

RESEARCH ARTICLE

Enterprise risk management and firm performance: The mediating role of corporate social responsibility in the European Union region

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Abstract

This study's aim is to examine the impact of enterprise risk management (ERM) on firm performance when aligned with firm strategy, with a particular emphasis on the mediating role of corporate social responsibility (CSR) in this relationship. Previous studies established a connection between ERM and firm performance, as well as between CSR and firm performance. However, the ERM effect on firm performance via CSR remains unexplored. Structural equation modeling (SEM) was used to assess how the ERM affects the firm's performance, both directly and indirectly, through the influence of CSR strategy. The ERM is represented through risk indicators collected from 222 companies in the European Union. The data were gathered from 2015 to 2019 and applied to a structural equations-based model to analyze how CSR acts as a mediator between ERM and firm performance. The findings suggest that ERM has a significant impact on firm performance, both directly and indirectly, through the effect of the CSR strategy.

KEYWORDS

corporate social responsibility, enterprise risk management, key performance indicators, key risk indicators, performance, strategy

1 | INTRODUCTION

According to the definition provided by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), Enterprise Risk Management (ERM) encompasses a series of practices, capabilities, and cultural aspects that organizations adopt while implementing their strategies. The ultimate goal of ERM, as per COSO (2017), is to effectively manage risks and create, preserve, and realize value for companies.

The updated approach to ERM, as defined by ISO (2008) and COSO (2017), aims to enhance organizational performance and maintain its value. This is accomplished by aligning ERM with the company's strategy and goals and adopting an integrated approach to the

business supply chain. A holistic view is necessary to manage organizations effectively, considering various factors that impact their goals and overall performance. Taking an ERM approach can help businesses gain a deeper understanding of their operations and make more informed decisions.

From an external point of view, a firm's Corporate Social Responsibility (CSR) is defined as a process that integrates social, environmental, ethical, human rights, and consumer concerns into their business operations and core strategy. The objective is to maximize the creation of shared value for their stakeholders while also identifying, preventing, and mitigating any potential adverse impacts on society at large (European Commission, 2011). In the same vein, Capelli et al. (2021), Gordon et al. (2009), and Ryman and Roach (2022)

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support the notion that possessing robust ERM skills can diminish risks and contribute to enhanced overall company performance across various business strategic dimensions.

Previous research has examined the relationship between risk and firm performance (Çamlıbel et al., 2021; Soares da Fonseca, 2020), as well as the potential impact of ERM on firm performance (Arnold et al., 2015; Farrell & Gallagher, 2015). Prior studies have also explored the relationship between risk and CSR (Bouslah et al., 2018; Cupriak et al., 2020; De Giuli et al., 2023; Hummel et al., 2021) and the relationship between ERM and CSR and its impact on performance (Chairani & Siregar, 2021; Naseem et al., 2020). However, a more thorough understanding of these relationships is necessary, especially in terms of ERM implementation and its alignment with a company's strategic dimensions, particularly CSR. Therefore, further research is needed to delve deeper into these relationships (Bromiley et al., 2015; Nirino et al., 2022).

On the one hand, it is important to comprehend the factors influencing the impact of ERM on organizational performance (Andriushchenko et al., 2019; Bromiley et al., 2017). Simultaneously, there is a need to understand how ERM implementation effectively creates added value. Despite significant contributions, the current literature lacks an in-depth exploration of new methods to assess ERM's relationship with firm performance to verify its impact and effectiveness using a strategic dimension like CSR. Additionally, there is a reliance on surveys about ERM implementation, which is susceptible to errors or subjective judgments. Furthermore, there is insufficient representation of ERM alignment with firm strategy levels when connecting it with firm performance, and these areas of research remain unclear (Andriushchenko et al., 2019; Bromiley et al., 2015; Farrell & Gallagher, 2015; Oprean-Stan et al., 2020; Ryman & Roach, 2022).

On the other hand, as noted by De Giuli et al. (2023), the literature on CSR (usually represented by ESG risk evaluation) is diverse, but the impact of CSR (represented by ESG risks) on finance and investment performance remains uncertain. Exploring the role of ERM in connecting CSR to firm performance as a strategic dimension, influenced by risk management actions and policies, could provide insights into managing CSR and its relationship with organizations' financial performance.

This study aims to evaluate how implementing ERM impacts a firm's CSR strategy level and overall performance. To achieve this, we propose a novel approach for evaluating the effectiveness of implementing ERM through risk indicators. The proposed model will simultaneously measure three key aspects: the influence of ERM on firm performance, the direct impact of ERM on a firm's CSR strategy, and the indirect impact of ERM on firm performance via its effect on the CSR strategy of the firm.

This study will deepen our understanding of the relationship between ERM and business strategy for creating and preserving firm value, consistent with COSO (2017) principles. The results could offer a potential new framework for addressing the gap in the existing literature regarding the measurement of ERM's positive role in achieving organizational strategic goals and improving performance. The proposed framework introduces an objective model for analyzing ERM

implementation effectiveness and its impact, moving away from subjective and susceptible-to-interpretation survey analyses and unclear alignments with business strategy levels. Additionally, it facilitates an effective analysis of the impact of risk indicators on business performance indicators. Ultimately, this study contributes to a better understanding of the relationship between CSR, as a strategy business dimension, and firm performance, offering insights for enhancing this relationship and promoting a wider acceptance of CSR implementation.

Structural Equation Modeling (SEM) will be used to investigate the effects of ERM on a company's performance, both directly and indirectly through its influence on the firm's CSR strategy. The method will be applied to a sample of 222 European Union companies and will examine the correlation between risk indicators (which suggest the adoption of ERM), ESG indexes (which represent CSR firm performance), and overall company performance. As demonstrated in previous literature, this method will provide the required different paths of relations between variables (Kline, 2011).

The study is organized as follows: first, we present the conceptual framework based on prior literature and establish our hypotheses from previous research. Second, the methods section outlines the sample, variables, and analysis procedures. Finally, we analyze the results and discuss the practical implications, theoretical contributions, and limitations of the study.

2 | CONCEPTUAL FRAMEWORK

Organizations use ERM to handle potential risks that may affect their business operations. According to the International Organization for Standardization (ISO), risk refers to the impact of uncertainty on objectives, which could be either positive or negative (ISO, 2008). The COSO emphasized the importance of aligning a company's strategy and value chain to maintain value and enhance performance as a crucial principle (COSO, 2017). To achieve their goals, companies need to prepare for proactively manage potential risks that could impact their strategy and supply chain. Gordon et al. (2009) suggested that by minimizing exposure to risks, companies could improve their performance outcomes and key business indicators. This study examines the relationships between ERM (measured by risk indicators), CSR (measured by ESG indexes), and firm performance.

2.1 | ERM and firm performance

According to COSO (2017) and ISO (2008), the goal of ERM is to improve firm performance. However, the relationship between ERM, risk indicators, and firm performance has yet to be fully understood in the literature.

In the existing literature, two main lines of research have investigated the relationship between ERM and firm performance. On the one hand, studies such as Farrell and Gallagher (2015) and Arnold et al. (2015) analyzed the impact of ERM on firm performance by

TABLE 1 Literature review on the relationship between enterprise risk management (ERM) and firm performance.

Author	Study	Main findings
Farrell and Gallagher (2015)	Analyzed the connection between a company's ERM maturity and performance. The study used RIMS RMM survey scores to measure ERM engagement and Tobin Q to measure performance.	Effective ERM implementation can improve outcomes and boost performance for companies.
Arnold et al. (2015)	Researched the impact of ERM on a company's success, focusing on strategic adaptability and supply chain efficiency. The study examined ERM implementation through IT integration and training interactions.	Aligning ERM with strategy enhances a company's ability to respond flexibly to unforeseen circumstances, impacting overall performance. IT integration also improves flexibility and performance.
Angelopoulos et al. (2017)	Investigated how various risk factors, such as policy design, financial, social acceptance, grid access, technical and management, administrative, market design, regulatory, and sudden policy changes, impact renewable energy investment projects.	Investment in renewable energy carries policy design risks that impact capital costs. Effective ERM implementation and performance indicators are crucial for efficient investment returns.
Soares da Fonseca (2020)	Analyzed the investment performance of European stock market firms using risk-performance ratios like Sharpe, Sortino, and Treynor.	Risk and performance are connected and measured by ratios like Sharpe, Sortino, and Treynor. These ratios also assess the impact of ERM on a company's performance in specific market conditions. Risk affects a company's performance in the stock market.
Çamlıbel et al. (2021); Zhang and Tjong (2012)	Explored the performance of fund investments through risk-performance-related ratios. Çamlıbel et al. (2021) used the Sharpe and Treynor indexes, while Zhang and Tjong (2012) utilized the Jensen, Treynor, Sharpe, and Snail Trail method indexes.	Fund performance varies in different market contexts.

examining its implementation within business strategy dimensions and measuring its influence on related business performance indicators. However, despite providing valuable insights, these analyses of ERM implementation relied on third-party surveys.

On the other hand, studies like those conducted by Soares da Fonseca (2020), Çamlıbel et al. (2021), and Zhang and Tjong (2012) explored the relationship between ERM and firm performance by examining the link between risk indicators and firm performance indicators. This represents a significant contribution, demonstrating the connection between risk and firm performance. Nevertheless, further examination of the role of ERM is needed, particularly in terms of its implementation effectiveness and integration with organizational goal setting and business strategy alignment. These studies are detailed in Table 1.

Based on prior research, we have developed the first hypothesis:

H1. Enterprise risk management (ERM) positively influences firm performance.

2.2 | ERM and CSR

To preserve value and positively impact firm performance, ERM should align with the firm's strategy and value chain activities according to ISO and COSO principles. For the purpose of this study, it is important to examine the relationship between ERM and CSR.

When examining the relationship between ERM and CSR, two distinct lines of research emerge. First, as evidenced by the research

conducted by Bouslah et al. (2018) and Cupriak et al. (2020), scholars have explored the relationships between CSR factors and their performance with corporate business risks. While these studies highlighted the correlation between these factors, the precise role of ERM remains unclear, necessitating specific research.

Second, as explored by Hummel et al. (2021) and Fakir and Jusoh (2020), there is another strand of research focused on the potential impact of ERM on CSR performance. These studies correlated risk factors with CSR indicators to measure the relationship and assess the potential impact of ERM on CSR performance. While these authors have demonstrated a connection between business risks, ERM, and CSR, further research is needed to deepen our understanding of this relationship at the organizational strategic level.

In the following Table 2, these studies are detailed.

Based on prior research, we have developed the second hypothesis:

H2. ERM positively influences firm CSR.

2.3 | CSR and firm performance

In the last decade, some studies have examined the relationship between CSR and firm performance. Some authors have noted that CSR goals may not directly aim for firm performance, but there may still be a meaningful relationship between the two. By looking at ESG indexes as a recognized way of measuring CSR, it is possible to obtain a clearer understanding of this relationship.

TABLE 2 Literature review on the relation between enterprise risk management (ERM) and corporate social responsibility (CSR).

Author	Study	Main findings
Bouslah et al. (2018)	Explored the link between a company's risk and social performance, examining seven social performance dimensions and six exclusionary social dimensions using computed market beta and idiosyncratic risk values.	Social performance is key to strong business performance and low-volatility risks. Managing financial risk indicators can help companies proactively control strategic objectives and orientations for better social performance.
Hummel et al. (2021)	Examined the link between risk, environment, and social factors, and how managing ESG risks can improve environmental and social performance. Surveys were used to assess the effectiveness of ERM and environmental and social procedures, while reported information was analyzed to measure their impact.	Integrating ESG strategy with ERM is important for better performance balance, despite no significant correlation found between environmental and social performance or risk management.
Cupriak et al. (2020)	Explored an approach that connects organizations' ESG strategies with socially responsible commodity acquisition by correlating ESG indexes with commodity index volatility.	ERM could identify sustainable commodities as predictive risk indicators for improving ESG indexes.
Fakir and Jusoh (2020)	Conceptualized ERM as a mechanism capable of generating a positive impact on CSR. Using a dataset from Bangladesh, the authors explored the direct relationship between board gender diversity and corporate sustainability performance, as well as the mediating effect of ERM on this association.	ERM can potentially enhance the CSR factors analyzed in the country. Although there was not a direct link between gender diversity and corporate sustainability performance in the analysis, there was evidence that highlighted the role of ERM implementation in the corporate structure.

The relationship between CSR and firm performance has been explored through various research approaches. For instance, studies by Zhao et al. (2018), Ionescu et al. (2019), Cek and Eyupoglu (2020), Kim and Li (2021), and El Khoury et al. (2023) have directly investigated the connection between CSR factors and firm performance indicators, providing important insights. However, it would be interesting

to introduce a third variable related to corporate and strategy management to better control and understand the relationship between CSR and firm performance.

Other studies, such as those conducted by Steen et al. (2020) and Ahmad et al. (2021), have examined the relationship between CSR and business performance while considering the influence of contextual factors. These studies offered valuable insights, particularly regarding the potential influence of ERM. Given ERM's focus on risk, uncertainty, and future-specific circumstances, its examination in the context of the link between CSR and business performance holds significant promise. However, this relationship remained unexplored. More details about these studies can be found in Table 3.

Therefore, based on prior studies, we develop the third hypothesis:

H3. CSR has a positive impact on firm performance.

2.4 | ERM, CSR, and firm performance

Previous research has investigated how ERM and CSR impact firm performance. However, the impact of ERM on firm performance through CSR is still uncertain. In this discussion, we will be examining the topic of preserving value and enhancing performance in ERM, based on the main principles of ISO (2008) and COSO (2017), using ESG indexes as accepted measures of CSR.

When focusing on the relationship between ERM, CSR, and firm performance, two key lines of research emerged. Naseem et al. (2020) and Chairani and Siregar (2021) directly explored the interplay between ERM, CSR, and firm performance. However, there remained some ambiguity regarding the development of a measure for ERM that can effectively analyze its impact on CSR as a strategic dimension and its positive impact on firm performance.

In another line of research, Hubel and Scholz (2018), Oprean-Stan et al. (2020), and De Boyrie and Pavlova (2020) delved into the relationship between ERM, CSR, and company performance by examining the correlation between risk, CSR, and performance factors. These studies offered valuable insights for further investigating the connections between these areas. Nonetheless, the role and impact of ERM and its potential influence remain somewhat ambiguous, limited to specific risks, and a deeper strategic level ERM study would be important. More details about these studies can be found in Table 4.

Following prior studies, we propose the fourth hypothesis:

H4. CSR mediates the relationship between ERM and firm performance.

The study's conceptual model, illustrated in Figure 1, shows the direct and indirect relationships between ERM and firm performance. This relationship is influenced by the impact of ERM (represented by risk indicators) on the strategic business dimension of CSR, which is represented by ESG indexes.

TABLE 3 Literature review on the relationship between corporate social responsibility (CSR) and firm performance.

Author	Study	Main findings
Zhao et al. (2018)	Studied the link between ESG performance and financial performance in China's power generation industry. They looked at environmental, social, and governance indicators in relation to return on capital employed (ROCE) and debt-to-equity ratios.	There is a positive effect of ESG performance on firm financial performance.
Ionescu et al. (2019)	Analyzed the correlation between good ESG scores and the performance and market value of travel and tourism companies, using ROA and ESG pillars as independent variables and Tobin Q and book value as performance indicators.	ESG performance had a low impact on the firm's book value. However, governance had the highest influence among the individual ESG pillars.
Steen et al. (2020)	Studied how ESG ratings affect mutual fund performance by analyzing data on returns, standard deviations, betas, and Sharpe ratios. Investigated whether sustainability metrics were linked to variations in portfolio mean return and volatility.	Historical sustainability could be positively influenced by momentum. Strong sustainability performance may lead to increased investment appeal, especially for European firms.
Cek and Eyupoglu (2020)	Observed correlation between ESG pillars and firm performance.	Social and governance performance affect a firm's economic performance, but environmental performance does not have a significant impact.
Ahmad et al. (2021)	Studied how ESG indicators impact UK firms' financial performance, with firm size as a moderator. They evaluated the correlation between ESG global scores and individual pillars with market value and earnings per share.	Firms with better ESG scores tend to have better performance indicators, and this relationship is more relevant when considering the size variable.
Kim and Li (2021)	Studied the relationship between ESG factors and corporate financial performance, exploring the correlation between ESG categories (strengths and concerns) and their influence on the variables ROA and customized credit rating scales.	ESG-positive performance generally has a positive impact on firm performance, with the social pillar having a greater impact, particularly in credit ratings.
El Khoury et al. (2023)	Researched if positive changes in ESG metrics can improve financial performance for banks, measured by Return on Assets and Equity, Tobin's Q, and Stock Return.	While ESG investments can be profitable, their impact and management may vary across different pillars.

TABLE 4 Literature review on the relationship between enterprise risk management (ERM), corporate social responsibility (CSR) and firm performance.

Author	Study	Main findings
Hubel and Scholz (2018)	Examined the impact of ESG factors and risk management on firm performance by creating three ESG risk factors based on metrics to assess firms' exposure and evaluate their effects.	Managing ESG risks can reduce negative effects on firm performance, especially during uncertain times like a recession. This is particularly important for the social pillar of ESG.
Oprean-Stan et al. (2020)	Studied the relationship between ESG sustainability reporting, management of ESG risks, corporate performance, and sustainable growth. The indicators used were sustainability reporting, ESG risk rating, involvement in controversial events, and financial and market data. These factors were analyzed to determine their impact on ROA, firm performance, and sustainability growth.	Sustainability reporting does not affect financial performance significantly. Environmental and social factors play a larger role in sustainable growth. Companies can improve sustainable growth by managing ESG social aspects and integrating ERM processes into sustainability. However, limited information from organizations can affect the effectiveness of ERM and the reliability of indicators.
De Boyrie and Pavlova (2020)	Studied how environmental performance impacts credit risk by analyzing sovereign credit default swap spreads for different countries. The study compared firm performance indicators with environmental sustainability to observe the relationship.	Insights from a study on the 2008 financial crisis show the importance of recognizing the relationship between ESG and credit risks. Key indicators can be used to manage organizational strategy and goals with effective ERM implementation.
Naseem et al. (2020)	Studied how CSR impacts firm performance by analyzing the ERM effect and the role of the ERM index in mediating the relationship between CSR scores and ROA/ROE.	CSR has both direct and indirect effects on firm performance, and ERM partially mediates this relationship, highlighting the importance of ERM.
Chairani and Siregar (2021)	Studied the ERM impact on firm financial performance and firm value, with ESG scores as a moderating variable.	Implementing ERM can positively impact a firm's financial performance and value, especially when considering Environmental, Social, and Governance (ESG) factors. ERM can help identify potential risks and opportunities related to ESG issues, leading to improved performance and competitive advantages for all industries.

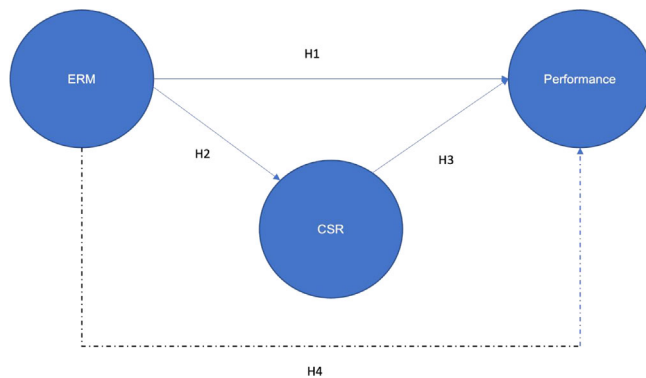


FIGURE 1 Conceptual model.

3 | METHODOLOGY

3.1 | Sample and data collection

This research used data from the EIKON Refinitiv database, which is provided by the London Stock Exchange Group. This database is widely recognized for being one of the largest sources of financial market data and infrastructure globally. Our study employed the same dataset source as previous research (Cek & Eyupoglu, 2020; El Khoury et al., 2023; Kordsachia, 2021; Naseem et al., 2020) that relied on the EIKON Refinitiv database and its indicators.

Our analysis initially aimed to encompass all European Union companies registered on the London Stock Exchange Group. However, due to issues related to CSR (and respective ESG indicators), non-disclosure of information, and random missing values, our dataset was limited to 222 companies spanning the period from 2015 to 2019. Despite this limitation, the European Union represents a significant player in the world economy, and our dataset provides a representative sample for preliminary analysis. Furthermore, the chosen analysis period, which falls within a relatively stable timeframe without major exceptional events such as the pandemic, is recent. The indicators were collected in March 2021, and the sample description is presented in Table 5.

The final sample primarily consisted of large companies, representing on average between 3% and 5% of the total companies in their respective sectors. An exception to this pattern was observed in the financial sector, where the representation was as low as 0.2%. Our dataset was constrained by both the information disclosure policies of the companies and the lack of effective CSR policies (and respective ESG indicators) implementation among companies registered with the London Stock Exchange Group.

3.2 | Variables and measurements

In this study, we utilized various combinations of indicators to investigate the relationships outlined in the conceptual framework.

ERM was the independent latent variable used to represent the effectiveness and impact of risk management practices. We employed two credit risk-rating measures, following Kordsachia (2021). The first

TABLE 5 Database generic descriptions.

Industry	Cases	Sample size (%)
Communication services	32	14.40
Consumer discretionary	35	15.80
Financials	2	0.90
Health care	82	36.90
Transforming	7	3.20
Information technology	64	28.80
Total	222	100.00

was the structural risk level (RI1), which calculates the risk of default and rating by considering three factors: structural leverage, asset volatility, and asset drift, scored on a scale from 0 to 100 (with 100 indicating the best score). The second was the smart ratios risk level (RI2), which evaluates the risk of default and rating by incorporating five factors: profitability, leverage, coverage, liquidity, growth, and stability, measured from 0 to 100.

Performance (PRF) served as the dependent latent variable for firm performance, assessed using three key performance indicators (KPI) frequently used in previous studies such as Oprean-Stan et al. (2020), Ionescu et al. (2019), and Lai (2017). The first indicator was Return on Equity (ROE) (PI1). This value was calculated as the net income before extraordinary items divided by the average total equity for the fiscal year, expressed as a percentage, reflecting firm profitability and how efficient it is at generating profits (higher values indicate better results). Return on Assets (ROA) (PI2) represented the return on assets before tax, calculated as income before tax for the fiscal year divided by the average total assets for the same period, also expressed as a percentage. This reflects how profitable a firm is relative to its total assets. The third KPI was Return on Invested Capital (ROIC) (PI3). This value was calculated as income after tax for the fiscal year divided by the same period's average total long-term capital for the same period, expressed as a percentage. This indicator assesses the firm's efficiency in allocating owned capital.

Corporate Social Responsibility (CSR) was represented by the level of ESG (environmental, social, and governance) rating, following Cek and Eyupoglu (2020), De Boyrie and Pavlova (2020), Ionescu et al. (2019), and Oprean-Stan et al. (2020). We measured this variable using a combined score, which considered information in the environmental, social, and corporate governance pillars (ESG Score), with an ESG Controversies overlay.

All the indicators were directly sourced from the EIKON Refinitiv database in March 2021, following the approach of previous studies (Cek & Eyupoglu, 2020; El Khoury et al., 2023; Kordsachia, 2021; Naseem et al., 2020).

3.3 | Data analyses

This study aimed to test the hypothesized relationships represented in the conceptual model in Figure 1. The key purpose was to examine

the relationship between ERM, represented by risk indicators, and firm performance while considering the role of CSR, represented by ESG indicators, as a mediator in this association. A structural equation model approach was utilized to achieve this goal with the assistance of AMOS 29 software, as described by Brown (2006).

The indicators from 2015 to 2019 were averaged over 5 years and exported to IBM SPSS. The mean replacement method was used to manage missing data. The Log10 transformation method was used to stabilize variation between groups, following Lo and Andrews (2015). The data were checked for multivariate normality and outliers, and preliminary analyses were conducted. In the following section, Table 6 displays the primary descriptive statistics of the data prior to the Log 10 transformation and the final values of the correlation matrix, means, and standard deviations of the study variables using the final data after the Log 10 transformation, along with the main descriptive statistics.

To determine the levels of ERM, CSR, and performance, composite scores were calculated by adding and averaging the item scores for each latent variable. This method was based on previous studies such as De Boyrie and Pavlova (2020) and Hair et al. (2010). Moreover, the recommended significance loadings outlined by Hair et al. (2010) were adhered to as reference points.

We analyzed the data using a two-stage modeling approach, as suggested by Anderson and Gerbing (1988). The confirmatory factor

analyses (CFAs) were conducted in IBM SPSS to evaluate the measurement model, while the structural model was tested using SEM in AMOS. The measurement model consisted of two latent variables: ERM and performance, which were each represented by two and three indicators, respectively. Additionally, CSR was an observed variable measured through ESG indicators. The structural model was assessed through SEM analysis, which is illustrated in Figure 2 (Kline, 2011). To test the mediation hypothesis, we followed Baron and Kenny's (1986) criteria. These included: (a) ensuring the independent variable is linked to the outcome variable; (b) ensuring the independent variable is linked to the mediating variable; (c) ensuring the mediating variable is linked to the outcome variable; and (d) determining whether there is full or partial mediation based on the significance of the predictor-outcome path. If it is non-significant, there is full mediation, and if it is significant, there is partial mediation.

Different fit indices were used to assess the model fit, as suggested by Bollen (1989) and Bentler (1990). These indices included the Goodness-of-Fit Index (GFI), Tucker-Lewis Index (TLI), Bentler Comparative Fit Index (CFI), Bentler Normed Fit Index (NFI), and the Hoelter Index. According to Bentler (1990) and Hu and Bentler (1999), a TLI value higher than 0.90 and GFI, NFI, and CFI values greater than 0.95 indicate good fit. Additionally, as suggested by Wan (2002), a Hoelter's critical N value between 75 and 200 indicates an acceptable fit.

TABLE 6 Study variable means, standard deviations, and correlation matrix ($N = 222$).

	Pre log10 means	Pre log10 SD	Means	SD	RI1	RI2	ESG	PI1	PI2	PI3
RI1	40.25	27.30	2.48	0.37						
RI2	43.30	25.78	2.53	0.34	0.62**					
ESG	51.43	18.82	2.67	0.21	-0.15*	-0.12*				
PI1	15.70	32.69	2.13	0.35	0.16**	0.10	-0.08			
PI2	6.44	7.62	1.77	0.36	0.35**	0.30**	-0.17**	0.83**		
PI3	26.30	25.78	2.13	0.39	0.22**	0.32**	-0.06	0.42**	0.49**	

* $p < 0.05$; ** $p < 0.01$.

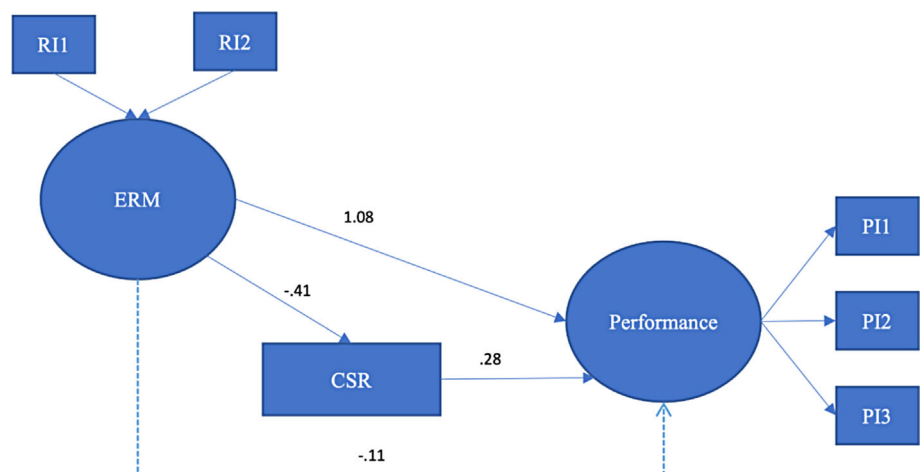


FIGURE 2 Structural model path analysis (standardized effects). All values are significant at $p < 0.05$ or $p < 0.01$.

4 | RESULTS

4.1 | Descriptive statistics

Table 6 displays the descriptive statistics of the dataset before the Log10 transformation and the study's final main statistics, such as means, standard deviations, and correlations between the variables.

In the data before Log10, the sample exhibits mean values of the ERM indicators around the 40/100 level, while the CSR ESG indicator's mean values are around the 50/100 level. Performance mean values span a range of 6%–26%. SD values range from 7.62 (lowest) to 32.69 (highest).

The final values were obtained after applying the Log10 transformation, according to Lo and Andrews (2015). The correlation matrix shows positive and statistically significant Pearson's correlations (at the 0.01 level) between ERM indicators and performance indicators. However, there are negative Pearson's correlations between CSR (ESG), ERM (RI1 and RI2), and performance (PI1, PI2, and PI3) indicators, even though they are generally statistically significant.

To verify if the set of indicators could be combined into a single factor, Harman's one-factor test was used with an unrotated factor solution. The result showed that a single factor accounted for 43% of the total variance, which is lower than the recommended threshold of 50%. However, this indicates that there were no issues with common method bias. The Cronbach's alphas for the latent variables ERM and performance are 0.77 and 0.80, respectively, meeting the 0.70 criterion for internal consistency as recommended by Bagozzi and Yi (1988) and Nunnally (1978).

4.2 | Measurement model

The measurement model was examined to understand how the constructs and their indicators are related. All factor loadings were above 0.40 (ranging from 0.43 to 1.07) and were significant at the 0.01 level, in line with Hair et al. (2010). Each factor's average variance extracted was higher than 0.50, which is the minimum acceptable value, with values ranging from 0.63 to 0.65, consistent with Fornell and Larcker (1981). The CFA results displayed an acceptable fit, with GFI, TLI, NFI, and CFI values all exceeding 0.90, in line with Bentler (1990) and Hu

and Bentler (1999). Furthermore, consistent with Wan (2002), Hoelter's critical N values between 75 and 200 indicated an acceptable fit.

To ensure data reliability, Cronbach's alpha and composite reliability assessments were conducted. The Cronbach alpha for each construct exceeded the suggested threshold of 0.70 (Nunnally & Bernstein, 1994), ranging from 0.77 to 0.80. Additionally, the composite reliability scores ranged between 0.78 and 0.83, surpassing the 0.70 benchmark recommended by Hair et al. (2010). Therefore, these results establish the reliability of each construct.

Convergent validity was assessed using the Average Variance Extracted (AVE) (Fornell & Larcker, 1981). AVE values exceeded the threshold value of 0.50 (Fornell & Larcker, 1981), with values between 0.63 and 0.65, thus confirming convergent validity.

Discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio, which remained below the recommended limit of 0.85 (Henseler et al., 2015). Hence, discriminant validity was validated. In Table 7, these findings are presented.

4.3 | Hypothesis testing

In Figure 2, the structural model results are presented and show how CSR, represented ESG indicators, acts as a mediator between ERM (represented by risk indicators) and firm performance relationships. All coefficients are significant at the 0.01 level.

In the examined model, the following goodness-of-fit indices were obtained: GFI = 0.96, TLI = 0.90, NFI = 0.95, CFI = 0.96, and Hoelter = 130.00. Consequently, all indices surpass the cut-off values, indicating a good model fit.

In Hypothesis 1 we hypothesized a positive relationship between ERM, represented by risk indicators, and firm performance. The results align with Farrell and Gallagher (2015), Gordon et al. (2009), and Ryman and Roach (2022), confirming a positive impact of ERM on firm performance. Thus supporting Hypothesis 1 and reinforcing the proposed need to evaluate ERM effectiveness and impact on firm performance.

Hypothesis 2 suggested a positive relationship between ERM and firm CSR. However, the results revealed the opposite – a significant negative relationship between ERM, represented by risk indicators, and CSR, as represented by ESG indicators. Therefore, Hypothesis 2

TABLE 7 Measurement model outputs.

	Loadings	Cronbach's alpha	AVE	Composite reliability	Model fit	HTMT
ERM	–	0.77	0.63	0.78	GFI	0.95
RI1	0.86				TLI	0.90
RI2	0.73				NFI	0.92
PRF	–	0.80	0.65	0.83	CFI	0.94
PI1	0.78				Hoelter	117.00
PI2	1.07					
PI3	0.43					

is not supported, consistent with observations from various authors (Cek & Eyupoglu, 2020; COSO, 2017; Landi et al., 2022; Naseem et al., 2020; Ryman & Roach, 2022). This reinforces the importance of aligning firm-specific goals, different strategy orientations, and ERM to help organizations enhance performance or preserve value.

In Hypothesis 3, the findings indicated that CSR, represented by ESG indicators, had a positive impact on firm performance. The findings support Hypothesis 3, in line with prior studies (Ahmad et al., 2021; El Khoury et al., 2023; Kim & Li, 2021; Zhao et al., 2018). This highlights CSR as an important business strategy dimension that can be aligned with ERM to create value.

Finally, Hypothesis 4 proposed that CSR plays a mediating role in the relationship between ERM and firm performance. The results indicated an unexpectedly negative but significant indirect relationship between ERM, represented by risk indicators, and firm performance through CSR, represented by ESG indicators. This suggests that CSR partially mediates the relationship yet remains significant in both direct and indirect effects. Therefore, Hypothesis 4 is supported. In line with Farrell and Gallagher (2015), Naseem et al. (2020), and Chairani and Siregar (2021), the results offer valuable insights into how ERM can be a tool for organizations to implement complex strategies like CSR while maintaining control of outcomes in uncertain environments.

The significance of these relationships was validated using the bootstrap method, with a significance level of 0.01 or lower (Hair et al., 2010). Further details will be discussed in the following section.

5 | DISCUSSION

The goal of ERM is to help organizations manage factors that directly impact their business goals and performance (COSO, 2017). By implementing ERM in a systematic way, aligned with an organization's strategy, it can become a management capability that leads to lower risks and improved outcomes (Arnold et al., 2015; Farrell & Gallagher, 2015; Gordon et al., 2009; Ryman & Roach, 2022). This study examines the relationship between ERM, represented by risk indicators, and CSR, represented by ESG indexes, with special attention to the mediating role of CSR in this relationship.

The study was focused on the European Union region, using data from 222 companies. The information was obtained from the EIKON Refinitiv database between 2015 and 2019.

The study's findings align with COSO's (2017) main principles and with previous literature. The results overview shows: (a) ERM, represented by risk indicators, has a positive direct effect on firm performance and a negative effect on its CSR performance, represented by ESG indexes (H1 and H2, respectively); (b) CSR, represented by ESG indexes, has a positive direct effect on firm performance (H3); and (c) CSR, represented by ESG indexes, has a negative mediating effect on the relationship between ERM, represented by risk indicators, and firm performance (H4). In the following paragraphs, these results are discussed: first, the results that are in line with the hypotheses in H1 and H3, and second, some results that are contrary to the hypotheses in H2 and H4.

First, in Hypothesis 1, the positive direct relationship between ERM, represented by risk indicators, and firm performance is in accordance with COSO (2017) principles. This alignment underscores the notion that ERM should be directed towards preserving value for organizations, helping in goal attainment, and ultimately improving firm performance. These results are also in line with previous literature, evidencing a positive relationship between ERM and firm performance (Farrell & Gallagher, 2015; Gordon et al., 2009; Ryman & Roach, 2022).

Moreover, according to Gordon et al. (2009), if a firm can reduce its organizational exposure to a certain risk, it should be able to increase its performance outcomes and respective business key performance indicators. Aligned with the study's main goal, this approach also introduces a novel perspective on evaluating ERM implementation through the use of risk indicators. This contrasts with the conventional survey-based methodologies employs, as seen, for example in studies by Arnold et al. (2015), Farrell and Gallagher (2015), and Hummel et al. (2021).

Second, in Hypothesis 3, the assertion of a positive relationship between CSR, represented by ESG indexes, and firm performance is strongly supported in the literature. This finding is bolstered by several prior studies, which explore aspects ranging from investment optimization based on responsible decision-making to the impact of reputation on business activities (Ahmad et al., 2021; El Khoury et al., 2023; Kim & Li, 2021; Zhao et al., 2018).

Third, contrary to the hypothesis, the study presented empirical evidence about the negative relationship between ERM, represented by risk indicators, and CSR, represented by ESG indexes (H2). Additionally, it reveals a negative indirect relationship between ERM and firm performance through CSR (H4). In light of the COSO (2017) ERM principles, it is important to analyze hypotheses, 2 and H4, together. This analysis should encompass three key points: (1) the nature of CSR as a strategic dimension aligning with organizational goals and ERM; (2) the nature of risks associated with ERM and firm performance, mediated by CSR; and (3) assuming that the risk managed by ERM directly relates to specific KPI and risk performance indicators. Therefore, it is important to consider the combination of the path analysis measures (the partial CSR mediation, the indirect effect of ERM on the firm's overall performance, and the ERM indirect effect on each performance indicator related to the CSR strategy dimension).

The examination of the negative relationship between ERM and CSR needs a thoughtful analysis, accounting for the intrinsic orientation of ERM towards business performance and firm value (Farrell & Gallagher, 2015; Gordon et al., 2009; Ryman & Roach, 2022). This orientation contrasts with CSR, which is inherently focused on the sustainable management of policies (Landi et al., 2022; Naseem et al., 2020). Regarding both views, management priorities oriented towards revenues instead of corporately responsible policies can explain the obtained results, especially in a short-term or volatile context. An example can be observed in Cek and Eyupoglu (2020), where the ESG social pillar failed to correlate with economic performance. Another example is elucidated by Landi et al. (2022), who identified

different objectives and CSR orientations between investors and investees, penalizing business value and systematic risk. The negative impact of ERM on firm CSR performance can be attributed to the counteractive influence of ERM procedures when attempting to minimize some CSR policies, potentially leading to unfavorable consequences on firm value or business performance.

The nature of the risks associated with ERM and firm performance, mediated by CSR, can also play a critical role in explaining the results. According to several authors (Cek & Eyupoglu, 2020; Di Tommaso & Thornton, 2020; Nirino et al., 2022), different CSR goals and strategic orientations could lead to different impacts on firm value and performance. An example can be found in De Giuli et al. (2023) where, in sensitive industries, they observed a negative relationship between CSR performance and company total risk. According to COSO (2017), ERM's main aim is to support the organization's goal achievement. These views align with the obtained results: the risk indicators used to represent ERM have an opposite nature from CSR orientations for value creation in organizations (Di Tommaso & Thornton, 2020; Landi et al., 2022). As analyzed in the following paragraph, the relationship between ERM and CSR exists. However, in this case, regarding the specific modeled alignment (systematic risk, CSR ESG indexes, and business value performance metrics), the relationship is negative. The negative relationship could possibly relate to the effort of ERM to optimize CSR effects on organization-specific business performance and value-analyzed metrics.

Finally, regarding the partial mediation on the relationship between ERM and firm performance, the study goes in line with previous literature, reinforcing the linkage between ERM, CSR, and firm performance (Naseem et al., 2020). Furthermore, regarding the negative indirect effect of ERM on firm performance, the previous analyses assume an important role: the orientation of ERM for business performance and firm value, in this case, can be conditioned by its alignment with the CSR strategy dimension. ERM could assume the role of balancing CSR policies, minimizing their possible negative impact on firm performance (without eliminating them completely), in line with Nirino et al. (2022).

Furthermore, regarding the indirect effect of ERM on individual performance indicators, mediated by CSR performance, in this case being positive, it could reflect higher levels of alignment between CSR policies, ERM goals, and business goals, having a positive effect on performance indicators. ERM may succeed in balancing the CSR effect on firm performance at a level that keeps the relationship positive to preserve organizational value from CSR's potential threat effects (Di Tommaso & Thornton, 2020). Additionally, the consideration of the momentum factor, particularly concerning the volatility and long-term perspective associated with CSR policies, is crucial, as highlighted by Steen et al. (2020).

In the context of the negative direct effect of ERM on CSR and its negative indirect effect on firm performance, ERM's role appear to create a balance between the short- and long-term impacts of CSR on performance, aligning with the insights provided by Nirino et al. (2022).

5.1 | Managerial implications

In today's uncertain and complex business environment, ERM can play a critical role for organizations. This study highlights the importance of ERM for managers and policymakers in business value preservation and performance enhancement, as supported by COSO (2017).

The study insights could be useful for managers to balance and optimize their CSR policies with ERM actions to optimize firms' value preservation and performance enhancement. The COSO (2017) principles on ERM suggest it aims to preserve value for companies and contribute to their performance, as reflected in H4. Our results suggest that aligning ERM policies and activities with CSR can positively impact firm value and performance, despite different conceptual orientations. ERM can balance the potentially negative impact of CSR policies and make them more optimized for business performance and value.

ERM emerges as a valuable tool for managers, offering them a means to improve their understanding of the organization and business context. It empowers them to predict potential events and scenarios, thereby enabling effective performance management and the preservation and enhancement of organizational value, as advocated by Farrell and Gallagher (2015). It can also aid in their decision-making process by identifying the factors that could impact their strategy and supply chain. However, it is essential to ensure effective ERM implementation to guarantee its positive impact on organizations.

The study aims to understand how ERM affects firm performance, through its relationship with strategy-level areas like CSR. With the provided results, this research could provide a new framework for comprehending the relationship between ERM and performance, particularly in non-profit-oriented strategy areas like CSR. Directly combining objective measures (such as risk indicators representing ERM, ESG indexes, representing the CSR strategy level, and firm performance indicators), this approach can be assumed as a representation of ERM alignment with a strategy dimension, connected to organizational goals, providing a transversal view of ERM implementation. Complying with COSO (2017) principles is more complete than direct connections between ERM and firm performance, or the reliance on subjective and error susceptible surveys (Arnold et al., 2015; Çamlıbel et al., 2021; Farrell & Gallagher, 2015; Soares da Fonseca, 2020). These insights could be critical for managers to balance and optimize their CSR policies with ERM actions to optimize firms' value preservation and performance enhancement. As proposed by De Giuli et al. (2023), we offer a new approach of the relationship between ERM's and CSR on firm performance.

In addition, this study highlights several important insights for organizations and their management. From exploring the traditional relationships between ERM and firm performance or CSR and firm performance, it goes deeper. It introduces both long- and short-term principles into these relationships, establishing a framework to connect ERM with non-profit natural-oriented strategy dimensions, such as CSR. This integration aims to contribute to organizational performance and value preservation in deep, uncertain, and complex environments. Despite CSR not clearly being a profit-oriented strategy

dimension with a volatile impact on firm performance, aligning it with ERM could be a good principle to optimize and control its impact on organization value and performance.

Despite recent advances in understanding the relationship between ERM and CSR (Bromiley et al., 2015; Nirino et al., 2022), political and management perspectives do not always consistently align or consider this relationship. This lack of alignment may be attributed to the inherent nature of both ERM and CSR concepts and their conservative perspectives.

On the one hand, CSR is not always profit-oriented and is naturally associated with non-financial aspects of the firm (Landi et al., 2022; Naseem et al., 2020). On the other hand, ERM is primarily associated with the financial and accounting aspects of the firm (Farrell & Gallagher, 2015; Gordon et al., 2009; Ryman & Roach, 2022). With this study, we provide clarity to perspectives that support COSO's (2017) emphasis on the alignment between ERM and firm strategy and goals.

Our findings demonstrate that the effective alignment of ERM with specific organizational strategy dimensions such as CSR. This interplay connects with firm performance, extending to metrics such as ROE, ROA, or ROIC.

Establishing an effective ERM system is a complex undertaking, and it often takes a considerable amount of time to see significant results (Farrell & Gallagher, 2015). However, stakeholders and policymakers can develop and implement strategies to realize the added value of ERM for their activities.

COSO (2017) emphasizes the need to foster a risk management culture within organizations. In this regard, working on small experimental projects within a strategic business framework may be a viable solution to kick-start ERM. It could help managers prepare demonstrations within the organization, engage key stakeholders, customize the ERM system to suit their needs, and obtain short-term results. As demonstrated in this study, CSR could serve as an excellent example for such initial projects.

In a different perspective, when applying ERM to critical projects or investments, managers and policymakers often prioritize short-term added value and require mechanisms for making quick decisions and activating instant performance controls. Since risk is inherently linked to the future and uncertainty (ISO, 2008), ERM could become a valuable tool for project or investment implementation. In this scenario, ERM does not necessarily need to be a comprehensive system but rather a tool to support project diagnosis and the ongoing monitoring of project operations and strategies. It could assist managers in predicting key risks and monitoring project or investment execution more effectively, providing unique short-term added value leveraged by ERM.

5.2 | Limitations and directions for future research

Previous studies on the effectiveness of ERM, such as Farrell and Gallagher (2015) and Arnold et al. (2015), relied on surveys to gather managers' opinions on the correlation between ERM and firm

performance. Contrary to conventional approaches, this study draws inspiration from Angelopoulos et al. (2017) and Da Silva et al. (2018), adopting a novel method that incorporates a combination of risk indicators. This framework is employed to assess the effectiveness of ERM and its impact on firm performance. Furthermore, this study delves into the mediating role of CSR in the relationship between ERM and firm performance, offering new insights into the need to align ERM with organizational strategies, as determined by the COSO (2017) ERM principles. These insights are particularly relevant for non-profit-oriented strategies.

Despite promising results further in-depth analysis, it is necessary to strengthen the study findings. In the context of the implementation, this study does not demonstrate how ERM was implemented or with what focus. It does not offer an analysis of the short-term or long-term effects on business decisions and operations. Regarding the study sample, the dataset used only comprises companies from the European Union region, which, while providing a representative sample, may limit the generalization of the findings to other regions. In addition, as presented in De Giuli et al. (2023), when constructing simple, the nature of industries must be taken into account, as the impact of ERM may differ.

Finally, the data used in this study predates the global health crisis. Future research could compare these results with the data from both the pandemic period and the post-pandemic era for a more comprehensive understanding of the impact of external events on the relationships studied.

In the future, more research could focus on analyzing ERM system policies, taking into consideration the principles outlined by ISO (2008) and COSO (2017). These principles provide guidelines for ERM implementation, emphasizing the integration of organizational goals, business operations, and supply chains, as well as the use of key performance indicators (KPI) and key risk indicators (KRI).

6 | CONCLUSION

This study presents a practical approach to analyzing how ERM affects firm performance by considering its alignment with strategic business dimensions, as recommended by ISO (2008) and COSO (2017). Instead of relying on managers' opinions collected through surveys, we used risk indicators. Our research investigates the relationship between ERM, the organization's strategy related to CSR, and the overall performance of the firm.

According to COSO (2017), the definition of ERM includes the culture, capabilities, and practices organizations use to manage risk while creating, preserving, and realizing value through their strategies. However, this definition does not make it easy to identify common measures of ERM that can help study the relationship between risk management, strategy, and firm performance. Previous research has limitations when it comes to understanding this relationship, particularly with respect to how it aligns with different dimensions of organizational strategies, such as CSR.



This research aims to address the knowledge gap regarding the effectiveness of ERM. Firstly, we identified the factors that impact ERM effectiveness, which were previously identified in the literature, including ROE, ROA, and ROIC, based on the financial statements of firms rather than opinion surveys. Secondly, we analyzed the alignment of ERM with non-intrinsic profit-oriented strategy dimensions, such as CSR, and how it affects both ERM and firm performance. Lastly, we examined the direct and indirect impact of ERM on firm performance through CSR. Results showed important insights not only for better understanding ERM but also for helping managers improve their strategic business dimensions, management, and resilience. A clear contribution was obtained regarding the potential added value that ERM can assume when applied to critical complex areas such as CSR, optimizing this area's goals while simultaneously preserving organizations' value and performance.

Despite the challenges associated with ERM implementation, policymakers and managers can adopt strategies to facilitate the process and gain short-term value. Small experimental ERM projects, or ERM applicability as a diagnosis and strategy/operations control tool, could be viable solutions. Aligning ERM with CSR as a strategic dimension would be an excellent practical demonstration, adding value both for ERM and CSR.

Further research could enhance the results and contributions of this study by implementing the suggested framework for companies operating in an uncertain environment, with specific CSR policies and organizational goals defined, and considering short- and long-term analyses.

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