaluation of environmental benefits made possible by the development of external environmental accounting
  - While standardization is progressing under the influence of Ministry of the Environment (MoE) guidelines, companies are evolving also on their own efforts.
  - Environmental conservation benefit are assessed by their monetary value, therefore this approach is expected to develop as a general method for evaluating environmental management.
  - There is the possibility of future expansion into sustainability accounting.

(2) Sub-theme 2: Environmental policy measures and environmental innovation

a) Case studies on environmental innovation

- CSR and SRI
  - Companies recognize that dealing with global environmental problems from the perspective of corporate social responsibility (CSR) and social responsibility investment (SRI) is an important issue.
  - For companies, environmental efforts are a must. The age is coming that they must raise environmental targets and take action to meet them.
  - Leadership from top management is essential in many cases. The top-down approach to environmental innovation is effective.
- Business to Business (BtoB) vs Business to Consumer (BtoC) markets
  - There is a difference in how environmental activities are undertaken between

businesses that mainly deal with other businesses (BtoB) and businesses that mainly deal with consumers (BtoC).

- Regarding BtoC relationships, the closer the company is to their customers, the more eco-friendly corporate activities they tend to perform as part of the CSR activities. This often leads to good corporate performance. However, BtoB activities have less of similar benefits so that larger incentives from policy measures will be required in view of the importance of these activities.
- As seen in the construction industry, there are cases where the incentive to conduct eco-friendly business activities is low because the customers are not directly connected to those involved in design, construction and management.

b) Categorization of environmental innovation

➢ Environmental innovation

- The case studies of Japanese companies observed some environmental innovations that have lead to innovation-offset mentioned above.
- Regarding environmental policy, it is necessary to foster environmental innovations that contribute to environmental conservation while bringing benefit to companies.

➢ Improvement of international competitiveness

- Environmental innovation helps to improve the competitiveness of a company in terms of product differentiation and cost leadership.
- Environmental policy provides an opportunity for environmental innovation to be created and, in some cases, help companies become more competitive.

➢ Servicizing as an innovation model that contributes to environmental conservation and improves corporate competitiveness

- Servicizing is a business model change of "not selling goods, but selling services and providing functions" and it includes "supply chain innovation."
- This concept has drawn increasing attention in Japan and the national government has provided support in implementing model cases.

➢ Supply chain innovation

- SRC (Sagawa Ryutsu Center) Plan by Sagawa Express Co., Ltd.
  This business model focuses on improving "services provided to customers".

➢ Eco-supply systems

- An eco-supply system, which shows environmental considerations while maintaining the services provided to customers, contributes to environment conservation as well as improvement of corporate competitiveness.

c) Empirical study of Japanese corporations

➢ Corporate environmental and financial performances and the effect of informational instruments of environmental policy

- Five consecutive years of data on 278 companies was analyzed by multiple linear

regression analysis and statistical cause-and-effect analysis. It revealed that the relationship of corporate environmental performance (CEP) and financial performance (CFP) often agrees with the Porter Hypothesis.

- Significant environmental policies introduced and promoted in Japan since 2000 that reinforced the aforementioned relationship were studied and differences in response to these policies were observed between industrial groups.

4. Expected contribution to global environmental policies

This study is expected to produce the following suggestions on global environmental policies.

- Preparation and announcement of MoE environmental management accounting guidelines (material flow cost accounting and environmental target costing) and introductions of best practices
- Preparation and announcement of MoE external environmental accounting guidelines and sustainability accounting guidelines, and introductions of best practices
- Introductions of best practices of eco-supply chain building in relation to energy (ESCO), hazardous chemical substances (CMS), waste, etc., and announcement of guidelines
- Effectiveness of both regulatory and informative approaches to environmental policy

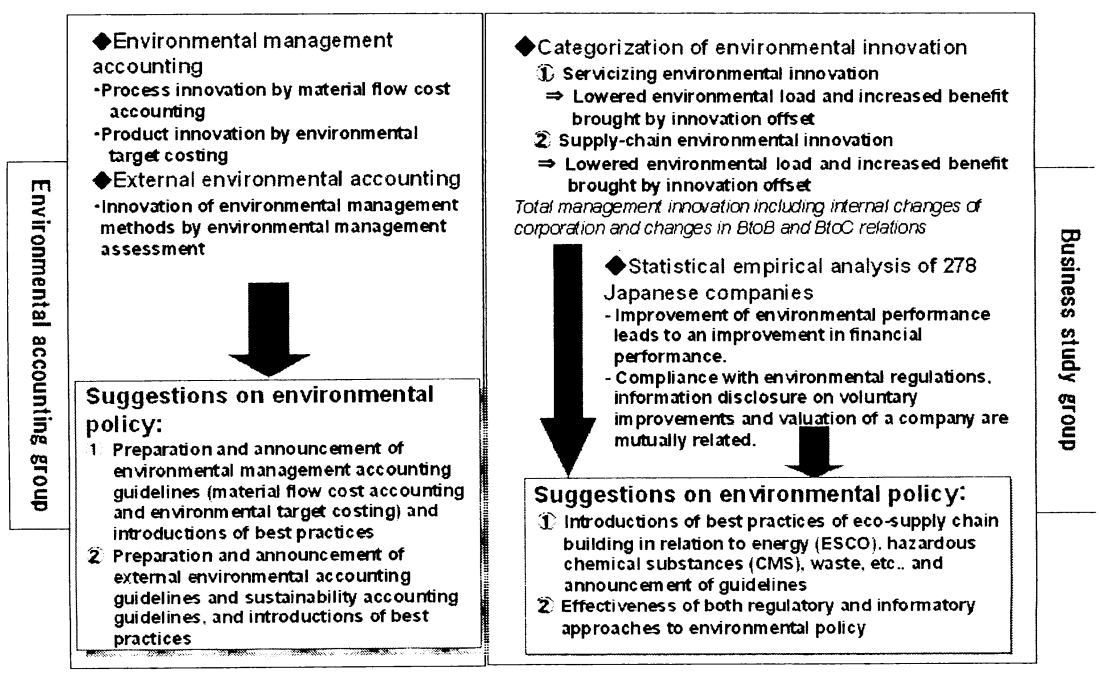

Figure-2: Research findings and expected contribution to environmental policies

5. Major outputs

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