IIAI Open Conference Publication Series IIAI Letters on Business and Decision Science Vol. 005, LBDS438 DOI: https://doi.org/10.52731/lbds.v005.438

Industrial Specific Evaluation for Corporate Social Responsibility

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Abstract

This study analyzed the differences in effective Corporate Social Responsibility(CSR) activities across industries among Japanese companies. Using Toyo Keizai CSR data and conducting statistical analysis with a multilevel model, the results revealed that internal CSR activities have a significant impact on CSR evaluations in the chemical industry, while external CSR activities are highly valued in the electrical equipment industry. These findings suggest that the key areas of CSR activities differ depending on industry specific risks and social demands, indicating that companies should develop CSR strategies tailored to the structure of their respective industries.

Keywords: Corporate social responsibility, Industry, Environment, Governance, Environmental consideration, Environmental risk.

1 Introduction

Corporate social responsibility (CSR) is the concept that companies are expected not only to generate profits, but also to act responsibly and be accountable to various stakeholders through consideration for social and environmental issues. CSR enables companies to gain the trust of society and build a foundation for long-term growth.

CSR has long attracted attention in academic research as well. Matthiesen and Salzmann [1] and Breuer [2] clarified the relationship between CSR and the cost of capital. Iliev and Roth [3] demonstrated that engaging in CSR activities can improve a company's overall operational performance. In recent years, research has increasingly focused on the relationship between CSR and consumers. Narayanan and Singh [4] examined the link between CSR and willingness to pay (WTP). However, much of this research has concentrated on the relationship between CSR activities and environmental issues, while there has been insufficient research of other areas of CSR, such as human rights, contributions to local communities, and activities for employees. Therefore, it is considered necessary to conduct more detailed research focusing on other fields in the future.

CSR activities span a wide range of areas, including local communities, diversity, employee relations, the environment, products, human rights, and governance. Managers must

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strategically decide which areas of CSR to prioritize and allocate limited resources accordingly. CSR activities are not merely about contributing to society. They are closely linked to important management issues such as enhancing corporate value, risk management, strengthening brand image, and attracting and retaining talented employees. In addition, with the recent expansion of ESG(Environment, Social, Governance) investment and the growing social awareness among consumers, the outcomes of CSR activities are increasingly directly connected to corporate evaluation and competitiveness. Therefore, managers need to consider the significance and impact of CSR activities from a medium to long term perspective, rather than focusing solely on short term profits. It is also necessary to select areas where limited resources can be utilized most effectively, based on the company's strengths, social impact, and industry characteristics, and to promote CSR activities strategically. Such decision making is essential for companies to achieve sustainable growth and earn the trust of society. However, since each company's business content and approach to social responsibility differ, there is no single answer as to which CSR areas should be prioritized.

Identifying specific areas of CSR activities is important not only at the corporate level but also at the industry level. In recent years, individual corporate initiatives have often been insufficient to address social issues adequately. As a result, it has become increasingly necessary for entire industries to work together to tackle common challenges. In their study, Bouslah et.al [5] showed that about 74% of companies concentrate on a single area of CSR. Industry level analysis also revealed that while some industries focus on specific areas, there are others that engage in multiple CSR activities. These differences in approach are suggested to be due to variations in regulations and social expectations across industries. However, despite this background, there has been no analysis of CSR activities by industry among Japanese companies.

Liu and Xu [6] indicated that CSR can be divided into external and internal categories. External CSR focuses on contributions to local communities and external stakeholders, emphasizing the impact on parties outside the company. Internal CSR refers to activities directed toward internal stakeholders such as employees and management. In other words, external CSR includes environmental and social contributions, while internal CSR involves aspects such as employee welfare. In their study, Liu and Xu investigated the difference in purchase rates between products that included CSR information and those that did not. The results showed that the presence or absence of CSR information led to differences in purchase rates. Furthermore, differences in purchase rates were also observed depending on whether the CSR was external or internal. Ahsan [7] investigated the impact of internal and external CSR activities on Italian companies on employees' job satisfaction and their psychological attachment and commitment to the organization. The study found that external CSR had a positive effect on both job satisfaction and psychological attachment and commitment. Internal CSR also positively influenced job satisfaction and psychological attachment and commitment. As these studies show, research has examined how internal and external CSR activities are managed at the company level, but there has been insufficient investigation into which is more emphasized at the industry level. On the other hand, although Bouslah et al. have conducted analyses of industries, they have not carried out detailed analyses separating internal and external factors, and thus have not grasped the trends of CSR activities in each industry.

Based on the above, the purpose of this study is to clarify the differences in effective CSR activities among industries. Specifically, by using a multilevel model, this research analyzes the extent to which internal and external CSR activities are effective in each in-

dustry. This will enable the realization of effective CSR activities by corporations in each industry.

In previous studies, there has been considerable discussion on the impact of CSR activities on corporate value and brand image; however, comprehensive analyses focusing on differences by industry or on the specific fields of CSR activities within industries have not been sufficiently conducted. By focusing on industrial differences in CSR activities, this study aims to fill this existing research gap. Furthermore, the limited research on internal CSR may be attributed to the fact that responses to environmental issues and corporate scandals have been highlighted as major social concerns, leading to a strong emphasis on external CSR, such as environmental protection and contributions to local communities, which are directly linked to corporate image and brand value. In contrast, internal CSR activities are less visible to external stakeholders, which may have resulted in relatively lower interest from researchers and society as a whole. However, engaging in internal CSR activities can enhance transparency and reliability within the company and is expected to reduce the risk of scandals. In addition, initiatives such as employee education and skill development promote individual growth, which can ultimately contribute to society as a whole. Thus, research on internal CSR activities can provide valuable insights that benefit both companies and society.

2 Method

2.1 Multilevel Models

In this study, regression analysis is conducted using a multilevel model. The multilevel model is an analytical method widely used in fields such as statistics, econometrics, psychology, and education. As Joop [8] points out, standard regression analysis assumes independence between samples in the data. However, in cases where observations belong to the same group such as student data within schools or employee data within companies this assumption may not hold. In other words, the multilevel model is a technique for modeling "hierarchical structures" and "differences between groups" that cannot be fully captured by ordinary regression analysis. The basic structure of a multilevel model combines fixed effects and random effects. Fixed effects represent overall trends or average influences, while random effects capture group specific characteristics and variability, making it possible to reveal the unique impact of each group. This model is effective when the independence of data cannot be assumed due to hierarchical structures, when differences between groups are expected, or when it is necessary to distinguish between individual variation and overall patterns. However, challenges include difficulties in application when the sample size is small or when there is insufficient variability between hierarchical levels. In the future, it is expected that the use of multilevel models will expand to large and complex data sets. In this study, we set "industry" and "company" as hierarchical levels, making it possible to analyze inter industry differences in CSR activities.

Aguinis et al. [9] provided insights into how multilevel modeling can be used to analyze whether relationships among lower level variables are influenced by higher level variables. Here, higher level refers to the contextual or group units that encompass the lower level. Aguinis and colleagues introduced three advantages of multilevel models. The first is flexibility, meaning that the direct and interaction effects between higher and lower level variables can be analyzed simultaneously. Elements treated as fixed effects in standard regression or analysis of variance can be modeled as random effects, enabling more realistic

estimation. The second advantage is the ability to separate error structures and variance components. Multilevel models allow for the separation and examination of error structures and variance components between groups (higher level) and within groups (lower level). This clarifies the impact at each hierarchical level. By estimating variance components such as the variability of intercepts and slopes, it becomes possible to understand the extent to which each level influences the data. The third advantage is practical usefulness. Using this model allows researchers to address real world issues in fields such as management and organizational studies. Theoretically, it is also presented as a valuable analytical method for integrating micro and macro domains.

2.2 Data-set

This study uses the "Toyo Keizai CSR Data: Comprehensive CSR 2024 Edition." This data set is collected and compiled by Toyo Keizai Inc. and covers a wide range of information related to corporate CSR activities. Since the data set combines proprietary data collected by Toyo Keizai Inc. with publicly available information, it offers high comprehensiveness and reliability.

There are 90 survey items. These items are scored as a "Comprehensive CSR Score." For each CSR domain (human resource utilization, environment and corporate governance + sociality), the scores of the respective evaluation items are summed to calculate a base score. A multiplier is then determined so that the top performing company receives a perfect score of 100, and this multiplier is applied uniformly to all companies to calculate the scores for each category. For corporate governance + sociality, the evaluation items for corporate governance and sociality are combined and totaled as a single domain to obtain the base score. The Comprehensive CSR Score is the sum of the scores for each domain, with a maximum possible score of 300 points. In other words, the Comprehensive CSR Score provides a holistic assessment of a company's CSR activities, not just in specific domains. Since the evaluation is based on a unified standard, this score is used as the dependent variable in this study. The survey items are used as independent variables. This approach enables a detailed analysis not only of the characteristics of CSR activities by industry, but also of their internal and external factors. The number of industries in the data set is shown in Table 1. There is variation in the number of companies across industries.

2.3 Analysis Procedure

The objective of this study is to analyze the extent to which CSR activities impact CSR scores across different industries. First, in order to understand the differences in the impact of each CSR activity (internal and external) on the CSR scores by industry, we constructed a multilevel model with random effects applied to the slopes. This approach enables us to estimate the varying effects of the elements of CSR activity in each industry and directly address the study objective of clarifying the specific differences between industries in impact. Next, we applied random effects to the intercept to estimate differences in average CSR scores among industries. The reason for applying it only to the intercept is to estimate the differences in average CSR scores among industries. Joop (2002) points out that while greater flexibility is possible, it can lead to a loss of parsimony, which is important in econometric analysis, and therefore, a simpler model should be used if it can sufficiently explain the data. In consideration of this, for each model, we compare the model without random effects (linear model) to the model with random effects and evaluate the goodness

Table 1: number of industries in the data set

Industry Name	Number
Electrical Machinery	91
Chemicals	86
Wholesale Trade	63
Machinery	57
Information & Communication	55
Construction	54
Retail Trade	46
Services	46
Food Products	42
Transportation Equipment	39
Pharmaceuticals	26
Land Transportation	22
Other Products	22
Real Estate	16
Nonferrous Metals	16
Precision Instruments	16
Metal Products	16
Electric & Gas Utilities	14
Textile Products	14
Steel	10
Rubber Products	10
Glass & Stone Products	10
Pulp & Paper	8
Warehousing & Transportation	4
Marine Transportation	4
Petroleum & Coal Products	3
Fisheries, Agriculture, Forestry	3
Mining	3
Air Transportation	3

Table 2: A random intercept model for internal CSR and a linear model

model	npar	AIC	logLik	deviance	Chisq	Df
linear	27	7376.3	-3661.1	7322.3		
multi level model	28	7350.6	-3647.3	7294.6	27.743***	1

Note:***: indicates significance at the 0.1% level

Table 3: A random intercept model for external CSR and a linear model

model	npar	AIC	logLik	deviance	Chisq	Df
linear	65	6842.5	-3356.2	6712.5		
multi level model	66	6836.7	-3352.4	6704.7	7.7388**	1

Note:**: indicates significance at the 1% level

of fit gained by adding random effects. As evaluation criteria, we use the Akaike Information Criterion (AIC) to measure how well the model fits the data, and we also conduct a χ^2 test to examine the improvement of the model due to the inclusion of random effects.

Table 2 compares the multilevel model with a random effect on the intercept to the linear model for internal CSR activities. Table 3 presents a similar comparison for external CSR activities. In both cases, the addition of a random effect to the intercept resulted in a significant improvement in model fit. This indicates that, for both internal and external CSR, the baseline CSR scores differ by industry, and the grouping effect of industry at the intercept cannot be ignored. In other words, this supports the existence of industry specific internal and external factors. Therefore, in this study, we include random effects for both the slopes and the intercepts in our analysis.

3 Results

3.1 Internal CSR

Table 4 shows the industry specific slopes obtained by adding the fixed effects to the random effects for the slope and intercept in the questionnaire items related to internal CSR activities. Only those items for which certain industries showed a positive effect, based on the magnitude of the coefficients, are presented. The bolded entries in the Table 4 indicate the top three industries that showed the most significant effects and the bottom three industries that showed no significant effects, compared to other industries, for each survey item. According to Table 4, internal CSR activities in the chemical industry have a greater impact on CSR scores compared to other industries. This is due to the fact that the chemical industry is exposed to qualitatively diverse and significant risks. Throughout the entire process from procurement of raw materials, manufacturing, and distribution, to disposal the chemical industry constantly faces high risks such as explosions, fires, toxic gases, environmental pollution, and occupational accidents. In addition, the handling of chemicals is subject to strict legal regulations. In the event of an accident, companies face risks such as significant compensation claims and lawsuits, business suspension, and social

Table 4: Industry specific results for internal CSR activities

Industry	Establishment of Internal Control Committee	Availability of initiatives to enhance employee solutions to social issues	Availability of CFO
Chemicals	10.58	6.572	2.178
Glass	9.457	5.943	-2.960
Stone Products) .1 31	3.743	-2.700
Pharmaceuticals	8.853	5.550	-5.817
Food Products	8.832	5.597	-0.2433
Nonferrous Metals	8.319	5.739	5.130
Electrical Machinery	8.161	5.492	-6.930
Pulp Paper	7.758	5.084	-7.099
Marine Transportation	7.723	5.197	-7.697
Real Estate	7.336	5.084	-9.786
Warehousing Transportation	6.982	4.993	-6.762
Other Products	6.978	5.570	-7.777
Mining	5.794	4.530	-6.818
Petroleum Coal Products	5.740	4.458	-6.330
Construction	5.691	4.453	-1.312
Rubber Products	5.674	4.881	-8.712
Land Transportation	5.629	4.378	-5.346
Electricity Gas Utilities	5.614	4.229	-9.384
Air Transportation	5.255	4.269	-7.071
Machinery	4.785	4.004	-15.78
Metal Products Fisheries	4.485	4.224	-4.430
Agriculture Forestry	3.821	3.820	-8.227
Transportation Equipment	3.813	2.859	-10.37
Textile Products	3.406	3.782	-9.391
Retail Trade	3.360	2.985	-14.82
Precision Instruments	3.066	3.659	-7.109
Steel	1.540	2.925	-7.139
Information Communication	-0.772	1.397	-8.508
Services Wholesale Trade	-2.115 -2.161	0.722 1.600	-10.42 -5.882

criticism. For this reason, chemical companies establish and operate risk management systems aimed at preventing risks and enabling early detection and response. These systems include the establishment of internal control committees, risk assessment and evaluation, employee training, emergency response drills, and internal audits. Furthermore, if inadequate risk management becomes known to the public, there is a high possibility that the company's very survival could be threatened. As a result, a strong awareness of risk is shared throughout the organization, from top management to frontline employees, leading to proactive engagement in internal CSR activities. In other words, in the chemical industry, the inherently high level of risk itself serves as the primary driver for the advancement and thorough implementation of internal CSR activities. Consequently, internal CSR evaluations in the chemical industry tend to be higher compared to those in other industries.

Similarly, the glass and stone products industry is also characterized by extremely high risks to employee safety and health due to the handling of high temperatures, high pressures, and heavy materials in the manufacturing process. As a result, companies in this industry prioritize the prevention of occupational accidents and health hazards, making it essential to thoroughly implement internal risk reduction measures such as strengthening safety and health management systems, standardizing work procedures, and conducting regular safety education and training. It is considered that these internal company responses to high levels of risk are reflected in evaluations, leading to higher CSR scores for internal CSR activities.

In industries where internal CSR activities are highly evaluated, a notable characteristic is that the associated risks are often less visible to consumers. Such invisible risks represent a fundamental source of anxiety for consumers, and if deficiencies in risk management or accidents become public, consumer trust can be lost rapidly. Therefore, it is essential for companies to proactively disclose information and ensure transparency. Consumers tend to place significant value on how much information companies disclose about their internal CSR activities in relation to these less visible risks, and this emphasis on disclosure is likely reflected in corporate evaluations. Furthermore, prior research has demonstrated that consumers are particularly responsive to CSR activities that are personally relevant to them [10]. In other words, when consumers are concerned about risks that directly affect their own safety or daily lives, companies' proactive disclosure of risk management systems and internal control initiatives is more likely to be perceived as personally meaningful. As a result, sincere information disclosure and transparency regarding internal CSR activities addressing less visible risks can directly contribute to enhanced consumer trust and improved corporate evaluations.

On the other hand, internal CSR activities in the service industry were found to have a lower impact on CSR scores compared to other industries. The main risks in the service industry such as customer disputes, information leaks, human error, and harassment—are difficult to quantify, yet these risks tend to manifest in daily operations and are relatively easy for consumers to recognize. Furthermore, as noted by Mohr et al. [11], while CSR activities can contribute to enhancing consumers 'product evaluations and purchase intentions, actual purchasing decisions are primarily determined by the functionality, price, and quality of the product or service itself. Based on these points, it can be considered that consumers in the service industry tend to place greater emphasis on the intrinsic value of the service rather than on CSR activities. Consequently, CSR initiatives are less likely to be reflected as independent evaluation items in this sector.

Table 5: Industry-specific results for external CSR activities

Industry	Social Contribution Expenditure	ISMS Certification	Social Issue Resolution Bond Issuance	Policy Standard Disclosure
Electrical	8.100	5.911	1.231	2.542
Machinery	((20	2 021	0.2602	0 (570
Nonferrous Metals Chemicals	6.628 4.954	3.021 0.4485	-0.2693 -1.993	0.6578 2.790
Land	4.934	U.4405	-1.993	2.190
Transportation	4.374	-0.2116	-3.103	-3.003
Glass				
Stone	1.923	-3.716	-3.219	-5.003
Products	1.723	-3.710	-3.21)	-3.003
Warehousing				
Transportation	1.278	-0.2908	-6.010	-5.003
Other Products	1.128	-1.765	-4.996	-5.185
Food Products	0.9471	-1.775	-4.055	-6.614
Metal Products	0.5806	-2.633	-7.716	-10.12
Marine				
Transportation	0.1814	-1.691	-4.627	-6.887
Mining	0.04548	-2.968	-4.818	-7.061
Steel	-0.7066	-0.2881	-2.946	-3.000
Petroleum	0.0660	7 100	6.402	
Coal Products	-0.9669	-5.100	-6.483	-9.053
Rubber Product	-1.128	-2.397	-5.984	-9.338
Air	1 100	4.210	6.065	0.146
Transportation	-1.198	-4.219	-6.965	-8.146
Electric Gas	-1.704	-3.481	-10.86	5 290
Utilities	-1./04	-3.461	-10.80	-5.389
Real Estate	-2.260	-6.737	-8.072	-9.495
Textile Products	-2.449	-5.472	-8.162	-6.025
Pulp Paper	-2.468	-4.565	-7.377	-7.990
Wholesale Trade	-2.609	-6.473	-7.158	-10.93
Fisheries				
Agriculture	-3.032	-6.216	-8.672	-9.784
Forestry				
Machinery	-3.646	-6.341	-8.689	-10.65
Pharmaceuticals	-3.693	-5.843	-10.68	-11.07
Precision	-4.057	-7.025	-9.747	-11.08
Instruments				
Construction	-5.262	-6.448	-11.07	-13.09
Information	-5.964	-8.759	-9.930	-14.25
Communication				
Services	-5.986	-11.53	-13.06	-14.85
Transportation	-6.593	-13.55	-14.42	-17.71
Equipment Retail Trade	7 402	11 60	17 56	20.27
Retail Hade	-7.493	-11.68	-17.56	-20.37

3.2 External CSR

The slopes for each industry, calculated by adding the fixed effects to the random effects applied to both the slope and intercept for the survey items related to external CSR activities, are shown in Table 5. As in Table 4, the bolded entries in Table 5 indicate the top three industries that showed significant effects and the bottom three industries that showed no significant effects, compared to other industries, for each survey item. According to Table 5, external CSR activities in the electrical machinery industry have a greater impact on CSR scores compared to other industries. The electrical machinery industry has a significant impact on society and the environment, including energy consumption, greenhouse gas emissions, resource use, and waste generation. Therefore, companies in this industry are strongly required not only to comply with laws and reduce costs, but also to actively contribute to building a sustainable society by reducing environmental burdens, promoting resource circulation, and addressing social issues. Given this background, it is considered essential for companies in the electrical machinery industry to accurately and transparently disclose to consumer what kinds of CSR activities they are implementing and what results they are achieving. The quality and transparency of information disclosure are important factors in ensuring the reliability and effectiveness of CSR activities and in enhancing social evaluation, which may lead to higher CSR scores.

On the other hand, it was found that external CSR activities are not effective in improving CSR scores in the service industry, transportation equipment industry, and retail industry. As a possible background for the lower evaluations in these industries, it can be inferred similarly to the results of the analysis of internal CSR that there is a general tendency within each industry for consumers to place greater emphasis on the intrinsic value of products and services rather than on CSR activities.

One possible reason for the lack of effectiveness of external CSR activities in the service industry lies in the fundamental characteristics of the industry itself. The service industry provides value not through products, but through people and experiences, and much of its work is intangible and dependent on interpersonal relationships. Therefore, it can be considered that the quality of customer service is regarded as more important than external CSR activities such as social contribution and environmental initiatives. Additionally, as mentioned earlier regarding internal CSR, risks such as customer troubles, information leaks, and human error in the service industry are difficult to observe and quantify. As a result, the effects of external CSR activities tend to be less clearly evaluated by society and the market. In the transportation equipment industry, the products are directly linked to public infrastructure and systems that support human life and society. Therefore, technological capability, quality, and safety are considered to be at the core of corporate evaluation. In this industry, what is most expected by consumers and society is a high level of safety and reliability that prevents accidents and malfunctions. When scandals related to quality or safety occur, companies lose the trust of society and are held socially responsible. Therefore, ensuring the safety and quality of their products and services, which is their core business, is considered to be at the heart of CSR. In the retail industry, CSR activities are often naturally integrated into store operations and daily business practices, and consumer services or community engagement frequently overlap with CSR itself. For example, the sale of eco-friendly products or the organization of local events are often extensions of core business activities such as increasing sales or attracting customers, making it difficult to evaluate these activities independently as CSR initiatives.

The results of this study revealed that effective CSR activities differ across industries. As

an overall trend, in industries with higher evaluations, risks are less visible to consumers, and this lack of visibility leads to consumer anxiety. It is considered that disclosing such information contributed to higher evaluations. On the other hand, in industries with lower evaluations compared to others, it is possible that consumers placed greater importance on the products themselves rather than on CSR activities.

4 Discussion and Conclusions

In this study, the CSR activities of Japanese corporations were analyzed using a multilevel model to examine the differences and impacts of internal and external CSR by industry. As a result, it was found that in the chemical industry, internal CSR activities are especially highly valued, while in the electrical machinery industry, external CSR activities have a large influence on the CSR score. These differences are thought to be caused by the nature of risks and social demands faced by each industry, and the level of risk, the invisibility of risks that makes consumers anxious, and the magnitude of social impact are considered to determine the focus areas of CSR activities. Furthermore, in some industries such as the service and retail industries, it was shown that both internal and external CSR activities have only a limited impact on the CSR score. This is probably because the risks in these industries are "difficult to quantify," so CSR activities are not recognized as the highest management priority, and also because CSR activities themselves overlap with daily operations and are not easily evaluated independently, and because consumers tend to focus on goods.

The significance of this study lies in its clarification of the characteristics and effects of CSR activities at the industry level, rather than being limited to analyses at the individual company level. As pointed out in previous research, CSR activities have been shown to influence corporate value, brand image, and risk reduction; however, the effects and areas of emphasis differ greatly across industries. CSR activities should be optimized according to the characteristics and social demands of each industry. The findings of this study provide valuable insights not only for managers but also for policymakers and practitioners in formulating industry specific CSR promotion strategies and evaluation criteria.

This study has several limitations. First, the differences in evaluation due to risk discussed in this research remain at the level of consideration and have not been thoroughly examined. In the future, analyses that can explain how risk influences evaluations will be necessary. Second, the CSR scores and evaluation items used in the analysis are based on the Toyo Keizai data set and depend on its evaluation criteria and item selection. Therefore, the results may differ if other evaluation agencies or different indicators are used. Third, in applying the multilevel model, there are constraints related to the hierarchical structure of the data and sample size, which may mean that the variability among industries and the diversity among companies are not fully captured. Going forward, it will be necessary to utilize larger and more diverse data sets and to supplement the analysis with qualitative case studies.

While this study quantitatively clarified the differences and impacts of internal and external CSR activities by industry, we believe that combining further qualitative case studies, surveys, and experiments in the future will enable a deeper examination of how industry characteristics, corporate culture, and differences in social demands are reflected in the content and outcomes of CSR activities. Additionally, by comparing not only Japanese companies but also overseas companies and international industries, it will be possible

to clarify the international trends in CSR activities, the characteristics and challenges of Japanese companies, and to obtain insights for strengthening international competitiveness and informing policy development, which are important research topics.

Acknowledgments

This study was supported in part by JSPS KAKENHI Grant Numbers JP23H01640.

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