The Link between Sustainable Supply Chain Management and Competitive Advantage

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***Abstract*—The purpose of this study is to clarify the relationship between Sustainable Supply Chain Management (SSCM) and firms' competitive advantage, and to propose one of the Creating Shared Value (CSV) models which Porter and Kramer advocate for firms to achieve sustainable competitive advantage. In this study, firstly, the concept of CSV is defined based on the previous research, then one CSV model is proposed, and, finally, the model is assessed through quantitative analysis of survey data from a sample of manufacturers. The survey data verifies 3 of the proposed model's hypotheses: 1. Positive correlation between SSCM activities and organization management capability / inter-organization management capability; 2. Positive correlation between organization management capability / inter-organization management capability and competitive advantage, especially dynamic capability. 3. Positive correlation between dynamic capability and economical value (customer recognition, cost reduction in total supply chain and sustainable competitive advantage, etc.).**

***Index Terms*—Competitive advantage, CSV, sustainable supply chain management.**

I. Introduction

The purpose of this study is to clarify the relation between Sustainable Supply Chain Management and firms' competitive advantage, and to propose a model for firms to achieve the sustainable competitive advantage. It has been maintained that social issues should be solved by the government or Nonprofit Organizations (NPOs). However, as contemporary environmental and social problems become more serious, the impact of corporate activities on society has become immeasurable, and its role and responsibility are expanding day by day. In addition, the scope and complexity of a company's activities have also increased, and it is also the case that issues that can be solved within one company alone are becoming limited. It is also generally considered that firms' efforts on environmental issues are predominantly behind schedule. [1]

Under these circumstances, firms are beginning to actively participate in Corporate Social Responsibility (CSR) activities, but as a result of working on volunteer activities that are not related to the main business at all, we often see these activities are easily suspended as soon as corporate performance is weak. Porter and Kramer [2] state that firms should implement strategic CSR in line with their strategy, not passive CSR as atonement or insurance. Furthermore, they develop this idea and advocate the idea of Creating Shared Value (CSV). The idea of CSV is intended to expand economic value and social value to society as a whole, based on the premise that the market is defined not only by conventional economic needs but also by social needs. [3] After a considerable time, more and more firms have begun to engage in CSV in recent years. Within academia, however, there is almost no empirical research on the impact on economic value of activities that create positive value for society and the environment, nor on how to improve economic value through these activities. [4] It is considered that there is a significant need for further research to unravel the relation between the three parties (society, environment and economy) and its mechanism.

In this research, we clarify the concept of CSV and how a firm can acquire its competitive advantage and economic value through CSR activities based on the existing strategic management theory, and we propose one model from the supply chain management point of view. Finally, data from a questionnaire survey is used to analyze the correlation between each of these concepts.

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II. Literature Review

A. Creating Shared Value (CSV)

ISO26000 defines CSR as "A company's sense of responsibility towards the community and environment (both ecological and social) in which it operates. Companies express this citizenship through their waste and pollution reduction processes, by contributing educational and social programs and by earning adequate returns on the employed resources," and presents seven core concepts: organizational governance, human rights, labor practices, the environment, fair business practices, consumer issues, community involvement and development. Today many firms have been fulfilling a CSR remit; however, this is sometimes achieved through non-continuous voluntary activities or activities which are really independent from the firm's main business. As Porter and Kramer [2] point out, most of firms passively conduct CSR as insurance. Porter and Kramer [3] propose a vision of CSV in which firms strategically improve social problems while increasing their own economic value. They define CSV as "Policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates". As the key steps towards CSV, they propose: "1. Reconceiving Products and Markets (such as Bottom of Pyramid business), 2. Redefining Productivity in the Value Chain, 3. Enabling Local Cluster Development." They say that as both direct and indirect economic effects of CSV, a

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firm to make gains in a range of areas: the development of new markets and the improvement of customer loyalty through new product development, the improvement of employee productivity, the improvement of energy efficiency, the improvement of productivity, the reduction of logistics costs, and the competitive advantage improvement. Similar research has been developed in the field of Supply Chain Management (SCM); Carter and Rogers [5] advocate a framework of Sustainable Supply Chain Management (SSCM). They outline a trio of bottom lines (economic value, social value, environment Value) and state that sustainability is achieved only when these three lines are balanced. They define SSCM as a means of solving environmental and social problems through SCM while simultaneously improving competitive advantage.

As an empirical study, a meta-analysis by Margolis *et al.* [6] proves that there are some positive correlations between the activities generating social value and the activities creating economic value. Likewise, in research on firms' relationship with stakeholders through CSR, Kotler *et al.* [7] propose "Social Marketing"; Tanimoto *et al.* [8] examine how firms' CSR activities are able to motivate and improve consumers' or investors' awareness and behavior regarding social and environmental problems. Miyazaki [9] demonstrates the effect of SSCM on the economic value (revenue) in firms. David Wittstruck and Frank Teuteberg [10] find positive impacts from SSCM, such as improving mutual learning among organizations and reducing resource consumption.

B. Criticism of CSV

While there are positive studies about the effects of CSV, there are also studies that show negative effects of CSV and SSCM models. By quantitative analysis Arimura and Sugino [11] find that while environmental regulations increase expenditure on environment-related research and development, they also create the possibility that other research and development is sacrificed which would have had the potential to lead to more productive activities. In terms of the change of consumers' consciousness, there are some studies that observe a gap between "consciousness" and "action". Even if awareness around social issues increases, consumers will not change their lifestyle when the change makes their daily life less comfortable and convenient. [12], [13] These studies show limitations upon the positive effects of CSR on a firm.

As the most fundamental criticism against CSV, Okada [14] notes an ambiguity in the concept itself. While adopting the view that, "A Corporation exists in society", the dependent variable is still same as the variable of neoliberalism which says "a firm is for enhancing economic value" and that is contradict; he points out that there is no clear theoretical structure for integrating social effects (including environmental problems) with economic effects. Okada [14] summarizes the causal relationship assumed within CSV discourses under three models. One model is "Pursuit of social value is one of the causes of economic value" and the second assumes "a causal relationship, whereby social value is a condition to gaining corporate profits". The third is one in which firms seek "to maximize the total sum of economic value and social value". According to Okada [14] we are able to stay until the second model based on existing strategic management theories, but he claims that the third model's logic cannot be fully explained by the existing strategic management theories. The reason is that the existing strategic management theories have set a sustainable competitive advantage as its dependent variable in the first two maxims, but, in the third, social value is introduced as one of the dependent variables. Therefore, a new strategic management concept is required that contains the social value concept.

There are a number of limitations in the previous research on CSR and CSV which must be addressed. Firstly, there is the point that the correlation between social value and economic value is very limited. Previous studies are too direct to examine social value and they don't consider the time lag between the execution of CSR activity and the time when we can see the financial performance improvement. Studies probably need to span a number of years to prove whether CSR activities truly contribute firms' financial performance, for example in terms of sales revenue and operating profit margins as considering other independent variables.

A second problem is that most previous research has focused on too few of the relevant stakeholders (for example, only consumers, or only shareholders) to rigorously examine the impact of activities for social value improvement. In order to investigate the effect of enterprise activities, it seems particularly important to consider the relationships with employees and business partners who are supporting firms' supply chains.

Thirdly, only a limited range of CSV models have been investigated. Porter and Kramer [3] present three approaches to practicing CSV. In previous research, there is a relatively large amount of verification of a model called "Reconceiving Products and Markets", the first method of CSV. Most studies have set firms' products and services which are able to improve environmental and social value as independent variables, and financial performance is placed as the dependent variable. From a strategic management point of view, the model is supposed to rely on Porter's Positioning theory (PSG). [15] For example, as one of three models a firm establishes a new position by producing environment-friendly products and as a result makes gains in economic value. There are only limited researches to examine the second model, "Redefining Productivity in the Value Chain" and third model, "Enabling Local Cluster Development." As one of the limited researches, Wittstruck and Teuteberg [10] find there is a strong correlation between social value and economic value in the internal firm and inter-organization, and they trial one model which posits that mutual learning, commitment and a mechanism like a process are having a deep relation with SSCM. And also Marchi [16] finds collaboration in R&D has a particularly great effect in Environmental innovation from inter-organization point of view.

Critics of Porter's PSG [15] often point out that it assumes a static world, but does not consider sustainable competitive advantage. If a firm only takes a positioning strategy, its competitors will catch up and it will lose the sustainable competitive advantage in the near future. As a

counterproposal Barney and other researchers introduce the Resource Based View (RBV) [17] that a firm will achieve its competitive advantage by improving its own resources, such as its unique mechanism and process. [18] Furthermore, we should consider Dynamic Capability (DC), which is the capability of a firm to change its organizational and inter-organizational structures to adapt an external environment, proposed by Teece *et al.* [19] In summary, to examine the effectiveness of CSV, the three forms of CSV proposed by Porter and Kramer [3], as well as other strategic management theories, ought to be evaluated, for a more comprehensive survey.

III. Hypothesis

A. Rationale

In this paper, based on CSV models [3], we try to build one hypothetical model to achieve firms' competitive advantage through SSCM activities by using strategic management.

Firstly, this paper is relying on the first of Okada's CSV causal relationship models, and tries to build on CSV model. Okada's second model, "a causal relationship, whereby social value is a condition to gaining corporate profits", can hardly be discussed based on the current understanding of strategic management; however, that is not the intention of this paper. Okada's third CSV model, "to expand the total sum of economic value and social value" cannot be discussed under the current strategic management models, but requires a new mechanism, as he claims. Again, that is beyond the scope of this paper.

Secondly, in light of the first criticism of previous research, "simplistic modeling of the relations between financial performance and CSR" as discussed in the Literature Review section, we do not use financial performance as the target variable, but we deploy the concept of firms' competitive advantage taken from previous studies of strategic management. In response to the second criticism, "observation of limited stakeholders" we expand the scope of the observation to include employees and related companies such as suppliers. Regarding the third criticism, examination of a limited range of CSV models, we do not only focus on Porter's PSG [15], but also on other strategic theories such as RBV and DC.

B. Introduction of Hypothesis

Here we propose one CSV model. CSR seems to have the potential to improve firms' internal organization capability as well as inter-organization capability. By improving these capabilities, firms' competitive advantage is enhanced, especially "firm's unique resource, capital and capability" as RBV and DC proposed, and as a result firm is able to achieve greater economic value.

We examine each concept and hypothesis based on the previous research.

C. 1st Hypothesis about the Relations among SSCM, Internal Organizational Capability, and Inter-organizational Capability

The first impact from firm's SSCM activities on organizational and inter-organizational capability is to improve the capabilities as below.

1) Company-wide efforts:
   Kamisu [20], Fujii and Kaino [21] emphasize that company-wide engagement, especially a bottom-up approach, is a very valid and feasible way to achieve CSR success.
2) Employees' Mindset and Intelligibility:
   Sendo [22] studied the effect of CSR. She found that employees understand CSR management better through CSR activities, and as a result a firm could have better relationship with stakeholders, improve their business performance, and human resource management, as well as its risk management.
3) Stakeholders' acknowledgement and behavior
   Tanimoto *et al.* [9] demonstrates that consumers' and shareholders' acknowledgement and daily behavior can change though firms' CSR activities. His study complements what the previous studies have said (Etgar [23], Yamakura [24], Tsai & Ghoshal [25]) That is, to improve confidence with stakeholders it is very important for a firm to build better organizational and inter-organizational linkages with them in the long term by having a shared vision and values with stakeholders. It is assumed that there are positive effects on firms' organizational and inter-organizational capacity though CSR, in terms of developing common vision and values.
4) Management skills for more complexity and expanded coverage:
   As one of the best examples, recently many firms have tried to conduct green procurement activities and have been forced to improve their management skills for internal organization and inter-organization, while the management scope tends to expand from 1st tier suppliers to 2nd and 3rd tier suppliers also. [26]
5) Relation-Specific Assets:
   Porter and Kramer [3] and Tanimoto *et al.* [8] show the importance of the collaboration with NPO. It is assumed that a firm can obtain surplus profit and competitive advantage through drawing in skills and know-how from the inter-organizational field; in other words, there are relation-specific assets [27] through the collaboration.

The second impact on a firm is its diversity management. Diversity is the core concept of CSR [28]. Although the definition of "Diversity" has been changed over time, there are basically two types of diversity. The first, surface diversity (visible and identifiable) and the other one is deep level diversity (more internal, such as religion and personality) [29]. As one of the major definitions of diversity, "The distribution of personal attributes among interdependent members of a work unit. The attributes of interest were those that can be readily detected upon first meeting a person (e.g., age, sex, racio-ethnicity), underlying attributes that become evident only after getting to know a person well. And attributes that fall between these two extremes of transparency (e.g., education, tenure)". [30] Thomas [31] presents Gerstner's reinvention at IBM as an example of the effectiveness of diversity, "We made diversity a market-based issue….It's about understanding our markets, which are diverse and multicultural."

The third impact to firms is related to its global management. Today firms' have expanded their management scope to 2nd tier and 3rd tier suppliers and places of production, either because a firm has tried to improve the quality and safety of its own products, or because CSR pressure from society has increased against a firm, or for both reasons. During the process it is assumed that a firm's global management and meta-national management need to be improved. [32] As an example of outputs, a firm is able to gain innovation [3], [12], [16] and reverse innovation from emerging countries. [33]

The fourth impact to a firm is overextension/stretch effect. Itami [34], Hamel and Prahalad [35] note that an organization can improve its capability through making a certain imbalances in the organization and in the subsequent process of adjusting the imbalance. They call this "Overextension Strategy" or "Strategic Stretch". A firm will be required to have more complex and advanced management index in order to achieve the improvement of both of environmental value and social value (Unruh and Ettenson [36], Triebswetter [37], Walther and Spengler [38], Unruh and Ettenson [39], Kobari [40], Kajiwara and Kunibe [41], Porter & Linde [42]). The imbalance may originate from either the internal or external environment, for example in the competitive environment of the market or in a countries regulatory framework. For example, when Honda Motors faced the Clean Air Act (Muskie Act) in the U.S in 1970, they invented a CVCC (Compound Vortex Controlled Combustion) engine by themselves and overcame the strict rules as the first company in the world. Toyota collaborated with UOP (Universal Oil Products), one of the biggest petroleum refinery companies in the U.S, was holding catalytic converter technology and broke through the situation. [43] These firm's internal organizational and inter-organizational capabilities were difficult for other to imitate, and formed the basis of long-term competitive advantage. Based on the reasons above, the following hypothesis 1 is proposed.

Hypothesis I: Firms' internal organizational and inter-organizational capability are improved by conducting SSCM to solve environment and social problems.

D. 2nd Hypothesis about the Relations among Internal Organization and Inter-organization Capability and Strategic Management Theories.

In this section, the relationship between a firm's internal organization and inter-organization capability and its competitive advantage is considered.

Regarding previous studies of strategic management, RBV and DC are the theories which focus on the firm's capability. Barney [17] emphasizes that a firm's resources （VRIO: Value, Rarity, Imitability and Organization） is the source of its competitive advantage. And Teece *et al.* [19] propose that a firm's capability to change its internal organization and inter-organizational structure is the source of its competitive advantage. With regard to their focus on sustainability, RBV and DC have a strong affinity with SSCM [44]. Whereas according to Porter's Positioning theory a firm may lose its competitive advantage over time, RBV emphasizes that a firm can sustain or even reinforce its competitive advantage, since the firm's capability is able to be improved as time proceeds. On the other hand, Barton [45] argues that an organization normally has "Core-Rigidity", meaning it is may be impossible for the organization to change itself to correspond changes in the external environment. And then Teece *et al.* [19] propose DC. In more dynamic market, a firm is required to have a capability to integrate, construct and rearrange its internal and external ability. Therefore, in this paper we build our Hypothesis II (below) on these two theories, RBV and DC.

Hypothesis II: A firm is able to develop its competitive advantage through the improvement of internal organization and inter-organization, especially from the perspective of RBV and DC.

As an alternative hypothesis, we also examine the impact of other strategic management theories. One of them is Porter's "Positioning theory (PSG)", in particular the "Differentiation Strategy" and "Cost Leadership Strategy". [15] And the other is "Dynamic Positioning Strategy (DPSG)", particularly "Platform Strategy" and "Niche Top Strategy". [46]-[49]

E. 3rd Hypothesis from Strategic Management to Sustainable Competitive Advantage.

Finally, we offer a complementary examination of the impact on economic value of such variables as improved customer recognition, cost reduction in total supply chain, and ongoing sustainable competitive advantage with Hypothesis III. [3], [8], [9].

Hypothesis III: A firm is able to gain economic values such as improved customer recognition, cost reduction in total supply chain, and ongoing sustainable competitive advantage by exploring competitive advantage strategies, especially RVB and DC.

F. Proposed Hypothesis Model

These 3 hypotheses are modeled. "Commitment to environment problems and Social problems" is set as the first explanatory variable. As the commitment to environment problems, we select, "Energy efficiency in SCM, efficient use of resources, re-define SCM, and adaption of global standard". As the commitment to social problems we select "Constructing social infrastructure, BOP business, labor environment improvement, re-define SCM and adaption of global standard." [2], [3], [32], [33] "Internal organization capacity and Inter-organization capacity" are set as the second explanatory variable, based on the previous studies. As for internal organization capacity, we select, "Top-down management, diversity, multinational employees, global education system and oversea expansion." As for inter-organizational capacity, we select "Collaborative R&D, long-term relationship, coverage area and customer relationship." As the target variables, based on the strategic management theories, PSG (Differentiation Strategy/Cost Leadership Strategy), DPSG (Platform Strategy/Niche Top Strategy), RBV (VRIO/Relation-Specific Asset), DC (Capability of transforming internal

organization/inter-organization) are set. And as economical value, we set, "Customers' recognition improvement, Cost reduction in total supply chain, and Possibility of keeping the sustainable competitive advantage 5 years later". And as control variables, we set up "regulation [3], [15], and competitive environment and firm's size."

IV. Research Methodology

A. Methodology

From the companies listed on the first section of the Tokyo Stock Exchange in Japan we selected 570 companies belonging to industries which were supposed to build supply chains, such as Chemistry, Machinery, Foods, Precision Equipment, Textile Products, Electrical Equipment, Transport Equipment, and we sent their CSR department a survey with 5-step Likert scale questionnaires. We also asked MBA students in Nagoya University of Commerce and Business to answer the questionnaires. Based on the previous studies, as described above, we prepared 39 questions, under the categories of "Commitment to environment issues", "Commitment to social issues", "Internal organizational capability", "Inter-organizational capability", "Competitive advantage," and "Economical Value".

B. Analysis Methodology

After doing factor analysis, multiple regression analysis was performed with SPSS, based on the hypothesis model.

C. Analysis Result

Out of 128 valid answers we selected relevant answers from 101 companies who seem to have supply chain. Due to the floor effect and ceiling effect, some explanatory variables such as "Strategic Management theory: Differentiation Strategy/Platform Strategy" and "Organization Capability: overseas expansion" were removed from the regression analysis. By the factor analysis (Principle Component Analysis and Promax rotation) in SPSS, 2 factors, "Top-down management" and "Diversity and Global talent" were extracted from Internal Organization. There is only one factor in each one of the other variables.

Fig. 1 shows the result of factor analysis and multiple regression analysis.

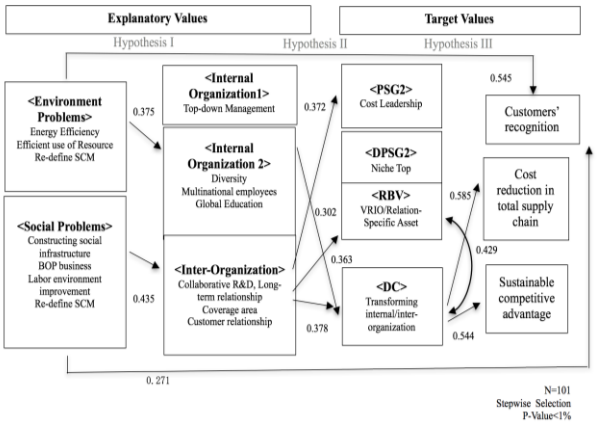

Fig. 1. Multi regression.

V. Implications

In this section we examine each hypothesis in light of the results of survey analysis.

A. Verification of Hypothesis I

There is a positive correlation between "Commitment to Environment Problems" and "Internal Organization Capability" based on statistical analysis. "Commitment to Social Problems" and "Inter-organization Capability" also have a positive correlation. Between "Commitment to Environment Problems" and "Inter-organization capability", there is no positive correlation. The same is true for the correlation between "Commitment to Social Problems" and "Internal Organizational Capability". It might be that we could not find any because social problems and environment problems have completely different characteristics, [44], [50] and the process to gain the competitive advantage is probably different for both. We would like to further examine the reasons for this finding. In summary, hypothesis I is partially supported.

B. Verification of Hypothesis II

In terms of the relations among "Internal Organizational Capability", "Inter-organizational Capability" and "Competitive Advantage (especially PSG, RBV and DC)", firstly, we found a correlation between "PSG's Cost leadership strategy" and "Inter-organizational Capability". Small firms tend to prioritize "Cost Leadership strategy", while product quality differentiation seems hard for them to achieve. Also, "large size of firms" and "Niche Top Strategy" have a negative correlation. This implies that large firms do not adapt niche top strategy. There is a positive correlation between "Inter-organization capability" and "RBV", and we also see the positive correlation between "Internal Organization Capability/Inter-Organization Capability" and "DC." By committing to social problems a firm can review its performance indicators, gain partners' cooperation, and improve its competitive advantage and economic value. However, we could not find any correlation between "Internal Organization capability" and "RBV", although we did find a correlation between "RBV" and "DC". In future studies, we need to investigate the hidden factors in this correlation. Thus, hypothesis II is also partially supported.

C. Verification of Hypothesis III

From the concept of "Competitive Advantage" in the hypothesis model, DC is the only one which has a positive correlation with "Cost reduction in total supply chain" as well as "Sustainable competitive advantage".

As for "Customer recognition", there is no positive correlation with competitive advantage but we find a positive correlation with "Commitment to Social/Environment Problems". This is the same result as in previou

s studies such as Tanimoto *et al.* [8], "CSR impacts stakeholder". In summary, hypothesis III is supported.

VI. Conclusion

Based on previous studies, we proposed one CSV model via which a firm can achieve competitive advantage through

SSCM. We also verified the effectiveness of the proposed model qualitatively through a survey of relevant firms. From the survey results we found that a firm is able to improve their internal organizational capacity through the process of hiring multinational employees, promoting diversity and global management, and they can also improve their inter-organizational capability by having more partners. Our proposed model provides a process to improve competitive advantage, especially Dynamic Capability and economic value, through these SSCM activities. Future studies should firstly examine the efficacy of different models depending on industry type and shape of supply chain. Secondly, differences of partnership structure should be examined further. "competitive advantage"; the difference could be due to the power balance of the relationship or the position a firm is located within a supply chain (either upper stream or lower stream). As Pagell and Wu [50] point out, a firm may achieve environment value and economical value but social value such as labor environment could be sacrificed to improve two other values. It could apply to inter-enterprise. One firm can achieve successful SSCM, but their suppliers are sacrificed to their success. We need to investigate it very carefully.

Thirdly, we would like to research how process innovation and product innovation are created in SSCM, specifically how different it is from the normal process of innovation. In this research, our assumption will be that the environment for creating more innovation is fostered through the process of improving internal organizational and inter-organizational capability; however, more specifically, we'd like to research what a successful SSCM firm's partnerships and network look like, how it differs from those of others.

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