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Article

# Corporate Social Responsibility Activity Combinations for Sustainability: A Fuzzy Set Analysis of Korean Firms

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**Abstract:** We examined how combinations of corporate social responsibility (CSR) activities lead to high performance in Korean companies. This study addressed two related questions to expand our limited knowledge in this area. The first was what combinations of CSR activities achieve high performance. The second was to identify how CSR activities form an interdependent system, depending on different corporate situations. Korean Economic Justice Institute index data, from 2012 to 2018, were used with fuzzy set qualitative comparative analysis, and the results revealed several effective CSR activity factor combinations under given strategies and management environments. Companies with high performance exhibit complementarity between social contribution, environmental management, fairness, and employee satisfaction. By contrast, companies with low corporate performance show no complementarity between relatively unrelated activity factors. For companies whose CSR activities lead to low financial performance, most of the causal pathways focused only on activities at the primary stakeholder level, with weak diversity of CSR activities' combinations at the primary and secondary stakeholder levels. These results indicate not only the appropriateness of CSR activity factor combinations for companies' strategy and management environment contexts, but also their effectiveness, and are expected to provide companies with significant implications for CSR activities.

**Keywords:** corporate social responsibility (CSR); sustainability; complementarity; fuzzy set qualitative comparative analysis (fsQCA)

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## 1. Introduction

In recent years, managers are required to have a deep understanding of the strategic environment and strong practices to achieve increasingly complex economic, environmental, and social goals [1]. In order to secure sustainability in the face of competition, companies' strategic priorities have become significant. The key success factors in corporate management over the last few decades have shifted from traditional economic factors, such as low cost, high quality and fast and reliable delivery [2-5] to more sophisticated, comprehensive factors, such as corporate social responsibility (CSR).

Accordingly, companies consider CSR as one of the solutions to corporate sustainability issues, and they are therefore investing and putting substantial effort into CSR activities. Research on CSR as a sustainability practice has largely three positions: claims that CSR activities contribute to increased corporate value [6-9], that the converse negatively affects corporate value [10-11], and that CSR

activities do not have any effect on corporate value [12–13]. However, these positions are converging towards the argument that recent CSR activities have positive effects on corporate performance.

In the many studies conducted on the CSR activities of Korean companies, academia has used an approach that distinguishes the actual effect of the relationship between CSR activities and business performance. However, although these studies have been relatively successful in identifying the relationship between CSR activities and business performance, little research has been conducted to understand the choices and consequences of combinations of CSR activity factors in different enterprise contexts. Furthermore, previous studies on CSR and performance are limited by the difficulty of identifying which CSR activity factors affect corporate performance when measuring a single index that sums up CSR activity factors at the corporate level [14–15].

This study aimed to expand the limited knowledge in this area with two related questions. The first question was what CSR activity combinations achieve high corporate performance. The implicit assumption here is that by combining the results of independent analyses of CSR activity factors, one can understand the combination of effective CSR activity factors [16]. However, observing the co-existence of a combination of CSR activities does not imply interdependence between activity factors [17]. Therefore, the second question in this study was to identify how CSR activity factors form an interdependent system and how this depends on diverse corporate situations. Because the effects of individual factors are dependent on their context, it is possible that a company's strategic situation also affects the degree of interdependence between activity factors [17]. For example, observed CSR activity factors that play a complementary role in one strategic situation may be irrelevant or substitutes in other situations.

This study used constructive logic and complementarity theory, which assert that CSR activity factors are combined in various ways, leading to high corporate performance. For the first research question, we used fuzzy set qualitative comparative analysis (fsQCA). This approach shows which CSR activity factors are relevant, or redundant, for achieving performance in particular situations [18]. This study aimed to demonstrate that in particular situations companies can combine CSR activities in several ways, whereas not all combinations of CSR activity factors will improve performance.

Although the results of the first analysis alone did not directly establish interdependence, the comparison of similarities and differences in the relevance of a combination of effective CSR activity factors provided information on which factors may complement each other or need to be substituted. Based on this comparison theory, it was possible to explain how and why certain factors in a combination of observed CSR activity factors work interdependently [17, 19].<sup>1</sup> The rest of the article proceeds as follows. First, the combination and complementarity of CSR at the corporate level was identified and its key dimensions were discussed. Then, fsQCA was used to identify the combination of causal conditions and CSR activity factors that drive good corporate financial performance within a formalized CSR model. Finally, the main findings are discussed and their implications for comparative CSR and corporate strategic research are presented in the conclusion.

## 2. Literature Review

### 2.1 CSR and Sustainability

Bowen [20] believes that entrepreneurs' social responsibility is to meet all social expectations. He stresses that social responsibility is more important when it comes to the relationship between business and society, and that maximizing social welfare is more important than corporate profitability [20] (p.6). Since then, definitions of CSR have been proposed by various scholars [21–29]. Beyond these ideas, all firms should be concerned about CSR activities and their relationships with stakeholders (employees,

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<sup>1</sup> As Grabner and Moers [17] (p.408) argue: “the complementarity theory is suitable to address issues related to CSR activities as a system because the theory explicitly addresses how a decision maker tries to maximize “performance” by (simultaneously) deciding on multiple choice variables.”

customers, suppliers, local communities, government organizations, etc.), and they should integrate economic, social, and environmental issues in their business models. The idea is to have responsible citizenship (both economically and socially). We define this as “the company’s efforts to fulfill its corporate social responsibility by voluntarily participating in actions and by complying with laws to enhance social as well as company interests.” This is consistent with the integration of economic, legal, ethical, and philanthropic responsibilities in corporate decision-making [22, 29].

Corporate sustainability is closely related to CSR. Sustainability means to “meet the needs of the present without compromising the ability of future generations to meet their own needs” [30] (p.16). The way a company views sustainability can vary. Some may argue that sustainability means keeping output up with a growing demand, some may emphasize the importance of maintaining a desirable way of life in the future, and others may focus on preserving an ecological balance [31]. A broader view of sustainability encompasses all of the above points, suggesting that sustainability interacts with the environment so that future generations can avoid harm [30-32].

While CSR and cooperate sustainability may be separated into different concepts [33], they are generally used in the same way [34-35]. According to a report by KPMG [34], 14% of the world’s top 100 companies use the term “corporate responsibility,” 25% use the term “corporate social responsibility,” and 43% use “sustainability.” Meanwhile, according to a survey by the Korean Standards Association [36], 73.1% of Korean companies use the concept of corporate sustainability in the title of their reports on CSR activities (management, possibility, feasibility of sustainability, etc.). Additionally, 7.3% use the term CSR and 19.6% use the terminology social responsibility management, social responsibility, and CSV report, among others. In practice, however, these names are used indiscriminately, so this study does not distinguish between CSR and the concepts of sustainability.

## 2.2 CSR Activities and Firm Performance

Heal [37] argues that CSR has various effects on corporate performance and value. CSR activities can reduce information risk to stakeholders and mitigate conflicts with them, thereby reducing corporate risk and lowering capital costs [37-41]. Moreover, a company’s service to society and its concern for the environment enhance its reputation and help improve its relationships with regulators. Efforts to respect human rights through organizational CSR activities lead to improved productivity through improved working conditions and employee satisfaction.

The perspective that favors CSR activities argues that striking a balance between shareholder interests and those of other stakeholders has a positive effect on corporate sustainability. Businesses can improve their performance when CSR activities meet the expectations and needs of various stakeholders. Enhancing corporate reputation through CSR activities has a positive effect on corporate performance, while the disappointment of stakeholders with CSR activities has a negative effect on corporate performance because of increased risk awareness [42]. For example, a company’s CSR activity can be an opportunity to absorb new knowledge, which has a positive effect on the company’s performance [43], but inconsistent CSR implementation cannot ensure that knowledge is fully absorbed and consumed. It also affects corporate performance adversely through unreliability and impedes subsequent CSR implementation [44]. Therefore, recent studies claim that in order for a company to successfully implement CSR initiatives, it must necessarily consider the individualities of various stakeholders (primary and secondary stakeholder groups) and the importance of resource allocation and communication that take the company’s contextual factors into account [44-47].

On the contrary, one of the negative aspects of CSR activities and corporate performance is that excessive investment in CSR damages corporate value. This conventional economic perspective argues that CSR activities are a kind of expense that has little effect on enhancing shareholder value. Moreover, it points out that CSR activities may be abused to enhance private shareholders’ reputations [48-49].

Contrary to these two positions, some argue that there is no direct relationship between CSR and corporate performance [12-13, 29, 41, 44, and 50]. Lys et al. [13] investigate whether the effect of CSR on financial performance is an investment or a signal. They argue that there is no causal relationship

between CSR and financial performance and that previous studies that establish a positive association between CSR and financial performance have been misinterpreted.

### 2.3 Complementarities in a Firm's CSR Activities

Over the past two decades, a considerable amount of research has been conducted on the relationship between CSR and the financial performance of Korean companies, and most of the research has been conducted from a stakeholder- or resource-based view. Many of these studies, however, suggest the role of successful CSR at the individual level. While such surveys are a good way to prove the validity of the concept, it is difficult to pinpoint the relative effects and interactions between factors, as success factors are multidimensional and diverse.

The concept of complementarity is generally theorized around internal suitability for interactions between different organizational attributes. Complementarity is defined as the relationship between factors, and applying one factor increases the value of applying another factor. Complementarity exists between actions or factors when increasing the level of one activity or factor increases the marginal return caused by an increase in the level of another [19, 51]<sup>2</sup>. Where complementarity exists, firms can achieve higher performance by considering multiple actions or factors simultaneously. For the same reason, when a level of one action or factor is increased, there is a substitutive effect between the actions or factors when the marginal return caused by the level of another action or factor is reduced [54].

The importance of the theory of complementarity does not mean that all factors must be considered to achieve higher corporate performance [53]. Rather, it emphasizes that the introduction of variables or strategies that are not complementary can reduce corporate performance. For example, if internally and externally oriented knowledge-sourcing strategies are not complementary, adopting them at the same time can have a negative effect on corporate performance.

In general, it is argued that the less diversity there is between activities in the same system, the better, because complementarity comes from similarities [55]. Grandori and Furnari [56], however, suggest that, contrary to the basic logic of complementarity, there is no theoretical reason for complementarity to come from similarities. They insist and prove that other kinds of activities might be successfully combined. Whittington et al. [52] show that the wider and more differentiated the set of practices already introduced, the higher the corporate performance. As a result, Grandori and Furnari [56] argue that marginal profits for increasing organizational homogeneity could be reduced and even negative. In other words, considering that CSR activities are expensive to implement, too many redundant and closely linked activity factors can lead to excessive CSR activities, which may adversely affect financial performance [44, 57].

## 3. Research Methods and Variable Description

### 3.1 Data Analysis: Fuzzy Sets QCA

FsQCA is used to identify the causality between variables by comparing and analyzing the differences and similarities of social phenomena or cases in empirical studies. It uses Boolean algebra to allow the evaluation of causal or causal conditions leading to subset linking [18, 58]. Although fsQCA

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<sup>2</sup> Complementarity theory basically deals with "fit," similar to the traditional organizational, contingency, or configuration theories [52]. However, unlike contingency theory, which focuses on one-to-one fit between two variables, complementarity theory emphasizes that multiple variables must be considered in a holistic perspective. It also emphasizes that improving individual variables does not improve corporate performance. Moreover, while the theory of construction focuses on finding effective archetypes through consideration of multiple variables, the theory of complementarity focuses on identifying unique interactions of individual variables and their effects on corporate performance [53].

was originally developed as a method of deriving inferences from a small number of cases, it has been increasingly applied to constructing and testing theories using much larger datasets [18, 59-64].

One of the main features of fsQCA is that it allows us to observe cases with a combination of conditions that jointly produce performance, in contrast to traditional correlation studies that analyze the effects of a variable in isolation. Although interaction effects reinforce standard linear regression to assess nonlinear relationships, they assess the suitability of a single path to the results and do not explore the correspondence in detail [18, 61]. Recent theoretical and empirical studies suggest that the use of fuzzy sets has many advantages over traditional regression methods when analyzing three or more interactions that drive performance [60, 65-67].

In this study, cluster analysis (which does not present test statistics), profile deviation analysis, coverage (similar to  $R^2$  values), and consistency (similar to p-values) were presented. Neither cluster analysis nor profile deviation analysis can determine which results in a combination contribute to performance, but fsQCA identifies the importance of CSR activity factors by identifying whether they are core, peripheral, or redundant [60, 68]. The fsQCA demonstration application proceeds in three main steps.<sup>3</sup>

The first step is to perform the most important calibration process in fsQCA. This task requires the specification of threshold values for each variable. Threshold values correspond to full membership, full non-membership, and the crossover point. Using these thresholds, the variable is readjusted from raw scores to fuzzy set configuration values between 0 (including complete ratios) and 1 (including complete ratios).<sup>4</sup>

The second step is to convert the data into a table known as the truth table. The row of truth tables represents all possible combinations of CSR activity factors. The effect of CSR activities is expected to vary depending on whether weights are taken into account. In the truth table, each company is assigned a row based on the fuzzy set member scores of CSR activity factors. Once the firm is assigned, the truth table evaluates which combinations consistently lead to performance and which ones do not. The minimum frequency and consistency thresholds for this task need to be specified. Frequency means the number of businesses that must be observed in the row of truth tables. To avoid inferences from single observations, it is recommended that the frequency be in a group of at least two firms for small data and at least three firms for large data [61]. Consistency is measured by the extent to which companies sharing a given combination of CSR activity factors share the results of high CSR activity effects. Ragin [18] recommends 0.80 as the minimum threshold. In this study, the consistency threshold of the stakeholder-weighted (SW) CSR group was 0.885 and that of the equal-weighted (EW) CSR group was 0.824.

The final step is to determine the commonality between the combinations of CSR activity factors that achieve consistently high CSR activity effects by applying algorithms based on Boolean algebra. This process identifies the core, peripheral, or redundant factors of CSR activity. In theory, key factors are tightly integrated and linked to other factors. They support the core but are surrounded by loosely coupled peripheral practices. Duplicate activity factors are not important because, whether they exist or not, they do not affect performance achievement. Based on these insights, Fiss [43] (p.398) defines core activities as causal conditions that show strong causality with performance, and peripheral activities as elements with weak evidence of causality with outcomes. This emphasizes the relative importance of activities within the union. A core activity is a necessary part of a combination to achieve performance, but it may not be enough on its own unless it is combined with a particular surrounding

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<sup>3</sup> For information on this method, we referred to Ragin [18] (p.44-68), Schneider and Wagemann [69] (p.126), and Bedford et al. [64] (p.25-27).

<sup>4</sup> Using the specified threshold, the logistic function is used to convert the fuzzy set score. Fiss [60] proposes adding a constant of 0.001 to the correction value of 0.5. This is necessary to prevent the loss of analysis in the crossover point [60, 70].

activity. However, because the surrounding activities are weakly linked, companies can replace or exchange them, potentially creating various combinations with the same effect.

### 3.2 Variable Description

#### 3.2.1 CSR Activities Index

One of the representative CSR activity indexes used in Korea is the Korean Economic Justice Institute (KEJI) Index, which was developed by the Korea Economic Justice Institute (KEJI) and the Citizens' Coalition for Economic Justice (CCEJ)<sup>5</sup> in 1991 to measure and report CSR activities of listed companies using financial results every year. The KEJI index, which has been published for approximately 27 years, maintains objectivity with a long history and is the most widely used index for CSR performance in Korea's CSR research. Initially, the KEJI index announced the top 200 companies, with a total score of 100 on seven items (soundness, fairness, contribution to social welfare, consumer protection, environmental protection, employee satisfaction, and contribution to the economy) and 58 indicators. Since 2012, the index has adjusted the indicators, weighting 73 indicators of 6 items (soundness, fairness, contribution to social welfare, consumer protection, environmental management, and employee satisfaction), rating them on a 100 point scale, and announces the top 200 companies after sorting them from the highest scores. This study used 1,400 KEJI index data from 2012 to 2018 for the analysis.

Table 1. *KEJI* evaluation clauses

Evaluation Clauses	Evaluation Index
Soundness (25%)	Governance, investment, and capital procurement
Fairness (20%)	Fairness, clarity, and relationship with others
Contribution to Social Welfare (15%)	Protection of neglected populations and supporting social welfare
Consumer protection (15%)	Protection of consumer rights, product quality, and advertisement
Environmental management (10%)	Commitment to environmental improvement, result of environmental commitment, and cases of illegal environment actions
Employee satisfaction (15%)	Investment in human resources, company benefits packages, gender equality, etc.

\* Source: Citizens' Coalition for Economic Justice, 2018.

\*\* ( ) is the weight.

The KEJI index assigns weights to six individual categories, limiting the maximum number of points that each category can have, which is somewhat arbitrary. This is because when companies allocate limited resources to CSR activities, they are influenced by their environment and strategy. Mandatory weighting of these individual categories can lead to problems that distort the company's actual intentions for CSR activities. Therefore, we converted the original scores of the individual KEJI

<sup>5</sup> The CCEJ is one of Korea's leading NGOs and was established to monitor the moral management and social responsibility of Korean companies. For more information about the CCEJ and KEJI, please visit [www.ccej.or.kr/eng/](http://www.ccej.or.kr/eng/).

index categories to a maximum of 100 points. For example, if the original score of health is 20, the health score is converted into  $20 \times (100/25) = 80$  because the maximum score is 25 and the weight is 25% of the health category. This results in a maximum total score of 600 for the six individual categories.

The first proxy is defined as the sum of simple scores from the six KEJI activity categories:

$$\text{Equal-weighted(EW) CSR activity index}_{it} = \sum_{k=1}^6 x_{ikt}$$

Where  $x_{ikt}$  is  $i$ -company's score for KEJI category  $k$  in year  $t$  with a maximum of 100 points as described above. This method assumes that all firms consider CSR factors equally important. However, companies may have different interests, depending on the environment or strategy they face [14]. As a result, companies are likely to receive different scores for CSR categories by allocating resources to specific stakeholder areas of interest. As a result, the EW CSR activity index does not reflect the situation that the company finds itself in. To solve this problem, we used the CSR weighting method suggested by Akpınar et al. [71].

Akpınar et al. [71] propose CSR measures that reflect the relative importance of each stakeholder group based on the industry in which the individual company operates. In order to calculate the SW CSR activity index, we classified the sample companies into 15 sectors according to the Korean Standard Industry Classification (KSIC-9)<sup>6</sup>. The KEJI index scores for each of the six categories were added together to obtain a CSR activity composite score for a particular industry. The individual sums of each of the six categories were then divided by the total sum to calculate the weights of the six categories for each industry. After obtaining weights for all industries, we multiplied the EW CSR activity index by the previously calculated weights to obtain the SW CSR activity index of all companies.

$$\text{Stakeholder-weighted(SW) CSR activity index}_{it} = \sum_{k=1}^6 x_{ijkt} \times \text{Weight}_{jkt}$$

The score of firm  $i$  in industry  $j$  in KEJI category  $k$  in year  $t$  can be calculated using  $x_{ijkt}$ .  $\text{Weight}_{jkt} = \frac{\text{Average}_{jkt}}{\sum_{k=1}^6 \text{Average}_{jkt}}$  and  $\text{Average}_{jkt}$  are the average scores in industry  $j$  in KEJI category  $k$  in year  $t$ . As the equation shows, the overall CSR measures industry weights for a particular KEJI category compared with the industry's average performance. Because CSR activities are directed at the interests of key stakeholders, these weights can be interpreted as reflecting the interests of various stakeholders.

### 3.2.2 Corporate Financial Performance

One of the ultimate reasons that companies conduct CSR activities is to improve financial performance for sustainable business. One of the most commonly used financial results of a company's CSR activities is return on equity (ROE), which reflects accounting performance and is calculated as follows:

$$\text{ROE} = (\text{Net Income}/\text{Total Equity}) \times 100$$

Should the ROE for companies with good CSR activities always achieve positive values? Even if a company performs well in CSR activities, it is possible that the ROE may be negative depending on changes in the business environment or market conditions. Are the company's CSR activities ineffective in this case? No. Rather, positive CSR activities result in a smaller loss than might otherwise have been incurred. However, the ROE of companies with good CSR activities should at least be larger than the industry average. Therefore, in this study, we used the adjusted ROE (AROE), which is the ROE of an

<sup>6</sup> There are more sectors classified based on the KSIC-9, but this analysis used 15 sectors.

individual company minus the sector average ROE, as its financial performance. The ROE adjusted to the industry average was calculated as follows:

$$AROE_{ijt} = ROE_{it} - MROE_{jt}$$

$AROE_{ijt}$  is the excess ROE of firm  $i$  in industry  $j$  in year  $t$ ,  $ROE_{it}$  is the ROE of firm  $i$  in year  $t$ , and  $MROE_{jt}$  is the industry average ROE of industry  $j$  in year  $t$ . A positive AROE is a high ROE and a negative AROE is a low ROE.

### 3.2.3 Calibration

Calibration refers to the adjustment made to conform to a reliable standard, which is a common way to standardize data in physics. One of the most important steps in fsQCA is the construction and correction of the fuzzy set. In fact, it is no exaggeration to say that the success of fuzzy set analysis depends on this stage. The most commonly used calibration method is Ragin's direct method, which Ragin [18] (p.85) describes as follows:

"Fuzzy sets are calibrated using external criteria, which in turn must follow from and conform to the researcher's conceptualization, definition, and labeling of the set in question. External standards can be implemented in two different ways. Using the first, *direct* method, the researcher specifies the values of an interval scale that correspond to the three qualitative breakpoints<sup>7</sup> that structure a fuzzy set: full membership, full non-membership, and the crossover point. These three benchmarks are then used to transform the original interval-scale values to fuzzy membership scores. Using the second, ... The end product of both methods is the fine-grained calibration of the degree of membership of cases in sets, with scores ranging from 0.0 to 1.0."

In order to calibrate the data accurately, the researcher must understand the change in the data and apply expert knowledge of what particular aspects of the change mean. We used median values to convert to fuzzy set scores because they have the advantage of being free from extreme problems that can occur when using average values [72]. We calculated the calibration values according to the Ragin [18] (p.85-104) direct method, which was performed using fsQCA 3.0 software. Table 2 shows the thresholds for calibration.

Table 2. Anchor points for calibration (High AROE group)

Variable	Membership function (Anchor Points)*	
	Stakeholder Weighted CSR activities index	Equal Weighted CSR activities index
Soundness	Calibration (15.12, 12.59, 10.42)	Calibration (74.70, 67.94, 59.36)
Fairness	Calibration (18.62, 16.05, 13.09)	Calibration (84.25, 76.75, 65.75)
Contribution to social welfare	Calibration (9.42, 5.06, 2.98)	Calibration (50.60, 44.56, 29.67)
Consumer Protection	Calibration (12.77, 12.18, 10.91)	Calibration (70.00, 68.33, 58.67)
Environmental Management	Calibration (8.27, 7.11, 6.00)	Calibration (61.00, 51.50, 45.50)

<sup>7</sup> Breakpoints can specify 3, 5, 7, or 10 breakpoints, but most researchers use 3 breakpoints because the process of specifying 5, 7, or 10 breakpoints is difficult [58, 18, 69]. Mendel and Korjani [73], by contrast, point out that the correction method may not explicitly explain the uncertainty of three or more breakpoints in the direct method.

Employee satisfaction	Calibration (11.90, 11.07, 8.14)	Calibration (69.75, 63.97, 52.60)
AROE	Calibration (0.19, 0.06, 0.00)	Calibration (0.19, 0.06, 0.00)

\* Anchor points are given in the following order: fully in, point of maximum ambiguity, fully out.

## 4. Results

### 4.1 Data and Descriptive Statistics

We used the KEJI indexes from 2012 to 2018 to sample our CSR index. The KEJI index on 200 companies is published each year for their excellent CSR activities, and we selected all 1,400 companies, which includes all 200 companies from each year (see Table 3). Most sample companies are manufacturing companies (1,085), whereas 315 are from other sectors, including non-manufacturing and financial. Financial performance data for each company was obtained separately from FnGuide<sup>8</sup>. Common method bias is not a problem because independent and dependent variable data are collected from two different sources.

Table 3. Industry (KSIC-9)

Industry	N	%
Construction	24	1.71
Education	4	0.29
Finance and insurance	48	3.43
Agriculture, forestry, fishing and aquaculture	5	0.36
Wholesale and retail trade	72	5.14
Real estate and rental	4	0.29
Business facilities management and business support services	7	0.50
Accommodation and food service	5	0.36
Arts, sports, and recreation related services	1	0.07
Transportation	24	1.71
Electricity, gas, steam, and air conditioning supply	14	1.00
Professional, scientific, and technical	58	4.14
Manufacturing	1,085	77.50
Publishing, electronic video, communication equipment, and information services	46	3.29
Associations and organizations, repairs and other personal services	3	0.21
Total	1,400	100.00

Table 4 shows the descriptive statistics of our sample data. The average ROE of the sample companies is 6.1%, which is 4.6% higher than the industry average ROE. The company's ROE, which had positive impacts on CSR activities, was 13.2% (AROE<sub>High</sub>) higher than the industry average ROE. However, the superior CSR activities did not mean that all companies had a high ROE, and companies with poor CSR activities were found to be -7.9% (AROE<sub>Low</sub>) lower than the industry average. This result

<sup>8</sup> FnGuide is a Korean CRSP (Center for Research in Security Prices) that provides financial information, statistics, and analysis on companies registered with the Korean Stock Exchange and KOSDAQ. (www.fnguide.com)

suggests that not all CSR activities lead to higher financial performance, and that an appropriate combination of CSR activities is required to achieve higher financial performance.

Table 4. Descriptive statistics (n=1,400)

	Mean	S.D	Min	Median	Max
ROE	0.061	0.26	-6.24	0.060	4.71
AROE	0.046	0.39	-5.67	0.017	6.37
<i>AROE<sub>HIGH</sub></i>	0.132	0.39	0.00	0.062	6.35
<i>AROE<sub>LOW</sub></i>	-0.079	0.36	-5.67	-0.027	0.00
SW CSR Activities Index	63.66	2.42	49.44	63.55	76.04
Soundness	12.79	2.39	7.98	12.49	36.11
Fairness	16.11	1.78	7.96	16.05	22.41
Contribution to social welfare	5.06	1.57	1.85	5.06	12.44
Consumer protection	11.94	1.04	6.26	12.18	15.75
Environmental management	7.01	1.80	0.00	7.11	12.45
Employee satisfaction	10.76	1.95	4.44	11.07	17.41
EW CSR Activities Index	366.58	18.70	278.99	367.32	424.74
Soundness	68.25	7.45	45.52	67.94	115.16
Fairness	76.78	9.89	43.75	76.75	86.75
Contribution to social welfare	42.82	9.89	18.33	44.56	81.87
Consumer protection	66.08	4.23	38.33	68.33	75.67
Environmental management	50.36	11.29	0.000	51.50	74.50
Employee satisfaction	62.61	7.72	33.40	63.97	78.72

Table 5 shows the result of calculating the weight of each CSR category in consideration of CSR activities using the method created by Akpinar et al. [71]. As shown in Table 5, the result reflects the characteristics of the sector well; the weights of health (weight = 25%) and consumer protection (weight = 20%) were the highest in the financial and insurance sectors, while environmental management was the lowest in these two sectors (weight = 2%). Meanwhile, the KEJI index gave the highest weight (25%) to soundness, but the calculated weight of soundness is 19%, which was calculated in consideration of industry conditions, indicating that in reality companies place less importance on soundness than the KEJI index does. By contrast, companies were more concerned with consumer protection, environmental management, and employee satisfaction than indicated by the KEJI index.

Table 5. Mean Weights by Industry (KSIC-9) and the KEJI category over 2012-2018 (n=1,400).

	Soundness	Fairness	Contribution to social	Consumer protection	Environment management	Employee satisfaction
Construction	0.18	0.21	0.13	0.18	0.14	0.16
Education	0.21	0.21	0.12	0.16	0.13	0.16
Finance and insurance	0.25	0.22	0.13	0.20	0.02	0.17
Agriculture, forestry, fishing and aquaculture	0.18	0.22	0.14	0.18	0.14	0.14
Wholesale and retail trade	0.18	0.21	0.12	0.18	0.14	0.17
Real estate and rental	0.16	0.19	0.13	0.18	0.15	0.19

Business facilities						
management and business support services	0.19	0.19	0.13	0.17	0.14	0.17
Accommodation and food service	0.19	0.21	0.12	0.18	0.14	0.16
Arts, sports and recreation related services	0.20	0.21	0.16	0.13	0.15	0.15
Transportation	0.18	0.21	0.12	0.18	0.14	0.17
Electricity, gas, steam and air conditioning supply	0.19	0.20	0.12	0.18	0.14	0.17
Professional, scientific and technical	0.18	0.21	0.13	0.18	0.14	0.18
Manufacture	0.18	0.21	0.11	0.18	0.14	0.17
Publishing, electronic video, communication equipment, and information services	0.19	0.20	0.13	0.17	0.14	0.17
Associations and organizations, repairs and other personal services	0.20	0.19	0.14	0.15	0.16	0.15
Average	0.19	0.21	0.13	0.17	0.13	0.17
<i>KEJI Index Weighted</i>	0.25	0.20	0.15	0.15	0.10	0.15

As discussed above, effective CSR activities were expected to have a positive relationship with financial performance. Table 6 shows the correlation coefficients between CSR activity factors and financial performance and provides some preliminary information. Not all CSR activity factors had a significant relationship with financial performance. Additionally, whether the weight of a CSR activity factor was considered or not affects the correlation among activity factors. For example, the EW CSR consumer protection activities showed a significant positive correlation with ROE, but the SW CSR was not significant. In the EW CSR, soundness was not correlated with the ROE, but in the SW CSR it was converted to a significant negative correlation. Furthermore, some activity factors show that weight considerations affect the relationship between activity factors (eg, fairness, social contribution and consumer protection) adversely. These findings suggest that CSR activities affect company performance differently, whether or not strategy and environmental considerations are involved.

Table 6. Pearson Correlation Coefficients (n=1400)

Panel A: Equal weighted CSR	1	2	3	4	5	6	7
1. Soundness	1.000	-.249**	.108**	-.354**	-.213**	-.270**	-.032
2. Fairness		1.000	-.067**	.142**	.091**	.032	.043
3. Contribution to Social Welfare			1.000	-.171**	.007	-.278**	.057**
4. Consumer Protection				1.000	.206**	.050	.079**
5. Environmental Management					1.000	.253**	.079**
6. Employee Satisfaction						1.000	.007
7. AROE							1.000
Panel B: Stakeholder weighted CSR	1	2	3	4	5	6	7
1. Soundness	1.000	-.235**	.228**	-.302**	-.416**	-.352**	-.056**
2. Fairness		1.000	-.016	.059**	-.065**	-.123**	.043
3. Contribution to Social Welfare			1.000	-.269**	-.159**	-.510**	.053**
4. Consumer Protection				1.000	-.053**	.008	.027

5. Environmental Management	1.000	.179**	.075**
6. Employee Satisfaction		1.000	-.028
7. AROE			1.000

Note: \*p<.10; \*\*p<.05; \*\*\*p<.01

#### 4.2 Combinations of CSR activities for high ROE

We performed a regression analysis to verify whether the six CSR activities had an overall effect on corporate performance before running a fuzzy set analysis. Table 7 shows the standardized regression coefficients and t-values from ordinary least squares (OLS) regression. Of the six CSR activities in the SW (Model 1) and EW (Model 2) CSR models, employee satisfaction was found to have significant effects, but most of the CSR activities did not have any significant effect. Because a company's CSR activities are performed in combination with a number of activity factors, adding interaction effects may produce different regression outcomes. We examined the potential interactions between CSR activities using fsQCA to examine whether a mixed composition of CSR activities could explain previous ambiguous and nondeterministic empirical results.

Table 7. OLS regression results for High AROE<sub>High</sub> firms (n=829)

	Dependent variable: AROE <sub>High</sub>			
	Model 1 <sup>a</sup>		Model 2 <sup>b</sup>	
	Coefficient	t-value	Coefficient	t-value
<i>SOUND</i>	0.019	0.403	0.029	0.745
<i>FAIR</i>	0.044	1.137	0.026	0.708
<i>CONSOC</i>	0.058	1.361	0.038	1.027
<i>CONPRO</i>	-0.010	-0.241	0.022	0.593
<i>ENVMGMT</i>	0.047	1.218	0.038	1.067
<i>EMPSAT</i>	0.078	1.788*	0.076	2.048**
<i>Adj. R</i> <sup>2</sup>	0.001		0.000	
<i>F</i> -value	0.907		1.054	
<i>Sig. F</i>	0.489		0.389	

Standardized coefficients reported. *SOUND* soundness, *Fair* fairness, *CONSOC* contribution to social, *CONPRO* consumer protection, *ENVMGMT* environment management, *EMPSAT* employee satisfaction.

a: stakeholder weighed (SW) CSR index firms, b: equal weighed (EW) CSR index firms.

\*p<.10; \*\*p<.05; \*\*\*p<.01

The fsQCA in Table 8 follows the method suggested by Ragin [18] and Ragin and Fiss [68]. The frequency threshold we used required the threshold of at least 70-80% of the cases. Our data was large enough to capture more than 90% of cases by adopting a frequency threshold of 3. The results in Table 8 show that the seven CSR activities we have found are fully linked to financial performance. We divided the results into two groups, SW CSR and EW CSR.

Table 8. Results of fsQCA for achieving high performance (High AROE) for High CSR index firms (n=829).

High AROE (sufficient causal conditions for High AROE)	
Stakeholder Weighed (SW) CSR activities index	Equal weighed (EW) CSR activities index

CSR activity	SH1a	SH1b	SH2a	SH2b	EH1a	EH1b	EH2
Soundness	●	⊗	⊗	●	●	●	●
Fairness	●	●			●	●	
Contribution to Social Welfare		●		●	⊗	●	●
Consumer Protection	⊗	⊗	⊗	●			⊗
Environmental Management	●		●		●	⊗	
Employee Satisfaction			●	●			●
Raw coverage	<u>0.165</u>	<u>0.161</u>	<u>0.209</u>	<u>0.197</u>	0.199	0.179	0.246
Unique coverage	0.016	0.014	0.008	0.001	0.050	0.014	0.025
Consistency	0.796	0.760	0.764	0.793	0.834	0.816	0.801
Overall solution coverage		0.594				0.511	
Overall solution consistency		0.885				0.824	

Solid circles (●) refer to the presence of CSR activities, Circles with a cross (⊗) designate its absence. Large circles represent core CSR activity. Small circles represent peripheral CSR activities. Blank spaces indicate the CSR activities are redundant for achieving the outcome.

Overall, we found four causal pathways in the SW CSR and three causal pathways in the EW CSR (with causal pathways describing high corporate performance) each with a consistency above 0.8. Overall solution consistency was 0.885 for SW CSR and 0.824 for EW CSR. Coverage was in the acceptable range, and the overall solution coverage was 0.594 and 0.511, respectively. The row coverages of the four combinations SH1a, SH1b, SH2a and SH2b of the SW CSR were 0.165, 0.161, 209 and 0.197, respectively. The row coverages of the three EW CSR combinations, EH1a, EH1b and EH2, were 0.199, 0.179, and 0.246, respectively. These results support the assertion that corporate CSR activities enhance corporate reputation, brand and trust, attract customers and employees, and ultimately increase profitability and corporate value [8-9, 44, 74-76].

As Table 8 shows, the solutions we found illustrate that there are core and peripheral conditions as well as a neutral exchange of the two combinations. The existence of different solutions generally refers to the equifinality of solutions, and the neutral permutations in solutions SH1 (SH1a, SH1b), SH2 (SH2a, SH2b), and EH1 (EH1a, EH1b) indicate the existence of secondary equivalence in the solution type.

Regarding key conditions, solutions SH1a and SH1b indicate the presence of fairness, which carries the highest weight (21%) in CSR activity, whereas there is no consumer protection activity. The solution also showed a trade-off between social contribution activities and environmental management activities, which had the lowest weight (13%). As the solution refers to the “absence” of the situation of consumer protection activities under the causal conditions of SH1a and SH1b, when fairness is a key activity, companies can achieve high performance even without consumer protection activities. Solution SH1a suggests that implementing environmental management activities can lead to high or low social contribution activities. However, solution SH1b, by contrast, carries out social contribution activities but is blank for environmental management. Solutions SH1a and SH1b thus indicate that high

social contributions and an absence of high environmental management activities can be treated as substitutes.

Solution SH2 differs from SH1 in that employee satisfaction is a key condition and fairness is not taken seriously. Conversely, solutions SH2a and SH2b, like SH1a and SH1b, indicate that high environmental management and lack of social contribution activities can be treated as substitutes. In addition, when executing environmental management activities as core conditions, we see that unlike SH1a, which is combined with environmental conditions, SH2a is not executed. Conversely, in contrast to SH1b, which lacks integrity as a key condition, SH2b combines the presence of soundness as a key condition. SH1 differs from SH2 in that fairness and absence of consumer protection are key conditions, while SH2 is critical in the absence of fairness and employee satisfaction. The difference in core CSR activities suggests that SH1 and SH2 are very different approaches to achieving high financial performance in the SW CSR context.

By contrast, the fsQCA results of EW CSR companies show three high-performance solutions. Each CSR combination includes soundness as a key condition. EH1a and EH1b are key conditions for fairness but do not include consumer protection and employee satisfaction. EH2 includes social contribution and employee satisfaction as key conditions. Solutions EH1a and EH1b also show a trade-off between social contribution activities and environmental management. Specifically, solution EH1a is marked as absent from social contribution activities, but environmental management activities achieve high performance due to the presence of key activities. By contrast, solution EH1b shows that social contribution activities exist as core activities, but environmental management is represented as absent. Solutions EH1a and EH1b thus indicate that the absence of social contribution activities and the existence of environmental management can be treated as substitutes. Furthermore, solution EH2 indicates that a combination of health, social contribution and the presence of employee satisfaction together with the absence of consumer protection is a key condition and a causal combination that does not value fairness and environmental management activities but still achieves high performance. Comparing the results of SW CSR and EW CSR, it can be seen that the combination of CSR activity factors depends on the weight of CSR activity factors (which also depends on the strategy and situation of the company).

#### 4.3 Combinations of CSR activities for low ROE

In fsQCA, the set of causal conditions that leads to performance is different from the negation of the set of conditions that leads to the absence of performance. This is because, unlike in regression analysis, if the inverse of the performance is used, the result does not change except for the sign of the coefficient [60]. Considering the characteristics of fsQCA, we analyzed the causal conditions leading to low ROE and the results are presented in Table 9.

Table 9. Results of fsQCA for achieving low performance (Low AROE) for High CSR index firms(n=571).

CSR activity	Low AROE (sufficient causal conditions for Low AROE)					
	Stakeholder Weighed (SW) CSR activities index				Equal weighed (EW) CSR activities index	
	SL1	SL2	SL3a	SL3b	EL1	EL2
Soundness	●	⊗		●	●	●
Fairness	⊗	⊗		●		
Contribution to Social Welfare			●		●	●
Consumer Protection	⊗	⊗				

Environmental Management	●	●	⊗	⊗	●	⊗
Employee Satisfaction			⊗			
Raw coverage	0.255	0.254	0.382	0.381	0.327	0.324
Unique coverage	0.009	0.009	0.016	0.023	0.069	0.066
Consistency	0.883	0.881	0.858	0.881	0.903	0.896
Overall solution coverage			0.685			0.393
Overall solution consistency			0.809			0.887

Solid circles (●) refer to the presence of CSR activities, Circles with a cross (⊗) designate its absence. Large circles represent core CSR activity. Small circles represent peripheral CSR activities. Blank spaces indicate the CSR activities are redundant for achieving the outcome.

Some previous studies argue that despite high CSR activities, the relationship between CSR and financial performance is negative [77] or there is no causal link between CSR and financial performance [13]. We defined that there are four paths to SW CSR and two paths to EW CSR, leading to low ROE.

The overall solution consistency that leads to low ROE in SW and EW CSR activities is 0.809 and 0.887, respectively. Coverage was in an acceptable range and the overall solution coverage was 0.685 and 0.393, respectively. The row coverages of the four combinations SL1, SL2 and SL3a and SL3b of the SW CSR were 0.255, 0.254, 0.382 and 0.381 respectively, and the row coverage of the two combinations EL1 and EL2 of the EW CSR were 0.327 and 0.324, respectively. Each of these means that CSR activities can lead to lower financial performance.

Regarding core conditions, solution SL1 was carrying out CSR activities by combining soundness and environmental management activities, and there was no fairness (21%) and consumer protection (17%) activities that are heavily weighted by SW CSR companies. By contrast, solutions SL1 and SL2 did not appear to be aware of the social contribution that can be used as a substitute in solutions SH1a and SH1b. This was also true for employee satisfaction activities. This combination represented a causal condition that leads to low performance. Solution SL2 shows that CSR activities are not combined with other activities, only environmental management activities are present, and soundness, fairness, and consumer protection activities were absent. Besides, social contribution activities and employee satisfaction activities could be high or low. Solution SL3a was a core activity, there are social contribution activities, but there are no environmental management and employee satisfaction activities. Meanwhile, soundness, fairness, and consumer protection activities could be high or low. However, solution SL3b shows a combination of soundness and fairness, a lack of environmental management activities, and social contribution, consumer protection, and employee satisfaction activities are unimportant. For EW companies, EL1 and EL2 combine soundness and social contribution activities and indicate that there is a combination with the absence of environmental management activities in the surrounding conditions. However, this causal condition seemed to be a powerful factor in achieving low performance with row coverage of 0.327 and 0.324, respectively.

As shown in Table 9, there were no special combinations except for the four cases presented in the SW CSR (SL1, SL2, SL3a and SL3b) and the two cases in the EW CSR (EL1 and EL2). Overall, our results appear to be limited in the number of firm configuration choices leading to high financial performance (Table 8) or the number of known causal combinations with respect to low financial performance.

## 5. Discussion and Conclusion

This study investigated combinations of CSR activities that are effective in achieving corporate sustainability. Moreover, it aimed to establish a bridge between studies that find that companies' CSR activities have an effect [37-41] and those that find no effect [12, 13, 29, 41, 44, 50, and 78]. We aimed to provide empirical evidence that the combination of CSR activities supports and identifies complementary constructs. Each of the seven solutions presented in Table 8 shows that at least two CSR activity factors are needed to achieve high performance and that activity factors can be substituted (there is a functional equivalence between combinations SH1a, SH1b, SH2a and SH2b, and combinations EH1a and EH1b).

The use of the fuzzy aggregation method in combining CSR activities has enabled the exploration and mapping of complementarity from the CSR perspective. The results show that this new methodological approach can provide a new starting point for interpretations of phenomena that are not currently described in a combination of CSR activities. To date, many CSR studies have focused on measuring companies' CSR levels as a single index that sums up the CSR activity factors and then focuses on whether this affects corporate performance. However, the drawback of this approach is that it is not easy to identify which of the various CSR activities influences the performance of the company. If CSR is performed through a combination of various factors, the more ordered the combinations, the better the effect [19]. Thus, our study assumes that complementarity effects are generated between ordered combinations. For example, when conducting intensive CSR activities to enhance sustainability, it is expected that all basic CSR activity factors, such as soundness, fairness, social contribution, consumer protection, environmental management, and employee satisfaction, will be high. The assumption was that the higher the activity level of these factors, the stronger the complementarity and ultimately the higher the corporate performance. As Table 8 shows, there is a complementarity between social contribution and environmental management related to environmental activities, which are referred to as key factors of corporate sustainability in both SW and EW CSR activities, between fairness and employee satisfaction. By contrast, as shown in Table 9, complementarity was not found empirically between relatively heterogeneous activity factors (e.g., soundness and environmental management, excluding SL3a). This result was inconsistent with Grandori and Furnari's [56] claim that complementarity can occur in both similar and discriminatory activities.

An effective approach to CSR activities is to begin with primary stakeholders and gradually expand to the secondary stakeholder level [44, 78]. As Table 8 shows, the causal route of the solution we found was the combination of the key elements, which included CSR activities at the primary stakeholder level (health, consumer protection, environmental management, and employee satisfaction) and secondary stakeholder level (fairness and social contribution, etc.), that leads to high financial performance. Conversely, Table 9 shows that the causal route of the solution is either mostly focused on CSR activities at the primary stakeholder level, or shows weak diversity of CSR activity combinations at the primary and secondary stakeholder levels. This was particularly true for SW CSR companies. If a company needs to conduct CSR activities in consideration of its business environment and strategy, the company is not strategic and focuses on solving the phenomenon. This may indicate that they may not fully enjoy the effectiveness of CSR activities. This result was consistent with Tang et al.'s [44] argument, suggesting that it is helpful for companies to generate profits by conducting long-term coherent CSR activities from primary to secondary stakeholders in a long-term and consistent manner.

Our study has some limitations. First, we did not completely overcome the problem of causal ambiguity even though we used QCA to analyze causal complexity. QCA is a suitable method for identifying combinations that match enough to drive results, but does not avoid the illogical blend of combinations and results. For example, sustainability is affected by the performance of a company's CSR activities, but in some cases sustainability results in CSR activities. In other words, the level of corporate sustainability may determine the level of CSR activity. Secondly, QCA is suitable for the

study of complex causality and multiple interactions, but because it is based on a complete interaction model that considers all possible configurations, the number of theoretically possible combinations increased exponentially.<sup>9</sup> Therefore, the number of cases available has to limit the number of causal conditions that can be analyzed simultaneously, and the investigator must be careful to ensure that there is sufficient freedom to avoid over-determining the results. Third, the CSR activities of companies used in our research are measured using CCEJ's own measurement system, so our research relied on this measurement system. For example, the KEJI index used in our research is one of the most reliable multi-dimensional CSR measures available in Korea. The status of the member's CSR awareness level, etc. was not measured. Therefore, we could not grasp the relationship between corporate CSR activities and corporate performance in various contexts.

Compared with a long-term study of the relationship between CSR activities and financial performance, the study of the role of sub-items of CSR activities is a relatively new topic. We look forward to more active research on CSR sub-categories and CSR practitioners' growing interest in this topic. It is therefore expected that the following studies will be conducted in future. First, a study on the role of CSR sub-details must be conducted. Our study examined the role of the six KEJI index categories, but for a deeper analysis, we need to analyze the roles of the sub-categories that make up these six categories. (In our study, data on the 73 sub-categories were not used because of limited availability). Second, a study on the direction of CSR activities according to the context of a company should be conducted. Companies will have different resource allocations depending on their environment and strategy. Therefore, corporate CSR activities can be affected by the environment or strategy. However, CSR studies to date have examined the role of CSR activities themselves, but lacked efforts to consider the environment or strategy of the company. Investigating the role of CSR activities in the context of a company's environment or strategy may provide managers with significant implications for CSR activities. In particular, questions combining the first and second research topics are expected to provide managers with insights into CSR activities. We will keep up with and participate in future discussions on these CSR research topics.

**Author Contributions:** Conceptualization, J.H.K and H.J.K; Methodology, J.H.K.; Analyzed the data, H.K. Writing-original draft preparation, J.H.K.; Writing-review & editing, J.H.K., H.J.K., and H.K.; Funding acquisition, H.J.K. All authors contributed to the writing, and have read and approved the final manuscript.

**Funding:** This work was supported by the research program of Soonchunhyang University.

**Conflicts of Interest:** The authors declare no conflict of interest.

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<sup>9</sup> See Marx [80] and Marx and Dusa [81] for benchmarks on the appropriate ratio of causal conditions in the cases.

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