

Exploring the Effects of Corporate Engagement and Compliance in ESG Investment on Business Performance

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Received: April 15, 2026

Accepted: May 16, 2026

Online Published: June 15, 2026

doi:10.11114/bms.v12i1.8701

URL: <https://doi.org/10.11114/bms.v12i1.8701>

Abstract

This study examines the effects of corporate engagement and compliance in environmental, social, and governance (ESG) investment on both financial performance and human resource performance, using a sample of 178 publicly listed companies in Taiwan. Because no existing scales for the degree of engagement and degree of compliance were found in the literature, we develop distinct scales for these constructs. Additionally, corporate performance is divided into financial and human resource performance, with corresponding scales constructed for each.

The empirical results indicate that the degree of engagement positively influences both financial and human resource performance and that the degree of compliance is positively associated with human resource performance but not with performance.

The effect of the degree of engagement on financial and human resource performance exceeds that of the degree of compliance. This finding suggests that companies with more active ESG investment tend to achieve superior overall business performance, with the effects of active ESG investment surpassing those of mere regulatory compliance. In other words, firms that actively seek to lead in production, marketing, human resources, research and development, and finance relative to their primary competitors see stronger improvements in performance than those that passively adhere to regulatory standards.

Keywords: Engagement, Compliance, ESG, Business Performance

1. Introduction

Researchers have increasingly been examining how environmental, social, and governance (ESG) factors affect stock returns. During the sharp downturn in global stock markets from late February to March 2020 that was triggered by the COVID-19 pandemic, companies with stronger ESG performance experienced relatively smaller declines in stock prices (Cheema-Fox et al., 2021). Similarly, an inverse correlation between ESG ratings and stock price crashes was observed in 24,193 Chinese companies between 2019 and 2020 (Fang et al., 2022).

Building on these studies, which primarily explore ESG ratings as the explanatory variable and corporate performance as the explained variable, the present study further refines the analysis by shifting the focus from the results of ESG ratings to corporate ESG investment attitudes, specifically their degree of engagement and degree of compliance. Most of the literature focuses on stock prices and financial performance. The present study concurrently analyzes financial performance and human resource performance.

In terms of corporate ESG investment attitudes, this study builds on Clementino and Perkins (2021), who categorized engagement attitudes into two dimensions: degree of engagement and degree of compliance. To quantify the degree of engagement, the present study constructs a scale of five dimensions: production, marketing, human resources, research and development (R&D), and finance. The relative leadership of sample companies over their primary competitors in these five dimensions represents their degree of engagement. The degree of compliance is measured through adherence to five major regulatory areas: compliance with labor laws, workplace safety regulations, environmental safety regulations, fire safety standards, and information disclosure requirements.

Although prior studies have extensively examined ESG disclosure and sustainability performance, limited research has differentiated firms' strategic responses to ESG rating agencies through engagement and compliance mechanisms.

Drawing on Stakeholder Theory, firms are expected to satisfy stakeholder expectations to maintain legitimacy, trust, and long-term support. However, existing research has not sufficiently explained whether corporate engagement with ESG rating agencies and substantive compliance with ESG criteria produces distinct effects on business performance. Consequently, the mechanisms through which ESG investment practices influence stakeholder evaluations and organizational outcomes remain underexplored.

This study contributes in three key areas. First, by extending the focus of studies on “the effect of ESG ratings on stock returns” to consider the influence of corporate ESG investment attitudes, specifically the degrees of engagement and compliance; second, by broadening the outcomes of these studies to include both financial and human resource performance; and third, by constructing scales to measure ESG engagement and compliance, as well as corporate financial performance and human resource performance.

The structure of this paper is as follows: Section 1 presents the introduction; Section 2 covers the literature review and hypothesis development; Section 3 discusses method; Section 4 provides analysis and results; and Section 5 concludes with conclusion and recommendations.

2. Literature Review and Hypothesis Development

2.1 Examination of Relationship Between ESG Ratings and Financial Performance

This study integrates stakeholder theory, institutional theory, and legitimacy theory to explain how corporate engagement and compliance in ESG investment influence business performance. Stakeholder theory suggests that firms enhance long-term organizational performance by addressing the expectations and interests of multiple stakeholders, including investors, customers, employees, regulators, and local communities (Freeman, 2010). In response to the growing demand for sustainable and responsible business practices, firms increasingly engage in ESG-related activities to strengthen stakeholder relationships, improve corporate reputation, and secure critical resources. However, organizational ESG practices are not driven solely by stakeholder expectations. Institutional theory further explains that firms operate within institutional environments characterized by regulatory requirements, industry norms, and competitive pressures (DiMaggio & Powell, 1983). As ESG standards and sustainability reporting become increasingly institutionalized, organizations face coercive, normative, and mimetic pressures to adopt ESG engagement and compliance practices in order to maintain competitiveness and conform to prevailing expectations. Building upon these perspectives, legitimacy theory argues that firms seek social acceptance and approval by aligning their activities with societal values and norms (Suchman, 1995). ESG engagement and compliance therefore function as important legitimacy-building mechanisms that signal corporate responsibility, transparency, and ethical commitment to external stakeholders. When organizations successfully satisfy stakeholder expectations, respond to institutional pressures, and maintain social legitimacy through ESG investment, they are more likely to achieve improved business performance. Collectively, these three theoretical perspectives provide an integrated explanation for why ESG engagement and compliance can serve as strategic mechanisms that contribute to sustainable organizational success.

Most studies have demonstrated that ESG ratings are positively associated with financial performance (Friede et al., 2015; Lee et al., 2016; Limkriangkrai et al., 2017; Cheema-Fox et al., 2021; Duque-Grisales and Aguilera-Caracuel, 2021; Fang et al., 2022; Egorova et al., 2022). Several studies offer contrasting perspectives. For example, Duque-Grisales and Aguilera-Caracuel (2021) investigated the relationship between ESG ratings and financial performance in Latin American multinational corporations and revealed a significantly negative correlation between ESG ratings and financial performance. This finding suggests that corporate ESG investment often prioritizes social welfare, potentially at the expense of economic returns. Although such investment may enhance public reputation, the associated decline in potential economic benefits could also elevate operational risks for the firm.

Given the lack of consensus in the literature on the relationship between ESG ratings and corporate financial performance, further examination of this relationship is warranted. Additionally, these mixed findings indicate the need for rethinking research methodologies in this area. In addressing this topic, where ESG ratings serve as the explanatory variable and corporate performance as the explained variable, the present study extends beyond ESG ratings to consider corporate ESG investment attitudes (i.e., the degree of engagement and degree of compliance). Other studies have focused on stock prices and financial performance. This study expands the analysis to include both financial and human resource performance.

2.2 Degree of Engagement and Degree of Compliance in Corporate ESG Investment

According to Clementino and Perkins (2021), corporate ESG investment attitudes are divided into two dimensions: degree of engagement and degree of compliance. The degree of engagement refers to the “active attitude” of a company’s ESG investment. Companies that exhibit high active conformity to, or low active resistance against, ESG-related regulations have a higher degree of engagement in ESG investment. By contrast, the degree of compliance

refers to the “passive attitude” of a company’s ESG investment. Companies that exhibit high passive conformity to, or low passive resistance against, ESG-related regulations have a higher degree of compliance in ESG investment.

Clementino and Perkins (2021) constructed two axes and four quadrants to describe corporate ESG investment attitudes. The horizontal axis measures the degree of engagement, and the vertical axis measures the degree of compliance. Clockwise, the quadrants are active conformity, active resistance, passive resistance, and passive conformity. Specifically, firms characterized by passive conformity primarily respond to ESG ratings through modifications in external disclosure and reporting practices aimed at satisfying the informational demands of SRAs, while making limited substantive changes to internal operations. By contrast, firms in the active conformity quadrant internalize ESG ratings more extensively by not only improving external reporting but also implementing internal changes in CSR-related organizational processes and practices. Conversely, firms exhibiting passive resistance tend to disregard ESG ratings altogether, whereas firms demonstrating active resistance seek to minimize the influence of ESG ratings on organizational activities and strategic decisions. Among these response patterns, active conformity emerged as the most prevalent organizational response, suggesting that many firms proactively adapt both their disclosure practices and internal structures to enhance ESG performance and maintain external legitimacy.

Clementino and Perkins (2021) noted that companies with a high degree of engagement actively seek to achieve operational breakthroughs by adjusting internal policies, conducting enhanced reporting, undertaking internal organizational changes, setting incentives, benchmarking for learning, and implementing new policies. In the present study, the degree of engagement scale assesses a company’s relative leadership in production, marketing, human resources, R&D, and finance compared with its main competitors. Regulatory compliance represents a baseline standard for corporate operations and serves as a measure of the degree of compliance.

Duque-Grisales and Aguilera-Caracuel (2021) were unable to confirm how corporate ESG investment attitudes affect corporate performance. Cahan et al. (2015) and Wang and Sarkis (2017) found that corporate ESG investment enhances corporate performance, whereas Horváthová (2010) and Duque-Grisales and Aguilera-Caracuel (2021) observed a negative correlation between ESG investment and financial performance. Lee et al. (2022), in their study of major global automobile brands such as Ford, General Motors, Honda, Hyundai/Kia, Toyota/Lexus, and Volkswagen/Audi/Porsche, demonstrated that firms with greater engagement in environmental, social, and governance (ESG) practices exhibit more favorable brand images. Collectively, these findings suggest a positive relationship between the effectiveness of CSR/ESG efforts and a company’s brand perception among stakeholders. Hence, the effect of corporate ESG investment attitudes on firm performance requires further verification.

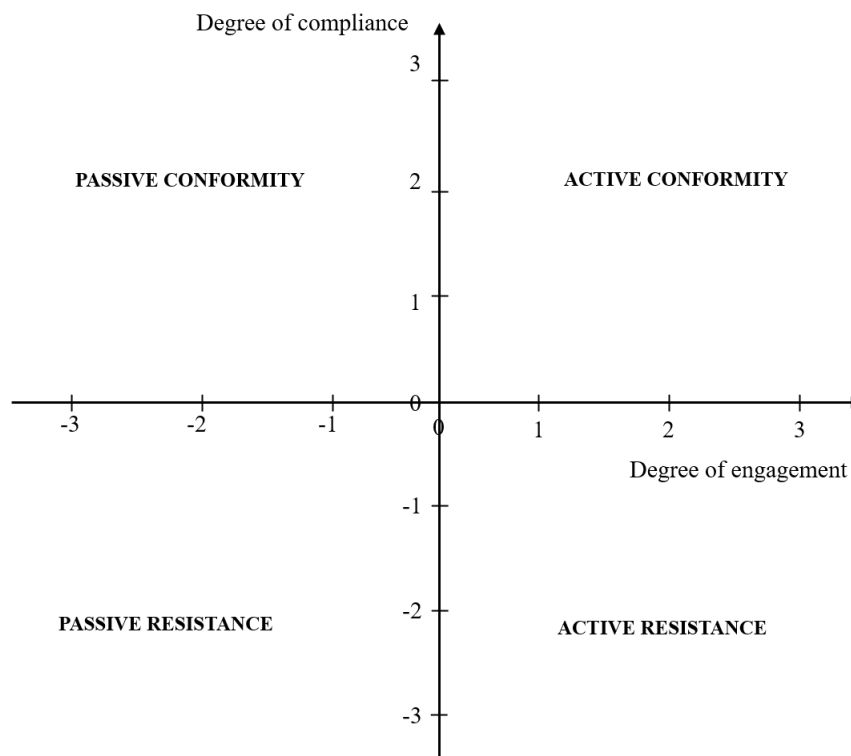


Figure 1. Classification of degrees of engagement and compliance in environmental, social, and governance investment

In the present study, we examine the effect of the degrees of engagement and compliance in ESG investment on corporate financial and human resource performance. According to Clementino and Perkins (2021), corporate ESG investment attitudes are categorized into two dimensions: degree of engagement and degree of compliance. This study measures degree of engagement in five dimensions, namely production, marketing, human resources, R&D, and finance and assesses active ESG investment relative to main competitors. Degree of compliance is assessed by the extent of adherence to five key regulatory areas. The study measures ESG investment attitudes and provides a reference for future researchers. Details are as follows (see Table 1):

Table 1. Typology of company responses to ESG ratings

Passive Conformity in ESG: Satisfying information demands by altering external disclosure and reporting practices to meet SRA requirements.	Active Conformity in ESG: Actively adjusting internal policies, willingly participating in and executing ESG initiatives, and implementing advanced measures, such as enhanced reporting, benchmarking, and new policy adoption.
Passive Resistance in ESG: Resisting ESG ratings primarily by choosing to completely ignore them.	Active Resistance in ESG: Taking measures to minimize the influence of ESG ratings on corporate operations.

Source: Adapted and expanded from Clementino and Perkins (2021).

As demonstrated in Figure 1, companies that actively conform to or comply with ESG standards share a common approach of proactively responding to ESG rating agencies. These companies aim to improve their scores through external reporting and internal changes in organizational processes and practices related to corporate social responsibility. By contrast, companies that passively conform to or comply with ESG standards tend to adapt to the external environment by implementing corporate social responsibility rating requirements in a passive or perfunctory manner.

In summary, in terms of corporate ESG investment attitudes, this study follows Clementino and Perkins (2021) by categorizing ESG investment attitudes into engagement and compliance. We further construct a scale to measure the degree of engagement in five dimensions: production, marketing, human resources, R&D, and finance. Degree of compliance is measured using a scale that evaluates the company's adherence to five key regulatory areas. These two scales not only measure degrees of engagement and compliance in corporate ESG investment but are also intended to serve as a reference for future researchers. The actual content of the scales for both degree of engagement and degree of compliance is discussed in Section 3. The degree of engagement scale includes two key considerations: first, the link to the company's production, marketing, human resources, R&D, and finance dimensions; second, the relative degree of engagement of the company compared with its main competitors in these same five dimensions. Similarly, the degree of compliance scale includes two key considerations: first, the company's compliance with labor laws, workplace safety regulations, environmental safety regulations, fire safety standards, and information disclosure requirements; second, the relative degree of compliance of the company compared with its main competitors. Based on these arguments, we propose:

Hypothesis 1: The degree of engagement in corporate ESG investment is positively associated with corporate financial performance.

Hypothesis 2: The degree of engagement in corporate ESG investment is positively associated with corporate human resource performance.

Hypothesis 3: The degree of compliance in corporate ESG investment is positively associated with corporate financial performance.

Hypothesis 4: The degree of compliance in corporate ESG investment is positively associated with corporate human resource performance.

The interaction of these hypotheses is illustrated in Figure 2.

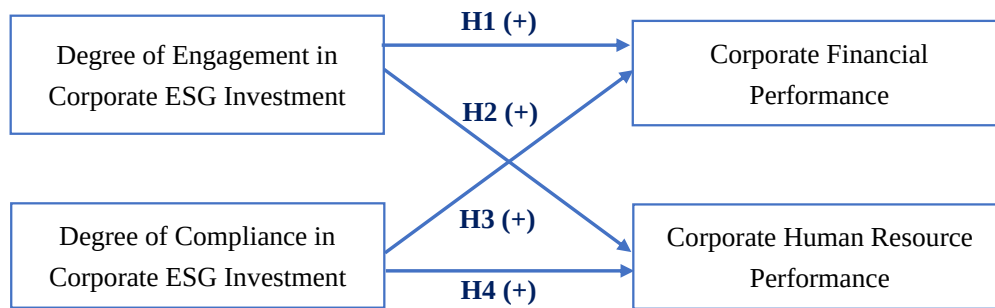


Figure 2. Research framework

3. Method

3.1 Participants and Procedure

The study sample consists of 402 publicly listed companies in Taiwan. These companies are included on the ESG IR Platform, an integrated investor relations platform, where they have received ratings from one or more of the seven major international ESG rating agencies (The ESG IR Platform, established by the Taiwan Depository & Clearing Corporation, provides ESG ratings from seven major international agencies, including FTSE Russell, Moody's, and MSCI). Senior executives or spokespersons from these 402 companies are invited to anonymously complete a questionnaire for this study. Items are rated using a 5-point Likert scale, with endpoints ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A total of 178 responses are received, constituting the final sample. Additional data for the sample companies are obtained from the Taiwan Economic Journal database.

To maximize sample size and ensure the authenticity of research findings, both paper-based and online questionnaires are used for data collection. First, company names and relevant details are collected from the Taiwan Economic Journal database. Subsequently, senior executives or spokespersons' names and the company addresses for each of the 402 companies are obtained from official company websites. Each survey is then mailed individually, using anonymous procedures to protect respondent confidentiality; each survey packet includes a security envelope and a return envelope. For the surveys, a QR code is also provided to allow respondents the option of completing the survey either in print or online. Data analysis for all variables is conducted using SPSS 22. Variable definitions are described in Table 2:

Table 2. Variable definitions and descriptions

Variable Abbreviation	Variable Name	Definition and Description
EG	Degree of Engagement	Captures the active level of the sample company's ESG investment.
CP	Degree of Compliance	Captures the extent of the sample company's adherence to ESG-related regulations.
FN	Financial Performance	Financial indicators, such as profit, relative to main competitors.
HR	Human Resource Performance	Indicators, such as employee satisfaction, relative to main competitors.
AGE	Company Age	The number of years since the founding of the company.
ID	Industry Type	The industry to which the sample company belongs; information industry is coded as 1, others as 0.
RD	R&D Expenditure	The annual R&D expenditure of the sample company.
CG	Dual Role of Chairperson and General Manager	Coded as 1 if the chairperson and general manager are the same person, otherwise 0.
RT	Female Board Member Ratio	Measures the proportion of female members on the company's board of directors.

Source: Compiled by this study.

3.2 Empirical models

This study examines the effects of the degrees of engagement and compliance in corporate ESG investment on corporate performance, along with five additional control variables. To test the hypotheses, we reference the regression models developed by Ho et al. (2023), as represented in empirical Models (1) and (2) and explained as follows:

$$FN_{it} = \alpha_{it}^1 + \beta_1^1 EG_{it} + \beta_2^1 CP_{it} + \beta_3^1 AGE_{it} + \beta_4^1 ID_{it} + \beta_5^1 RD_{it} + \beta_6^1 CG_{it} + \beta_7^1 RT_{it} + \varepsilon_{it}^1 \quad (1)$$

$$HR_{it} = \alpha_{it}^2 + \beta_1^2 EG_{it} + \beta_2^2 CP_{it} + \beta_3^2 AGE_{it} + \beta_4^2 ID_{it} + \beta_5^2 RD_{it} + \beta_6^2 CG_{it} + \beta_7^2 RT_{it} + \varepsilon_{it}^2 \quad (2)$$

Here, α is the constant term, β is the regression coefficient, ε is the error term, i is the observation, and t represents time.

The variables explained in Equations (1) and (2) are *FN* (financial performance) and *HR* (human resource performance), respectively. The explanatory variables comprise two primary independent variables and five control variables. The two main independent variables are *EG* (degree of engagement) and *CP* (degree of compliance). If the coefficient β_1^i for *EG* in Equation (1) is significantly positive, then Hypothesis 1 is supported; if the coefficient β_2^i for *EG* in Equation (2) is significantly positive, then Hypothesis 2 is supported. Similarly, if the coefficient β_1^i for *CP* in Equation (1) is significantly positive, then Hypothesis 3 is supported; if the coefficient β_2^i for *CP* in Equation (2) is significantly positive, then Hypothesis 4 is supported.

3.3 Measures

Because no established scales are available to measure the degree of engagement and compliance in corporate ESG investment, this study developed corresponding scales. Regarding corporate ESG investment engagement, we drew on Clementino and Perkins (2021) and assessed engagement across five managerial dimensions: production, marketing, human resources, R&D, and finance. A company's degree of engagement was represented by its level of advancement relative to its main competitors across these five dimensions.

1. Compared with its main competitors, the company's production technology is more advanced.
2. Compared with its main competitors, the company's marketing strategy is more advanced.
3. Compared with its main competitors, the company's human resource management is more advanced.
4. Compared with its main competitors, the company's R&D management is more advanced.
5. Compared with its main competitors, the company's financial management is more advanced.

Compliance is measured using adherence to five key regulatory areas.

1. Compared with its main competitors, the company has a higher degree of compliance with labor laws.
2. Compared with its main competitors, the company has a higher degree of compliance with workplace safety regulations.
3. Compared with its main competitors, the company has a higher degree of compliance with environmental safety regulations.
4. Compared with its main competitors, the company has a higher degree of compliance with fire safety standards.
5. Compared with its main competitors, the company has a higher degree of compliance with information disclosure requirements.

We adapt the scale developed by Jia et al. (2013) to measure corporate performance. Jia et al. (2013) divide corporate performance into financial performance and human resource performance.

1. Compared with its main competitors, the company has high profitability.
2. Compared with its main competitors, the company has high total revenue.
3. Compared with its main competitors, the company's profit is rapidly growing.

We used a two-item scale adapted from Jia et al. (2013) to measure human resource performance. The survey items were as follows:

1. Compared with its main competitors, the company has a high level of employee satisfaction.
2. Compared with its main competitors, the company has high employee productivity.

The control variables are company age, industry type, R&D expenditure, dual role of chairperson and general manager, and female board member ratio, following the framework set by Duque-Grisales and Aguilera-Caracuel (2021).

4. Analysis and Results

4.1 Descriptive Statistics

Tables 3 and 4 present the descriptive statistics for the empirical variables in this study. Table 3 shows that the sample consists of 178 publicly listed companies across 27 industries. Of these, 52 companies belong to the information and communications technology sector, comprising 3 in optoelectronics, 2 in information technology, 2 in telecommunications, 14 in electronics, 3 in computer and peripheral equipment, and 28 in semiconductors.

Table 3. Industry attribute analysis of sample companies

Corporate Industry Type	Number of Observations	Percent
Optoelectronics	3	1.69
Automotive Industry	7	3.93
Oil, Electricity, and Gas	2	1.12
Glass and Ceramics	1	0.56
Biotechnology and Medical	18	10.11
Textiles and Fiber	4	2.25
Shipping	5	2.81
Manufacturing	1	0.56
Tourism	3	1.69
Trade and Retail	11	6.18
Information Technology	2	1.12
Food Industry	11	6.18
Telecommunications	2	1.12
Paper Industry	6	3.37
Finance	11	6.18
Steel Industry	6	3.37
Electronics	14	7.87
Electrical Machinery	4	2.25
Computer and Peripheral Equipment	3	1.69
Chemical Industry	4	2.25
Semiconductors	28	15.73
Plastic Industry	4	2.25
Building Materials	16	8.99
Real Estate Development	2	1.12
Rubber Industry	4	2.25
Cement Industry	3	1.69
Others	3	1.69
Grand Total	178	100

Source: Compiled by this study.

Table 4 provides descriptive statistics for the primary variables, including the mean, median, standard deviation, minimum, maximum, and sample size for each. Table 4 indicates that the mean scores for the degree of engagement and degree of compliance are 3.83 and 4.12, respectively.

Table 4. Descriptive statistics

	Degree of Engagement (EG)	Degree of Compliance (CP)	Financial Performance (FN)	Human Resource Performance (HR)	Company Age (AGE)	Industry Type (ID)	R&D Expenditure (RD)	Dual Role of Chairperson and General Manager (CG)	Female Board Member Ratio (RT)
Mean	3.838	4.127	3.651	3.764	3.19	13.22	2.87	1.78	2.16
Median	3.900	4.000	3.666	4.000	3.00	12.00	3.00	2.00	1.00
Std. Deviation	0.5925	0.6510	0.669	0.6157	2.015	8.270	1.508	0.415	3.765
Variance	0.351	0.424	0.448	0.379	4.061	68.390	2.276	0.172	14.179
Minimum	2.2	1.0	2.000	2.0	1	1	1	1	0
Maximum	5.0	5.0	5.000	5.0	7	27	6	2	45
N	178	178	178	178	178	178	178	178	178

Source: Compiled by this study.

4.2 Validity and Reliability

The standardized factor loadings and reliability estimates are presented in Table 5. The construct reliability coefficients ranged from 0.702 to 0.889, indicating satisfactory internal consistency reliability for all constructs. Most standardized factor loadings exceeded the recommended threshold of 0.70, providing support for convergent validity. Two items under the construct of degree of engagement—"Compared with its main competitors, the company's production technology is more advanced" (factor loading = 0.566) and "Compared with its main competitors, the company's financial management is more advanced" (factor loading = 0.561)—fell below the preferred cutoff value of 0.70. However, both loadings remained above the minimum acceptable threshold of 0.50 and were statistically significant, suggesting acceptable item reliability in exploratory or applied organizational research contexts. Overall, the measurement model demonstrates acceptable convergent validity (Cheung et al., 2024). In addition, all the correlation coefficients are lower than 0.7, implying discriminant validity among the variables (Fornell and Larcker 1981).

Table 5. Standardized factor loadings

Factor Loading	Estimate	Cronbach's alpha
Degree of Engagement (EG)		0.781
1. Compared with its main competitors, the company's production technology is more advanced.	0.566c	
2. Compared with its main competitors, the company's marketing strategy is more advanced.	0.672	
3. Compared with its main competitors, the company's human resource management is more advanced.	0.742	
4. Compared with its main competitors, the company's R&D management is more advanced.	0.691	
5. Compared with its main competitors, the company's financial management is more advanced.	0.561c	
Degree of Compliance (CP)		0.889
1. Compared with its main competitors, the company has a higher degree of compliance with labor laws.	0.734	
2. Compared with its main competitors, the company has a higher degree of compliance with workplace safety regulations.	0.820	
3. Compared with its main competitors, the company has a higher degree of compliance with environmental safety regulations.	0.868	
4. Compared with its main competitors, the company has a higher degree of compliance with fire safety standards.	0.847	
5. Compared with its main competitors, the company has a higher degree of compliance with information disclosure requirements.	0.661	
Financial Performance (FN)		0.799
1. Compared with its main competitors, the company has high profitability.	0.689	
2. Compared with its main competitors, the company has high total revenue.	0.703	
3. Compared with its main competitors, the company's profit is rapidly growing.	0.881	
Human Resource Performance (HR)		0.702
1. Compared with its main competitors, the company has a high level of employee satisfaction.	0.722	
2. Compared with its main competitors, the company has high employee productivity.	0.751	

Note: a = standardized factor loading significantly less than 0.4; b = standardized factor loading significantly less than 0.5; c = standardized factor loading significantly less than 0.7 ($p < .05$)

4.3 Confirmatory Factor Analysis

Because the data in this study were collected at a single point in time, we conducted a common method variance (CMV) assessment prior to hypothesis testing (Podsakoff et al., 2003). The results of Harman's single-factor test indicated that the first unrotated factor accounted for only 39.57% of the total variance, suggesting that CMV is unlikely to pose a serious threat to the validity of the findings (Podsakoff et al., 2003). In addition, CFA was conducted using the measure Q package in R (Cheung et al., 2024) to assess construct validity and reliability. The results indicated that the four-factor measurement model demonstrated a good fit ($\chi^2 = 180.602$, $df = 150$, $p < 0.05$; CFI = 0.983; TLI = 0.977; RMSEA = 0.034; SRMR = 0.045) (Cheung et al., 2024; Hu and Bentler, 1999).

4.4 Correlation Analysis

Table 6 reports the correlation coefficients among the primary study variables. The results indicate that the degree of engagement was positively associated with human resource performance ($r = 0.562$, $p < 0.01$) and financial performance ($r = 0.582$, $p < 0.01$). These initial findings provide preliminary support for Hypotheses 1 and 2. Similarly, the degree of compliance was positively associated with financial performance ($r = 0.275$, $p < 0.01$), human resource performance ($r = 0.426$, $p < 0.01$), and degree of engagement ($r = 0.446$, $p < 0.01$). These findings provide preliminary support for Hypotheses 3 and 4.

Table 6. Correlation coefficients between variables

Variables	Company Age (AGE)	Industry Type (ID)	R&D Expenditure (RD)	Dual Role of Chairperson and General Manager (CG)	Female Board Member Ratio (RT)	Financial Performance (FN)	Human Resource Performance (HR)	Degree of Engagement (EG)	Degree of Compliance (CP)
Company Age (AGE)	1								
Industry Type (ID)	-.025	1							
R&D Expenditure (RD)	-.025	-.035	1						
Dual Role of Chairperson and General Manager (CG)	.252**	-.168*	-.102	1					
Female Board Member Ratio (RT)	-.046	-.035	.023	-.025	1				
Financial Performance (FN)	-.161*	.034	-.045	-.107	-.018	1			
Human Resource Performance (HR)	-.317**	.081	.002	-.093	-.064	.572**	1		
Degree of Engagement (EG)	-.069	.111	.013	-.058	.045	.562**	.582**	1	
Degree of Compliance (CP)	-.294**	.135	.053	.037	.144	.275**	.426**	.446**	1

Note: a. Values in parentheses indicate reliability coefficients. b. * and ** denote significance levels at 5% and 1%, respectively (two-tailed test).

4.2 Hypothesis Testing

In the following section, we present the testing results for Hypotheses 1 through 4, with the empirical findings listed in Tables 7 and 8.

Table 7 presents the regression analysis results for the explained variable, corporate financial performance, based on two primary explanatory variables, the degree of engagement and the degree of compliance, along with five control variables. The regression results indicate that the degree of engagement is significantly positively associated with corporate financial performance (coefficient = 0.623, significant at the 1% level), supporting Hypothesis 1. However, the effect of the degree of compliance on corporate financial performance is nonsignificant (coefficient = 0.017), which means that the empirical results do not support Hypothesis 3. Therefore, the empirical findings in Table 7 indicate that this study supports Hypothesis 1, which suggests a positive correlation between the degree of engagement and corporate financial performance. However, Hypothesis 3 is not supported, implying that the degree of compliance does not show a significantly positive correlation with corporate financial performance.

Additionally, using the *t*-test of regression coefficients from Model (2), we compare the difference between β_1^i and β_2^i , specifically, to determine whether the effect of the degree of engagement on financial performance (0.623, significant at the 1% level) is greater than that of the degree of compliance on financial performance (0.017, nonsignificant). The results suggest that the influence of the degree of engagement on financial performance is significantly higher than that of the degree of compliance on financial performance.

Table 7. Regression analysis of effects of degrees of engagement and compliance on corporate financial performance

Variables	Financial Performance (FN)		
	Coefficient	t-value	Variance Inflation Factor Value
Constant (α)	1.619***	4.139	
Degree of Engagement (EG)	0.623***	7.849	1.271
Degree of Compliance (CP)	0.017	0.223	1.457
Company Age (AGE)	-0.032	-1.369	1.243
Industry Type (ID)	-0.004	-0.832	1.081
R&D Expenditure (RD)	-0.028	-1.008	1.019
Dual Role of Chairperson and General Manager (CG)	-0.096	-0.892	1.157
Female Board Member Ratio (RT)	0.007	-0.346	3.782
R-Square	0.344		
Adj R ²	0.313		
F	11.079***		
N (Sample Size)	178		

Note 1. Table 7 analyzes the effects of the degrees of engagement and compliance in ESG investment on financial performance. The regression model used is as follows:

$$FN_{it} = \alpha_{it} + \beta_1^i EG_{it} + \beta_2^i CP_{it} + \beta_3^i AGE_{it} + \beta_4^i ID_{it} + \beta_5^i RD_{it} + \beta_6^i CG_{it} + \beta_7^i RT_{it} + \varepsilon_{it}^i \quad (3)$$

2. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

Table 8 presents the results of regression analysis testing the effects of the degrees of engagement and compliance on human resource performance. The degree of engagement is positively associated with human resource performance (coefficient estimate = 0.142, significant at the 5% level), supporting Hypothesis 2. Additionally, the degree of compliance is positively associated with human resource performance (coefficient estimate = 0.524, significant at the 1% level), thereby supporting Hypothesis 4. These results provide empirical support for Hypotheses 2 and 4, confirming that both the degree of engagement and compliance are positively associated with human resource performance.

A *t*-test of the regression coefficients in Model (2) is used to compare the differences between β_1^2 and β_2^2 to determine whether the effect of the degree of engagement on human resource performance is greater than that of the degree of compliance on human resource performance. The results show that the effect of the degree of compliance on human resource performance (coefficient = 0.524, significant at the 1% level) is significantly higher than that of the degree of engagement on human resource performance (coefficient = 0.142, significant at the 1% level).

The empirical results in Tables 7 and 8 suggest that the effect of the degree of engagement on both financial performance and human resource performance is greater than that of the degree of compliance. This finding indicates that companies with more active ESG investment achieve superior overall business performance. Specifically, the positive effect of active ESG investment on operational performance surpasses that of mere compliance with ESG regulations. Companies that actively strive to excel in production, marketing, human resources, R&D, and finance relative to their main competitors see a greater improvement in operational performance compared with those passively adhering to regulatory requirements.

Table 8. Regression analysis of effects of degrees of engagement and compliance on corporate human resource performance

Variables	Human Resource Performance (HR)		
	Coefficient	t-value	Variance Inflation Factor Value
Constant (α)	1.502***	4.533	
Degree of Engagement (EG)	0.524***	7.795	1.271
Degree of Compliance (CP)	0.142**	2.171	1.457
Company Age (AGE)	-0.072***	-3.670	1.243
Industry Type (ID)	-0.001	-0.194	1.081
R&D Expenditure (RD)	-0.007	-0.312	1.019
Dual Role of Chairperson and General Manager (CG)	-0.019	-0.206	1.157
Female Board Member Ratio (RT)	-0.012	-0.675	3.682
R-Square	0.444		
Adj R ²	0.417		
F-value	16.840***		
N (Sample Size)	178		

Note: 1. Table 8 presents an analysis of the effects of the degrees of engagement and compliance in ESG investment on human resource performance. The regression model used is as follows:

$$HR_{it} = \alpha_{it}^2 + \beta_1^2 EG_{it} + \beta_2^2 CP_{it} + \beta_3^2 AGE_{it} + \beta_4^2 ID_{it} + \beta_5^2 RD_{it} + \beta_6^2 CG_{it} + \beta_7^2 RT_{it} + \varepsilon_{it}^2 \quad (4)$$

2. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

The degree of engagement is positively associated with both financial performance and human resource performance (Tables 7 and 8). The degree of compliance is not significantly associated with financial performance but is positively associated with human resource performance. A summary of this study's results are presented in Table 9.

Table 9. Summary of results

Hypothesis	Empirical Results
Hypothesis 1: The degree of engagement in corporate ESG investment is positively associated with corporate financial performance.	Supported
Hypothesis 2: The degree of engagement in corporate ESG investment is positively associated with corporate human resource performance.	Supported
Hypothesis 3: The degree of compliance in corporate ESG investment is positively associated with corporate financial performance.	Not Supported
Hypothesis 4: The degree of compliance in corporate ESG investment is positively associated with corporate human resource performance.	Supported

Source: Compiled by this study.

5. Conclusion and Recommendations

This study examines the effects of the degrees of engagement and compliance in corporate ESG investment on financial

performance and human resource performance, using a sample of 178 publicly listed companies in Taiwan. Because no scales for the degree of engagement and degree of compliance were found in the literature, this study develops distinct scales for these constructs. Corporate performance is divided into financial performance and human resource performance, with corresponding scales constructed for each.

The empirical findings indicate that the degree of engagement has a positive effect on both financial performance and human resource performance. The degree of compliance is positively associated with human resource performance but not financial performance.

Further analysis reveals that the effects of the degree of engagement on both financial and human resource performance are stronger than those of ESG compliance. This suggests that more active ESG investment yields more favorable corporate performance outcomes. In other words, companies that actively pursue leadership in production, marketing, human resources, R&D, and finance compared to their main competitors achieve a higher level of performance improvement than those that merely adhere to regulatory compliance.

Acknowledgments

Not applicable.

Author contributions

Lee was responsible for the innovative design of the study, the construction of the empirical model, the analysis of the empirical results, the writing of the managerial and policy implications, and the revision and modification of the manuscript. Kuo was responsible for research design, literature review, questionnaire collection, implementation of empirical analysis, and manuscript writing.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could appear to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Redfame Publishing.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

Data sharing statement

No additional data is available.

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