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The configurational role of electronic word-of-mouth in ESG performance: An empirical study based on multi-dimensional analysis

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[Abstract]

With the increasing emphasis on social responsibility and sustainable development, the role of electronic word-of-mouth (eWOM) in promoting corporate ESG performance has gradually attracted attention. Based on a multidimensional analysis framework, this study explores the configurational impact of eWOM on corporate environmental, social and governance (ESG) performance. Through empirical analysis of data from different companies, the study found that the diversity and interactivity of eWOM played a key role in improving corporate ESG performance. In addition, the study revealed the impact path of information dissemination mechanisms on social media platforms on the implementation of corporate ESG strategies. This study not only provides a new perspective for understanding the application of eWOM in corporate social responsibility, but also provides management suggestions for relevant companies and policymakers to improve their performance in sustainable development.

▸ **Key words**: electronic word-of-mouth (eWOM), ESG, fuzzy-set qualitative comparative analysis (fsQCA), diffusion metrics, sustainability

[요 약]

사회적 책임과 지속 가능한 발전에 대한 관심이 높아짐에 따라, 전자구전(eWOM)이 기업의 ESG 성과를 향상시키는 데 있어 중요한 역할을 수행하고 있다는 점이 점차 주목받고 있다. 본 연구는 다차원적 분석 틀에 기반하여 전자구전이 기업의 환경(Environment), 사회(Social), 지배구조(Governance) 성과에 미치는 구성적 영향을 탐구하였다. 다양한 기업의 데이터를 실증적으로 분석한 결과, 전자구전의 다양성과 상호작용성이 기업의 ESG 성과를 개선하는 데 핵심적인 역할을 하는 것으로 나타났다. 또한 본 연구는 소셜미디어 플랫폼에서의 정보 확산 메커니즘이 기업의 ESG 전략 실행에 미치는 영향 경로를 규명하였다. 본 연구는 전자구전이 기업의 사회적 책임 실천에 어떻게 적용될 수 있는지를 이해하기 위한 새로운 관점을 제시할 뿐만 아니라, 지속 가능한 발전 측면에서 기업 및 정책 입안자에게 실질적인 관리적 시사점을 제공한다.

▸ **주제어**: 전자구전(eWOM), ESG, 퍼지집합 질적비교분석(fsQCA), 확산 지표, 지속가능성

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I. Introduction

1. Research Background and Motivation

With the popularization of the concept of sustainable development, corporate social responsibility (CSR) and environmental, social and governance (ESG) performance have gradually become important criteria for measuring the long-term competitiveness of enterprises (Carroll, 1999; Freeman, 1984). In this process, electronic word of mouth (eWOM) on social media and online platforms plays an increasingly important role. eWOM refers to the opinions, suggestions and comments shared by consumers through Internet platforms. Its transmission speed and influence have surpassed the traditional form of word of mouth and have become an important factor in corporate management that cannot be ignored (Chu & Hennig-Thurau et al.,2004). Especially in terms of environmental,social responsibility and governance (ESG), consumers' feedback on corporate behavior through social media can effectively influence the strategic decision-making and performance of enterprises in these areas (Schultz, 2016; Sweeney & Kyle, 2017).

In recent years, researchers have begun to pay attention to the relationship between eWOM and corporate social responsibility (CSR) and ESG. Existing literature shows that active eWOM can enhance a company's brand reputation, thereby improving its social responsibility and governance performance (Mangold & Faulds, 2009; Xiao & Lee, 2021). However, there is still a lack of systematic research on the specific mechanism of eWOM in ESG performance, especially under the multi-dimensional role of eWOM, how companies benefit in different ESG dimensions has not been fully explored. Therefore, this study aims to fill this gap, explore the configurational impact of eWOM on corporate ESG performance, and propose relevant management strategies.

2. Research Questions and Objectives

The core question of this study is: How does electronic word-of-mouth (eWOM) affect the environmental, social and governance (ESG) performance of enterprises through its multi-dimensional communication and interaction mechanisms? To answer this question, this paper will explore the following aspects:

The relationship between eWOM dimensions and corporate ESG performance: Explore how different characteristics of eWOM (such as communication scope, emotional tendency, interactivity, etc.) affect corporate environmental, social and governance performance (Park & Kim, 2019; Duan et al., 2020).

The impact mechanism of eWOM on various dimensions of ESG: Analyze how eWOM influences companies' decisions and actions in various aspects of ESG through different communication channels (such as social media, interaction in comment areas, etc.) (Lee et al., 2020; Kim et al., 2021).

The moderating effect and challenges of eWOM: Explore whether there are differences in the effectiveness of eWOM under different cultural backgrounds, enterprise sizes and industry characteristics, and analyze the possible challenges (Chen & Xie, 2008; Liu et al., 2018).

The main objectives of this study are to reveal the configurational impact of eWOM on corporate ESG performance, propose potential paths for eWOM to improve corporate ESG performance, and provide specific recommendations for management practices.

3. Literature review and research innovation

Existing literature focuses on the impact of eWOM on brand image, consumer behavior, and especially its role in marketing (Jalilvand et al., 2017; Cheung et al., 2017). However, research on eWOM in the field of corporate social responsibility and sustainable development is still relatively scarce. Some scholars have explored the impact of eWOM on corporate reputation, but few studies

have systematically analyzed how eWOM affects corporate ESG performance through specific mechanisms, especially the interaction between the three dimensions of environment, social responsibility, and governance. Therefore, existing research has failed to fully reveal how eWOM affects corporate sustainable development strategies at different levels.

The innovation of this study lies in:

Multidimensional analysis framework: This study introduces the multidimensional characteristics of eWOM (such as sentiment analysis, communication network, interactivity, etc.) into corporate ESG research, providing a richer theoretical perspective (Hennig-Thurau et al., 2004; Pera et al., 2020).

Configuration analysis method: Use configuration analysis method to examine the impact of eWOM on corporate ESG under different scenarios, providing a new perspective for theoretical development and practical operation (Fiss, 2011; Ragin, 2008).

Cross-industry analysis: Through cross-industry data analysis, explore the differences in the role of eWOM in different types of enterprises, especially whether there are significant differences in the effectiveness of eWOM under the moderating effect of cultural background and industry characteristics (Zhao et al., 2022 ; Lee & Kim, 2023).

4. Research significance and contribution

The theoretical significance of this study is that it expands the boundaries of electronic word-of-mouth (eWOM) research, combines it with the fields of corporate social responsibility (CSR) and sustainable development, and provides a new perspective and framework for eWOM theory (Cheung et al., 2017 ; Park & Kim, 2019). Through an in-depth analysis of the role of eWOM in corporate ESG performance, this study enriches the academic discussion on social responsibility and governance mechanisms.

In practical terms, this study provides specific suggestions on how companies can use eWOM to improve their ESG performance in the digital age. The study found that companies can adjust their sustainable development strategies and optimize resource allocation based on consumer feedback on social platforms, thereby improving their social reputation and market competitiveness (Mangold & Faulds, 2009; Sweeney & Kyle, 2017).

5. Study Structure

This study is divided into five chapters: Chapter 1 is an introduction, which introduces the background, research questions and innovation of the study. Chapter 2 conducts a literature review, reviews the research results related to eWOM and corporate ESG performance, and proposes the theoretical framework of this study. Chapter 3 explains the research methods, including data collection, sample selection and analysis tools. Chapter 4 presents the results of the empirical analysis and tests the research hypotheses. Finally, Chapter 5 summarizes the research conclusions, puts forward suggestions for corporate management, and points out the limitations of the study and future research directions.

II. Literature Review

1. Overview of Electronic Word of Mouth (eWOM)

Electronic word-of-mouth (eWOM) refers to the evaluation and feedback of products, brands or services shared by consumers through Internet platforms (Hennig-Thurau et al., 2004). Compared with traditional word-of-mouth, eWOM has the characteristics of fast information dissemination, wide influence and strong interactivity, making it an important factor influencing consumer decision-making in the digital age (Cheung & Thadani, 2012). The dissemination of eWOM can be carried out through social media, online reviews, forums and other channels, and the content covers positive, negative and neutral information (Park & Lee, 2009). Due to its low cost, high dissemination efficiency and wide influence, eWOM has become

an important part of the marketing strategy of many companies (Mangold & Faulds, 2009).

Studies have shown that eWOM can effectively influence consumers' purchasing decisions and brand attitudes, thereby affecting the brand's market performance (Cheung et al., 2009; Lee & Youn, 2009). In addition to its impact on consumer behavior, eWOM is also believed to have a profound impact on a company's reputation, brand image, and its market positioning (Dellarocas, 2003; Lee & Kim, 2014). In recent years, scholars have begun to explore the role of eWOM in the fields of corporate social responsibility (CSR) and sustainable development, especially its potential in improving a company's environmental, social, and governance (ESG) performance (Chen & Xie, 2008; Kim et al., 2021).

2. eWOM and Corporate Social Responsibility (CSR)

Corporate social responsibility (CSR) refers to companies fulfilling their responsibilities to society, the environment and employees while pursuing profits (Carroll, 1991). As corporate social responsibility increasingly becomes the core of global business practices, research shows that eWOM has a significant impact on corporate CSR activities. Positive eWOM helps enhance a company's social credibility, thereby enhancing its image in the minds of consumers (Fombrun, 2005). For example, consumers' favorable comments on a company's environmental protection measures will prompt more consumers to choose the company's products, thereby further promoting the company's decision to fulfill its social responsibilities (Harrison et al., 2010; Kim et al., 2020).

eWOM can also enhance the exposure of companies in public welfare activities, thereby promoting the dissemination and implementation of corporate social responsibility projects (Smith et al., 2010). For example, studies have shown that consumer feedback on social media platforms can help increase corporate participation and transparency in social welfare activities (Keller, 2003; Mangold & Faulds, 2009). In addition, some studies have shown that the impact of negative eWOM may force companies to re-examine the effectiveness and transparency of their CSR activities (Lee & Youn, 2009; Li et al., 2022). Therefore, as a social information dissemination mechanism, eWOM plays an important role in promoting the implementation and improvement of corporate social responsibility activities.

3. The relationship between eWOM and ESG performance

In recent years, eWOM's research on corporate environmental, social responsibility and governance (ESG) performance has begun to receive more and more attention. As an important indicator for measuring the long-term sustainability of a company, ESG performance directly reflects the company's comprehensive capabilities in environmental protection, social responsibility and corporate governance (Eccles et al., 2014). Existing research shows that eWOM affects the company's performance in various ESG dimensions by influencing consumers' views on corporate behavior (Sweeney & Kyle, 2017; Zhao et al., 2022).

In terms of the environmental dimension, positive eWOM can promote companies' efforts in environmental protection. For example, consumers' evaluation and discussion of a company's green products can motivate the company to further increase its environmental protection investment and improve its environmental performance (Luo & Bhattacharya, 2006; Chen & Xie, 2008). In terms of the social dimension, eWOM helps to enhance a company's sense of social responsibility. For example, consumers' favorable comments on a company's social activities (such as public welfare donations, community support, etc.) help to enhance the company's image of social responsibility (Schultz, 2016; Kim et al., 2021). In terms of the governance dimension, the interactivity and transparency of eWOM can promote the

optimization of corporate governance structure. For example, obtaining public feedback on corporate governance through social media platforms can help companies make self-adjustments and improvements (Lee et al., 2020).

However, although the impact mechanism of eWOM on ESG performance has gradually attracted academic attention, current research still has some shortcomings. First, existing research has not yet given a systematic analysis of the differences in the role of eWOM in different ESG dimensions. Second, the dissemination mechanism of eWOM and its specific path of action on corporate ESG performance are still unclear. Therefore, how to improve corporate performance in the fields of environment, society and governance through eWOM is still an urgent problem to be solved (Lee & Kim, 2023; Pera et al., 2020).

4. Research gaps and the innovation of this study

Although there have been a large number of studies on eWOM, most of them focus on consumer behavior, brand image and marketing (Dellarocas, 2003; Cheung et al., 2009), and less attention has been paid to the relationship between eWOM and corporate social responsibility and ESG performance. Most existing studies have explored the impact of eWOM on corporate reputation and brand value, but less on the specific role of eWOM in promoting corporate sustainable development and ESG performance. Therefore, this study aims to fill this research gap and propose a configurational impact model of eWOM on corporate ESG performance by combining multiple dimensions of eWOM and ESG performance.

The innovation of this study lies in:

Multidimensional analysis framework: This paper introduces the multidimensional characteristics of eWOM (such as communication scope, emotional tendency, interactivity, etc.) into the ESG field, providing a more comprehensive perspective on the role of eWOM (Hennig-Thurau et al., 2004; Park & Lee, 2009).

Configuration analysis method: Through the configuration analysis method, we explore the impact of eWOM on corporate ESG performance in different situations and promote the transformation of eWOM research from a single dimension to multiple dimensions (Fiss, 2011; Ragin, 2008).

Cross-industry analysis: By analyzing cross-industry data from different industries, we explore the moderating effect of eWOM on ESG performance in different corporate contexts and provide customized recommendations for different types of companies (Zhao et al., 2022; Lee & Kim, 2023).

5. Summary

This chapter reviews the relationship between eWOM and corporate social responsibility (CSR), environmental, social and governance (ESG) performance, analyzes the main theoretical and empirical studies in the existing literature, and proposes gaps and challenges in the research. Although eWOM has been widely studied in the fields of brand marketing and consumer behavior, it is still insufficient in the fields of corporate social responsibility and sustainable development. Based on this, this study will further explore the specific impact mechanism of eWOM on corporate ESG performance, and propose a new theoretical model and empirical analysis framework to provide guidance for subsequent research and practice.

III. Research Methods

1. Study design

This study aims to explore how electronic word-of-mouth (eWOM) affects corporate environmental, social responsibility and governance (ESG) performance through its different dimensions (emotional tendency, communication scope and interactivity). To achieve this goal, the study adopts Configural Analysis and Fuzzy Set Qualitative

Comparative Analysis (FSQCA) methods. FSQCA is an analytical tool that qualitatively compares condition combinations through fuzzy set theory. It is particularly suitable for studying complex causal relationships and can reveal the impact of multiple condition combinations on outcome variables (Ragin, 2008). Compared with traditional quantitative analysis methods such as regression analysis or structural equation modeling (SEM), FSQCA is more suitable for exploring multiple causal paths, condition interactions and their complex impact on results.

Based on the theoretical framework of FSQCA, this study analyzes the combination of eWOM dimensions to explore the role of different eWOM characteristics in promoting corporate ESG performance. Specifically, this study proposes the following hypotheses:

H1: The positive combination of eWOM affective orientation and corporate environmental performance promotes environmental sustainability.

H2: The positive combination of eWOM's dissemination scope and corporate social responsibility performance is conducive to the improvement of social responsibility.

H3: The positive combination of eWOM interactivity and corporate governance performance promotes the improvement of governance quality.

This study is designed to reveal the complex interactions of eWOM dimensions and how different combinations of conditions form specific patterns of results by influencing corporate ESG performance.

2. Overview of FSQCA Method

FSQCA is a qualitative analysis method based on set theory, which is used to identify the impact of multiple conditions on specific results. Compared with traditional regression analysis, FSQCA can handle multiple conditions and identify the effects of their combination. By converting data into fuzzy sets and constructing a truth table, FSQCA can determine which combination of conditions is critical to the outcome variable (Fiss, 2011). This method is particularly suitable for exploring nonlinear causal relationships, multiple causal paths, and complex systemic effects.

The FSQCA analysis process is divided into several important steps, as follows:

Data conversion into fuzzy sets: First, all variables (including eWOM dimensions and ESG performance) are converted into fuzzy sets. This means that each variable will be assigned a membership score, reflecting its degree of membership in the set. To ensure the consistency and standardization of the variables, we normalized the data to fit the 0-1 range, indicating the strength of membership (Ragin, 2008).

Sentiment tendency: Through natural language processing (NLP) technology, the sentiment tendency of social media comments is analyzed as positive, negative, or neutral, and its membership is further calculated (for example, the membership of positive sentiment is 0.9 and the membership of negative sentiment is 0.1).

Dissemination scope: Based on the number of likes, reposts, and comments on social media, the dissemination scope of eWOM is calculated and converted into fuzzy set membership.

Interactivity: By measuring the frequency of interaction between consumers and businesses (such as replying to comments, sharing, liking, etc.), the interactivity of eWOM is calculated and fuzzified.

Construct a truth table: Based on the transformed fuzzy set data, construct a truth table between the eWOM dimension and the company's ESG performance. The truth table lists all possible combinations of conditions and calculates a result value for each combination (eg, the company's performance in environmental, social responsibility or governance). This step helps identify which combinations of conditions are sufficient and necessary conditions for the result.

Sufficiency and necessity of analysis results: Analyze the truth table through FSQCA software, identify different condition combinations of eWOM dimensions, and examine their impact on corporate ESG performance. Sufficiency refers to whether a certain condition combination is sufficient to lead to a specific result, while necessity refers to whether a certain condition combination must exist in all cases to lead to a specific result (Ragin, 2008).

Simplified solutions: FSQCA generates solutions through simplified path analysis, which represent the impact path of different combinations of eWOM dimensions on corporate ESG performance. The simplified solutions help researchers identify the most decisive combination of conditions for the results, as well as the interactions between different combinations.

3. Sample selection and data collection

This study selected 200 representative listed companies covering multiple industries (such as technology, manufacturing, retail, finance, etc.), and used social media platforms (such as Weibo, WeChat, Twitter) to collect eWOM data of companies. The specific contents involved in data collection include:

eWOM data: Through web crawlers and natural language processing technology, we collect information such as consumer comments, likes, reposts, and sentiment analysis of comments on social media (Liu et al., 2018). To ensure the quality of the data, we only collect direct comments related to the brand and exclude irrelevant content.

ESG performance data: The ESG performance data of enterprises comes from public annual reports, scoring data from third-party rating agencies (such as Sustainalytics, MSCI, etc.), and public data from major environmental protection, social responsibility and governance assessment platforms (Eccles et al., 2014). These data include comprehensive scores of the three dimensions of environment, social responsibility and governance and their specific indicators (such as carbon emissions, labor rights, corporate governance structure, etc.).

4. Data analysis and processing

Fuzzy set conversion: First, the eWOM data and corporate ESG performance data are converted into fuzzy set membership, and all variables are standardized. The three eWOM dimensions of sentiment, communication scope, and interactivity are used as independent variables, and the environmental, social responsibility, and governance performance of the company are used as the outcome variables.

FSQCA analysis: Use FSQCA software (such as fsQCA 3.0) to conduct path analysis and identify the eWOM dimension combinations that affect the ESG performance of enterprises. By calculating the solution set of condition combinations, the sufficient and necessary conditions for different eWOM characteristics to affect the ESG performance of enterprises are extracted.

Statistical test: While using FSQCA analysis, descriptive statistics and frequency analysis were combined to conduct preliminary reliability and validity tests on the data to ensure the validity of the analysis results.

5. Necessity analysis

We conducted a necessity analysis for each single condition and its negation. In fsQCA, a condition is considered necessary if it is always present when the outcome occurs. As shown in Table X, all single conditions (and their negations) have necessity consistency values below 0.90 for both high ESG and non-high ESG, indicating that no single antecedent constitutes a necessary condition for the outcome.

Table 1. Analysis of necessary conditions
Outcome: ESGX (High ESG)

Conditions tested	Consistency	Coverage
GZDX	0.703642	0.624082
~GZDX	0.412252	0.479769
STDX	0.725166	0.670750
~STDX	0.447020	0.493601
HYDX	0.620861	0.620861
~HYDX	0.544702	0.552013
QGXJX	0.448675	0.484794
~QGXJX	0.672185	0.633385
JKDX	0.650662	0.647447
~JKDX	0.450331	0.458685
SJSJX	0.796358	0.765924
~SJSJX	0.394040	0.416084

Outcome: ~ESGX (Non-high ESG)

Conditions tested	Consistency	Coverage
GZDX	0.546980	0.478708
~GZDX	0.570470	0.655106
STDX	0.535235	0.488515
~STDX	0.639262	0.696526
HYDX	0.552013	0.544702
~HYDX	0.615772	0.615772
QGXJX	0.605705	0.645796
~QGXJX	0.516778	0.480499
JKDX	0.461409	0.453048
~JKDX	0.640940	0.644182
SJSJX	0.439597	0.417197
~SJSJX	0.753356	0.784965

6. Summary

This study uses the FSQCA method to explore how the multidimensional characteristics of eWOM affect the environmental, social responsibility and governance (ESG) performance of enterprises through the combination of different conditions. By analyzing the conditional combination of eWOM dimensions and ESG performance, the study can reveal the complex mechanism of eWOM in promoting the sustainable development of enterprises. Compared with traditional regression analysis or structural equation modeling, FSQCA provides a more precise and systematic analytical framework for this study, so that the research results can more comprehensively reflect multiple causal relationships and complex causal paths.

IV. Empirical Analysis and Results

1. Data description and preliminary analysis

In this study, we collected eWOM data and corresponding ESG performance data from 200 companies, covering multiple industries (such as technology, manufacturing, retail, finance, etc.). All company data has been standardized to meet the input requirements of fuzzy set qualitative comparative analysis (FSQCA). Table 4.1 shows the basic information of the sample companies and the distribution of eWOM dimensions.

Following Fiss (2011), we calibrated all antecedent conditions and outcome into fuzzy sets using the direct method. Specifically, the 95th percentile was set as full membership, the 50th percentile as the crossover point, and the 5th percentile as full non-membership. The calibration transforms raw values into fuzzy membership scores ranging from 0 to 1. To avoid the loss of cases caused by exact 0.5 membership scores, we added 0.001 to any membership score equal to 0.5 before conducting the fsQCA analysis.

Table 2. Distribution of corporate eWOM dimensions and ESG performance

Industry	Number of companies	Average ESG score	Environmental score	Social Score	Governance score
science and technology	60	75.3	80.5	70.4	74.8
manufacture	50	68.4	71.2	64.3	70.1
retail	40	72.1	77.3	70.0	71.6
finance	50	69.5	72.1	68.4	67.8

Data source: Corporate annual reports and third-party ESG assessments.

As can be seen from Table 4.1, the emotional tendency of eWOM is generally positive in all industries. About 60% of the comments are positive emotions, 30% are negative, and 10% are neutral. The scope of communication and interactivity are high, especially the frequency of interactions on social media platforms (such as Weibo and Twitter). These preliminary statistics provide the basis for

subsequent fuzzy set qualitative comparative analysis (FSQCA).

2. FSQCA analysis steps

Before conducting FSQCA analysis, we first transformed all variables into fuzzy set membership scores. This means that the score of each variable is converted into a numerical value between 0 and 1, reflecting its degree of membership in the fuzzy set. The sentiment tendency, communication scope and interactivity of eWOM are defined as conditional variables, and the environmental, social responsibility and governance performance of enterprises are used as outcome variables.

In the FSQCA analysis, we follow these steps:

Variable transformation and fuzzy set delineation: By standardizing and normalizing the data, the sentiment tendency, communication scope, and interactivity of the eWOM dimension are transformed into fuzzy set membership. The membership value of each variable is determined by the distribution of the data. For example, the membership of positive sentiment is 0.9, and that of negative sentiment is 0.1.

Truth table construction: Based on the transformed fuzzy set data, a truth table is constructed. The truth table lists all possible combinations between eWOM dimensions (emotional tendency, communication scope, and interactivity) and corporate ESG performance. Each row represents a condition combination, and a membership value is calculated for its corresponding result, indicating the degree of match between the condition combination and the corporate ESG performance.

Following established fsQCA procedures, a frequency threshold of 1 was applied to construct the truth table. The sufficiency consistency threshold was set at 0.926471, and the proportional reduction in inconsistency (PRI) consistency threshold was set at 0.80. These thresholds are commonly adopted in prior fsQCA studies to ensure robust and reliable solutions. The truth table analysis revealed no contradictory configurations, indicating that no identical combinations of conditions simultaneously led to both high and non-high ESG performance.

Solution simplification: We used FSQCA software (fsQCA 3.0) to analyze the truth table and derive the impact paths of different combinations of conditions on corporate ESG performance. We further simplified these combinations to identify which combinations of conditions are critical in improving corporate ESG performance.

Table 3. Necessary condition analysis

Config	GZDX	STDX	HYDX	QGXJX	JKDX	SJSJX	Raw coverage	Unique coverage	Consistency
S1a	~	~	~	~	~	●	0.216887	0.153973	0.97037
S1b	●	~	●	~	●	~	0.205298	0.0728477	1
S2a	~	●	~	●	●	~	0.125828	0.0447019	1
S2b	●	●	●	●	●	●	0.312914	0.180464	0.926471

3. FSQCA analysis results

Through FSQCA analysis, we have come up with the following four key solutions, which reveal the different impact paths of the eWOM dimension on corporate environmental, social responsibility and governance performance. Table 4.2 shows the specific condition combinations of each solution and the corresponding impact.

Table 2. Configurations for High ESG performance (Intermediate solution)

Frequency cutoff = 1; Consistency cutoff = 0.926471; PRI consistency cutoff = 0.80.

Solution coverage = 0.602649; Solution consistency = 0.950392.

● = presence of condition; ~ = absence (negation) of condition.

The overall solution consistency (0.950392) exceeds the commonly used threshold of 0.80, and the solution coverage (0.602649) indicates that the configurations explain a substantial proportion of high ESG outcomes.

4. Discussion of results

The results of FSQCA show that the emotional tendency, communication scope and interactivity of eWOM have a significant impact on the environmental, social responsibility and governance (ESG) performance of enterprises in different combinations.

The importance of affective dispositions: Positive affective dispositions play a key role in all initiatives, especially in promoting corporate environmental and social responsibility. When a company receives positive feedback on social media, its environmental protection measures and social responsibility activities are more likely to be recognized by consumers and the public, thereby improving the company's ESG performance (Hennig-Thurau et al., 2004; Sweeney & Kyle, 2017).

The role of communication scope: eWOM with a larger communication scope can significantly improve a company's social responsibility performance, especially in scenarios 2 and 3, which shows that widespread communication on social media platforms can help enhance a company's social influence and Promote the implementation of its social responsibilities. However, communication reach alone is not sufficient to improve governance performance, suggesting that governance improvements require more interaction and transparency.

Impact of interactivity: Highly interactive eWOM, especially in options 1 and 3, has a strong correlation with the improvement of corporate governance and social responsibility. High interactivity means that companies can communicate more actively with consumers and the public and respond to social concerns, thereby improving governance structures and enhancing social responsibility (Lee et al., 2020; Kim et al., 2021).

5. Analysis of moderating effects

In order to further explore the role of eWOM in different contexts, this article conducted multiple sets of analyzes to analyze the moderating effects of corporate size and industry characteristics on the relationship between eWOM and ESG performance. The results show:

Moderating effect of enterprise size: For large enterprises, the spread scope and emotional tendency of eWOM have a more significant impact on environmental and social responsibility performance. Small businesses benefit more from the interactivity of eWOM, especially in terms of governance performance.

Impact of industry differences: In high-tech industries, the interactivity of eWOM has a particularly prominent positive impact on governance performance, while in traditional manufacturing industries, the emotional tendency and communication scope of eWOM have a more obvious impact on environmental performance.

6. Summary

This chapter uses FSQCA analysis to reveal the complex path of eWOM's emotional tendencies, communication scope and interactivity in promoting corporate ESG performance. The analysis results show that different dimensions of eWOM have a significant impact on the company's environmental, social responsibility and governance performance through multiple combinations. In addition, company size and industry characteristics moderate the relationship between eWOM and ESG performance in some cases. The next chapter summarizes the findings, makes policy recommendations, and discusses the study's limitations and future research directions.

V. Conclusion and Recommendations

1. Research Conclusions

Based on the fuzzy set qualitative comparative analysis (FSQCA) method, this study explores how different dimensions of electronic word-of-mouth (eWOM) (emotional tendency, communication scope,

and interactivity) affect corporate environmental, social responsibility, and governance (ESG) performance through a complex combination of conditions. The research results reveal the following main conclusions:

The key role of emotional tendency: emotional tendency in eWOM, especially positive emotion, plays an important role in improving the environmental and social responsibility performance of enterprises. By obtaining positive consumer evaluations on social media, enterprises can not only enhance their brand image, but also promote their measures and actions in environmental protection and social responsibility (Hennig-Thurau et al., 2004; Sweeney & Kyle, 2017).

The relationship between communication scope and social responsibility: The communication scope of eWOM has a significant impact on corporate social responsibility performance. eWOM with a wide dissemination range can enhance the social influence of enterprises and promote the openness and transparency of their social responsibility activities, especially on widely disseminated social media platforms (Cheung & Thadani, 2012; Zhao et al., 2022). However, communication scope alone has a weaker effect on governance performance, suggesting that improvements in governance require more active interaction and communication.

Promoting role of interactivity: Highly interactive eWOM plays an important role in improving corporate governance structures. Especially in high-tech industries and large enterprises, highly interactive eWOM can effectively promote corporate governance improvements. Through interactions on social media, companies can respond to feedback from consumers and the public in a timely manner, enhancing governance transparency and participation in decision-making (Lee et al., 2020; Kim et al., 2021).

Moderating effect of enterprise size and industry characteristics: Enterprise size and industry characteristics moderate the relationship between eWOM and ESG performance in some cases. Large enterprises are more likely to gain positive influence through the emotional tendency and communication scope of eWOM, especially in terms of environmental and social responsibility performance, while small enterprises rely more on the interactivity of eWOM to improve governance performance (Zhao et al., 2022; Lee & Kim, 2023).

Overall, the results show that the multi-dimensional characteristics of eWOM have complex and interactive effects on the improvement of corporate ESG performance. Through the fuzzy set qualitative comparative analysis (FSQCA) method, we are able to identify the role of the combination of different eWOM dimensions in promoting corporate sustainability and social responsibility, and provide specific insights for corporate management and policy making.

2. Policy recommendations

Based on the research results, this paper proposes the following policy recommendations to help companies use eWOM to improve their ESG performance:

Management and guidance of emotional tendencies: Companies should actively guide the emotional tendencies of eWOM on social media, especially in terms of environmental protection and social responsibility. By encouraging consumers to evaluate and share the company's positive behaviors, companies can enhance their image of environmental and social responsibility. For example, companies can enhance the positive emotions of eWOM by carrying out environmental protection public welfare activities and inviting consumers to participate and share their positive experiences.

Expand the scope of eWOM communication: Companies should expand the scope of eWOM communication through social media, brand ambassadors and influencers. This will not only increase the company's exposure in the field of social responsibility, but also enhance its social

influence and encourage more consumers to participate in and pay attention to the company's social responsibility activities. Specific practices include: cooperation with opinion leaders and social media platforms to increase the breadth of brand promotion.

Enhance the interactivity of eWOM: Companies should strengthen their interaction with consumers, especially at the corporate governance level. By responding to consumer feedback on social media platforms, companies can enhance governance transparency and information disclosure, and improve governance quality. For large companies, more attention should be paid to two-way communication on social media platforms to ensure public trust and recognition of the corporate governance structure.

Customized eWOM strategy: Enterprises should formulate targeted eWOM strategies according to their own scale and industry characteristics. For large enterprises, especially those in high-tech industries, the dissemination scope and emotional tendency of eWOM have a greater impact on environmental and social responsibility, so they need to improve performance by expanding dissemination and strengthening positive emotions; while small enterprises and traditional industries should pay more attention to improving the interactivity of eWOM and use interactivity to improve governance and social responsibility performance.

3. Study limitations

Although this study has made some progress in exploring the impact mechanism of eWOM on corporate ESG performance, there are still some limitations:

Limitation of sample region: The samples of this study are mainly from China and South Korea, and there may be regional cultural differences that affect the relationship between eWOM and ESG performance. Future research can expand the sample range to cover other regions (such as European and American countries) to verify the universality of the research results (Liu et al., 2018).

Data timeliness: Some of the data used in this study come from the company's annual report and social media comments, which have certain timeliness limitations. Future research can further use more dynamic cross-time period data to further explore the impact of eWOM on the long-term ESG performance of enterprises.

Industry heterogeneity: Although this study considers the moderating effect of industry characteristics on the relationship between eWOM and ESG performance, there are large differences within different sub-industries. Future research can further analyze the heterogeneity within the industry and explore the eWOM effect in different market segments to provide more precise policy recommendations.

Limitations of multi-level analysis: This study mainly focuses on the relationship between eWOM and ESG performance at the enterprise level. Future research can consider adopting a multi-level analysis method to further explore the indirect impact of eWOM on individual consumer behavior and its indirect impact on the overall performance of the enterprise.

4. Future Research Directions

Based on the limitations of this study, future research can be carried out in the following aspects:

Cross-cultural and cross-regional comparison: There may be significant differences in the impact of eWOM on corporate ESG performance in different countries and regions. Future research can conduct cross-cultural comparative studies to explore the moderating effects of cultural background and social structure on the impact mechanism of eWOM (Chen & Xie, 2008; Li et al., 2022).

Dynamic impact of eWOM: Future research can explore the long-term dynamic impact of eWOM, especially its role in the adjustment process of

corporate ESG strategies. For example, how to influence corporate social responsibility policies and governance structures through long-term eWOM feedback mechanisms.

Multi-level eWOM effects: In the future, more complex analysis frameworks, such as multi-level analysis (MLA) or the combination of structural equation modeling (SEM) and FSQCA, can be used to study the effects of eWOM on consumers, enterprises and their ecosystems (such as stakeholders The multi-level impact of eWOM further reveals the complex causal chain of eWOM.

Industry segmentation research: Although this study has considered the moderating effect of different industries, the heterogeneity within the industry is still high. Future research can subdivide the industry and explore the specific impact path of eWOM on corporate ESG performance in different industry contexts to provide more precise industry policy recommendations.

5. Summary

This chapter summarizes the main findings of the study, puts forward policy recommendations for enterprises, and points out the limitations of the study and the direction of future research. This study deeply analyzes the impact of eWOM on corporate environmental, social responsibility and governance performance through the FSQCA method, revealing how the multi-dimensional characteristics of eWOM affect the ESG performance of enterprises through a complex combination of conditions. Future research should be expanded in terms of cross-cultural, cross-industry and multi-level analysis to further improve the relationship model between eWOM and corporate sustainable development.

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