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The Role of Transition Finance, Renewable Energy Investment, and Climate Risk Management on the Financial Performance of Energy Companies in Indonesia

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ABSTRACT

This study examines the role of transition financing, renewable energy investment, and climate risk management in influencing the financial performance of energy companies in Indonesia amid the global transition toward a low-carbon economy. A quantitative approach was employed using primary data collected from 75 managers and professionals in the energy sector through a structured questionnaire measured on a five-point Likert scale. The data were analyzed using SPSS version 25 through descriptive statistics, validity and reliability tests, classical assumption tests, and multiple linear regression analysis. The results indicate that transition financing has a positive and significant effect on financial performance, suggesting that access to sustainable financing mechanisms supports corporate financial stability during the energy transition. Renewable energy investment also shows a significant positive influence, indicating that investment in clean energy technologies enhances operational efficiency and long-term competitiveness. Furthermore, climate risk management significantly affects financial performance, highlighting the importance of identifying and mitigating climate-related risks to maintain corporate financial resilience. Simultaneously, the three variables significantly influence financial performance with an R^2 value of 0.480, indicating that 48% of the variation in financial performance can be explained by the model. These findings demonstrate that the integration of sustainable financial strategies and environmental risk management practices can improve the financial performance of energy companies, while also contributing empirical evidence to the literature on climate finance and corporate sustainability and offering practical insights for managers, investors, and policymakers in supporting the transition toward sustainable energy systems.

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1. INTRODUCTION

The global energy sector is currently undergoing a profound transformation driven by the urgency to address climate change and accelerate the transition toward a low-carbon economy. Governments, international organizations, and financial institutions are increasingly encouraging the adoption of sustainable financial practices and environmentally responsible investment strategies to reduce greenhouse gas emissions and achieve global climate targets [1], [2]. Within this changing landscape, energy companies are required to adjust their operational and financial strategies to remain competitive while meeting sustainability expectations. The integration of sustainable financial mechanisms, particularly transition financing, renewable energy investment, and climate risk management, has therefore emerged as a critical strategic approach for energy companies seeking to balance economic performance with environmental responsibility [3], [4].

Indonesia plays a significant role in the global energy market as one of the largest energy producers in Southeast Asia. Nevertheless, the country's energy system remains heavily reliant on fossil fuels, particularly coal, oil, and natural gas. This dependency creates significant challenges for achieving national and global climate commitments, especially in the context of the global movement toward decarbonization [5], [6]. The transition toward cleaner energy systems requires substantial financial resources, technological innovation, and supportive regulatory frameworks. In response to these challenges, transition financing has emerged as an important financial mechanism designed to support companies that are shifting their operations from carbon-intensive activities toward more sustainable and environmentally responsible energy production [7], [8].

Transition financing enables companies to gradually adopt cleaner technologies and reduce their environmental footprint without disrupting economic productivity. Through financial instruments such as green bonds, sustainability-linked loans, and transition funds, companies can secure the capital required to modernize their infrastructure and invest in low-carbon technologies [9], [10]. These financing mechanisms are increasingly recognized as essential tools for supporting the energy transition in emerging economies, where financial constraints often hinder large-scale technological transformation. For energy companies in Indonesia, access to transition financing can play a vital role in strengthening financial stability while enabling strategic investments that align with global sustainability standards.

In addition to financial support mechanisms, investment in renewable energy has become a key driver of sustainability within the energy sector. Renewable energy sources such as solar, wind, geothermal, and hydropower provide environmentally friendly alternatives to fossil fuels while offering long-term economic benefits [11], [12]. Many energy companies in Indonesia have begun to allocate significant resources toward renewable energy development in response to regulatory pressure, international climate commitments, and growing market demand for sustainable energy solutions. These investments not only contribute to environmental sustainability but also enhance operational efficiency, reduce exposure to fossil fuel price volatility, and improve corporate reputation among investors and stakeholders.

Another crucial factor affecting corporate sustainability and performance is climate risk management. Climate change presents multiple risks to energy companies, including regulatory risks arising from stricter environmental policies, physical risks related to extreme weather events, and market risks resulting from shifting investor preferences toward sustainable investments [5], [6]. Companies that fail to anticipate and manage these risks may experience financial instability, operational disruptions, and reduced investor confidence. Consequently, climate risk management has become an integral component of corporate governance and strategic decision-making, enabling

companies to identify potential risks, develop mitigation strategies, and enhance long-term organizational resilience.

Despite the increasing importance of sustainability practices in the energy industry, empirical research examining the combined influence of transition financing, renewable energy investment, and climate risk management on corporate financial performance in Indonesia remains relatively limited. Most previous studies have focused on macro-level energy policy, renewable energy development, or corporate social responsibility initiatives. Therefore, further research is needed to provide firm-level empirical evidence regarding how these sustainability-oriented financial and strategic factors affect corporate financial outcomes. Based on this gap, this study aims to analyze the role of transition financing, renewable energy investment, and climate risk management in influencing the financial performance of energy companies in Indonesia. By providing empirical insights from the Indonesian energy sector, this research contributes to the growing literature on climate finance and sustainable corporate strategy while offering practical implications for policymakers, corporate managers, and investors involved in the energy transition process.

2. LITERATURE REVIEW

2.1 Transition Financing

Transition financing has emerged as an important financial mechanism that supports companies in shifting from carbon-intensive operations toward more sustainable and environmentally friendly business models. This concept refers to financial resources provided to firms that are in the process of transitioning to lower-carbon activities, particularly in sectors that traditionally rely heavily on fossil fuels such as energy, transportation, and heavy industry [13], [14]. Transition financing helps bridge the financial gap between existing high-emission operations and future sustainable energy systems by providing access to capital needed to adopt cleaner technologies and improve energy efficiency through instruments such as green bonds, sustainability-linked loans, and transition bonds. In the energy sector, this form of financing enables companies to gradually reduce their dependence on fossil fuels while maintaining operational stability and financial viability during the transition process [15], [16]. Financial institutions and investors increasingly support transition financing initiatives as part of global efforts to achieve climate targets, including commitments under the Paris Agreement and various national decarbonization policies. Previous studies indicate that companies that successfully obtain sustainable financing often experience benefits such as lower capital costs, increased investor confidence, and improved corporate reputation. As environmental, social, and governance (ESG) considerations become more prominent in investment decisions, companies are encouraged to adopt sustainable financial strategies, making transition financing an important factor influencing the financial sustainability and long-term competitiveness of energy companies.

2.2 Renewable Energy Investment

Renewable energy investment refers to the allocation of financial resources toward the development and implementation of energy

technologies derived from sustainable natural sources such as solar, wind, geothermal, hydropower, and biomass, which produce significantly lower greenhouse gas emissions compared to conventional fossil fuels. As global concerns regarding climate change intensify, renewable energy investment has become a key strategy for achieving sustainable economic development and enhancing energy security [11], [17]. Governments worldwide, including Indonesia, have introduced various policies and incentives such as subsidies, tax benefits, and renewable energy targets to encourage the expansion of renewable energy infrastructure and reduce dependence on fossil fuels. From a corporate perspective, investment in renewable energy offers several strategic advantages, including the potential to reduce long-term operational costs through more stable energy sources that are less vulnerable to global fossil fuel price fluctuations [12], [18]. In addition, renewable energy projects can strengthen corporate reputation and improve relationships with stakeholders who increasingly prioritize sustainability and environmental responsibility. Furthermore, such investments create opportunities for innovation and new business development within the energy sector. Empirical studies also indicate that companies investing in renewable energy technologies tend to achieve improved operational efficiency, stronger market competitiveness, and greater resilience to environmental regulatory changes, making renewable energy investment an important factor that supports both environmental sustainability and corporate financial performance.

2.3 Climate Risk Management

Climate risk management refers to the process of identifying, assessing, and mitigating risks related to climate change that may affect corporate operations, assets, and financial performance. These risks generally include physical risks, such as extreme weather events, floods, and rising temperatures that can disrupt energy infrastructure, and transition risks arising from policy changes, technological developments, and shifts in market preferences toward low-carbon systems [8], [19]. For energy companies, these risks are particularly significant because the sector is closely connected to environmental regulations and climate policies, including carbon pricing and emission reduction targets. Failure to manage climate risks effectively may result in financial losses, reduced investor confidence, and reputational damage [20], [21]. Therefore, companies increasingly integrate climate considerations into corporate governance, strategic planning, and risk management frameworks through strategies such as energy portfolio diversification, resilient infrastructure investment, and improved environmental reporting. International frameworks such as the Task Force on Climate-related Financial Disclosures (TCFD) also encourage companies to

disclose climate-related risks in financial decision-making. Empirical evidence suggests that firms with strong climate risk management practices tend to achieve greater financial stability and long-term performance because proactive risk management helps reduce operational disruptions and enhances adaptability to changing regulatory and market conditions.

2.4 *Financial Performance*

Financial performance reflects a company's ability to generate profits, maintain financial stability, and create value for shareholders, and it is commonly used as an indicator of organizational success and efficiency in utilizing resources. It is typically evaluated through financial indicators such as profitability, return on investment, revenue growth, and operational efficiency. In the energy industry, financial performance is influenced by various internal and external factors, including operational efficiency, technological innovation, regulatory policies, and market conditions [22], [23]. As the sector evolves in response to environmental challenges and increasing sustainability demands, companies are required to adopt strategic approaches that balance financial objectives with environmental and social responsibilities. The integration of sustainability practices into corporate strategies has increasingly been linked to improved financial outcomes, as companies that invest in renewable energy, utilize sustainable financing mechanisms, and implement effective risk management practices are often better positioned to achieve long-term financial stability [24], [25], enhance operational efficiency, reduce exposure to environmental risks, and attract capital from sustainability-oriented investors.

2.5 *Conceptual Framework and Hypothesis Development*

Based on the literature discussed above, this study proposes that transition financing, renewable energy investment, and climate risk management play important roles in influencing the financial performance of energy companies. Transition financing provides the financial resources needed to support sustainable transformation, renewable energy investment contributes to improving operational efficiency and technological innovation, while climate risk management strengthens corporate resilience against environmental and regulatory uncertainties. The conceptual framework of this study assumes that each of these variables independently contributes to enhancing financial performance. Companies that effectively utilize transition financing, actively invest in renewable energy technologies, and implement strong climate risk management practices are expected to achieve better financial outcomes compared to those that do not integrate these sustainability-oriented strategies into their operations. Therefore, based on these considerations, several research hypotheses are formulated in this study.

H1: Transition financing has a positive and significant effect

on the financial performance of energy companies in Indonesia.

H2: Renewable energy investment has a positive and significant effect on the financial performance of energy companies in Indonesia.

H3: Climate risk management has a positive and significant effect on the financial performance of energy companies in Indonesia.

3. METHODS

3.1 Research Design

This study employs a quantitative research approach to examine the influence of transition financing, renewable energy investment, and climate risk management on the financial performance of energy companies in Indonesia. A quantitative method is used because it enables the measurement of relationships among variables objectively through statistical analysis. The study adopts an explanatory research design that aims to explain the causal relationships between the independent variables and the dependent variable. In this research, the independent variables consist of transition financing (X1), renewable energy investment (X2), and climate risk management (X3), while the dependent variable is financial performance (Y). The relationships among these variables are analyzed using multiple linear regression analysis to determine whether each independent variable has a significant effect on financial performance.

3.2 Population and Sample

The population of this study consists of managers and financial decision-makers working in energy companies operating in Indonesia, as these individuals are directly involved in financial planning, investment decisions, and sustainability-related strategies within their organizations. Due to limitations in time and accessibility, this research employs a purposive sampling technique, which is a non-probability sampling method where respondents are selected based on specific criteria relevant to the research objectives. The criteria used include individuals who hold managerial positions, financial analysts, sustainability officers, or professionals involved in strategic decision-making within energy companies. Based on these criteria, a total of 75 respondents were selected as the research sample, which is considered adequate for conducting statistical analysis using multiple regression techniques.

3.3 Data Collection Technique

The data used in this research are primary data collected through a structured questionnaire distributed to the respondents. The questionnaire contains several statements designed to measure respondents' perceptions and evaluations regarding the variables studied. All questionnaire items are measured using a five-point Likert scale ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. The Likert scale is commonly used in quantitative research because it allows respondents to express their level of agreement with specific statements, making it easier to measure attitudes and perceptions related to the research variables.

3.4 Operational Definition of Variables

In order to ensure clarity in measurement, each variable in this study is defined operationally. Transition Financing (X1) refers to financial mechanisms that support energy companies in shifting from carbon-intensive operations toward more sustainable and environmentally friendly business activities, measured through indicators such as access to sustainable financing instruments, availability of funding for energy transition projects, financial support for clean technology development, and alignment of financing strategies with sustainability goals. Renewable Energy Investment (X2) refers to the allocation of financial resources toward the development and implementation of renewable energy technologies such as solar, wind, geothermal, and hydropower, reflected through indicators

including investment in renewable energy technologies, expansion of renewable energy infrastructure, innovation in sustainable energy projects, and long-term commitment to clean energy development. Climate Risk Management (X3) refers to organizational processes used to identify, evaluate, and mitigate risks associated with climate change that may affect corporate operations and financial performance, with indicators including identification of climate-related risks, implementation of climate adaptation strategies, integration of climate risks into corporate planning, and environmental risk monitoring and reporting. Meanwhile, Financial Performance (Y) represents the company's ability to generate profits, maintain financial stability, and create value for shareholders, measured in this study based on managerial perceptions through indicators such as profitability growth, operational efficiency, revenue growth, and overall financial stability.

3.5 Data Analysis Technique

The data collected from the questionnaire were analyzed using SPSS version 25 through several statistical procedures to test the research hypotheses. First, descriptive statistics were used to describe the characteristics of respondents and summarize the distribution of responses for each research variable. A validity test was then conducted using the Pearson correlation method to determine whether the questionnaire items accurately measured the intended variables, where an item is considered valid if the correlation coefficient exceeds the critical value of the r-table. Reliability testing was performed using Cronbach's Alpha to assess the consistency of the measurement instrument, with a value greater than 0.70 indicating reliable variables. Before conducting regression analysis, classical assumption tests were performed, including the normality test to examine whether residual data are normally distributed, the multicollinearity test to determine whether independent variables are highly correlated, and the heteroscedasticity test to assess whether residual variance remains constant across observations. Multiple linear regression analysis was then used to examine the effect of transition financing (X1), renewable energy investment (X2), and climate risk management (X3) on financial performance (Y), using the regression model $Y=\alpha+\beta1X1+\beta2X2+\beta3X3+\varepsilon$, where α represents the constant, $\beta_1-\beta_3$ are regression coefficients, and ε is the error term. Hypothesis testing was conducted using the t-test to analyze the partial effect of each independent variable, the F-test to examine the simultaneous effect of all independent variables, and the coefficient of determination (R^2) to measure the proportion of variation in financial performance explained by the model. Through these analytical procedures, the study aims to determine the extent to which transition financing, renewable energy investment, and climate risk management influence the financial performance of energy companies in Indonesia.

4. RESULTS AND DISCUSSION

4.1 Respondent Demographics

This study involved 75 respondents who work in energy companies in Indonesia. The respondents consisted of managers, financial analysts, sustainability officers, and other professionals involved in strategic financial and operational decision-making within their organizations. Understanding respondent characteristics is important to provide context regarding the perspectives represented in the survey.

Table 1. Respondent Demographic Characteristics

Characteristics	Category	Frequency	Percentage
Gender	Male	46	61.3%
	Female	29	38.7%
Age	< 30 years	14	18.7%

	30–40 years	31	41.3%
	41–50 years	20	26.7%
	> 50 years	10	13.3%
Education	Bachelor Degree	41	54.7%
	Master Degree	28	37.3%
	Doctoral Degree	6	8.0%
Work Experience	< 5 years	18	24.0%
	5–10 years	29	38.7%
	> 10 years	28	37.3%

Table 1 presents the demographic characteristics of the respondents involved in this study. Based on gender, the majority of respondents are male, accounting for 46 individuals (61.3%), while female respondents represent 29 individuals (38.7%). In terms of age distribution, most respondents fall within the 30–40 years category with 31 respondents (41.3%), followed by those aged 41–50 years with 20 respondents (26.7%), respondents under 30 years with 14 individuals (18.7%), and those above 50 years with 10 individuals (13.3%). Regarding educational background, the majority of respondents hold a bachelor's degree with 41 individuals (54.7%), followed by master's degree holders with 28 individuals (37.3%), and doctoral degree holders with 6 individuals (8.0%). In terms of work experience, most respondents have between 5–10 years of experience with 29 individuals (38.7%), followed closely by those with more than 10 years of experience with 28 individuals (37.3%), while 18 respondents (24.0%) have less than 5 years of work experience. These results indicate that the respondents generally possess adequate educational backgrounds and professional experience, suggesting that they are capable of providing reliable insights regarding financial and sustainability-related practices within energy companies.

4.2 Descriptive Statistics

Descriptive statistics are used to summarize the distribution of responses for each research variable.

Table 2. Descriptive Statistics of Variables

Variable	N	Min	Max	Mean	Std. Deviation
Transition Financing	75	2.10	4.85	3.87	0.64
Renewable Energy Investment	75	2.30	4.90	4.01	0.58
Climate Risk Management	75	2.15	4.88	3.95	0.61
Financial Performance	75	2.25	4.92	4.05	0.57

Table 2 presents the descriptive statistics of the variables examined in this study. The results show that renewable energy investment has the highest mean value (4.01) with a standard deviation of 0.58, indicating that respondents generally perceive that energy companies are actively investing in renewable energy technologies. Financial performance also shows a relatively high mean value of 4.05 with a standard deviation of 0.57, suggesting that most respondents evaluate their companies' financial conditions as relatively strong and stable. Climate risk management has a mean score of 3.95 with a standard deviation of 0.61, reflecting that companies have begun integrating climate-related risk considerations into their operational and strategic decisions. Meanwhile, transition financing has a mean value of 3.87 with a standard deviation of 0.64, indicating that although companies are increasingly accessing sustainable financing mechanisms, the level of adoption still varies among organizations.

4.3 Validity Test

The validity test was conducted using Pearson Product Moment correlation. An item is considered valid if the correlation coefficient (r-count) is greater than the r-table value (0.227 for n = 75).

Table 3. Validity Test Results

Variable	Item	r-count	r-table	Result
Transition Financing	TF1	0.682	0.227	Valid
	TF2	0.714	0.227	Valid
	TF3	0.735	0.227	Valid
Renewable Energy Investment	RE1	0.701	0.227	Valid
	RE2	0.722	0.227	Valid
	RE3	0.756	0.227	Valid
Climate Risk Management	CR1	0.688	0.227	Valid
	CR2	0.731	0.227	Valid
	CR3	0.743	0.227	Valid
Financial Performance	FP1	0.697	0.227	Valid
	FP2	0.726	0.227	Valid
	FP3	0.754	0.227	Valid

Table 3 presents the results of the validity test for all questionnaire items used in this study. The results show that all items across the variables of transition financing, renewable energy investment, climate risk management, and financial performance have r-count values ranging from 0.682 to 0.756, which are higher than the r-table value of 0.227. This indicates that each questionnaire item has a strong correlation with its respective variable and successfully measures the intended construct. Specifically, the items measuring transition financing (TF1–TF3), renewable energy investment (RE1–RE3), climate risk management (CR1–CR3), and financial performance (FP1–FP3) are all declared valid. Therefore, the measurement instruments used in this study are considered appropriate and capable of accurately capturing respondents' perceptions regarding the variables examined.

4.4 Reliability Test

Reliability testing was conducted using Cronbach's Alpha. A variable is considered reliable if the Cronbach's Alpha value exceeds 0.70

Table 4. Reliability Test Results

Variable	Cronbach Alpha	Standard	Result
Transition Financing	0.823	0.70	Reliable
Renewable Energy Investment	0.846	0.70	Reliable
Climate Risk Management	0.812	0.70	Reliable
Financial Performance	0.835	0.70	Reliable

Table 4 presents the results of the reliability test for all variables used in this study. The findings indicate that transition financing has a Cronbach's Alpha value of 0.823, renewable energy investment has a value of 0.846, climate risk management shows a value of 0.812, and financial performance records a value of 0.835. All these values exceed the reliability threshold of 0.70, indicating that the measurement instruments used in this research have a high level of internal consistency. This means that the questionnaire items for each variable consistently measure the same construct and produce stable and dependable results. Therefore, all variables in this study are considered reliable and suitable for further statistical analysis, including regression and hypothesis testing.

4.5 Classical Assumption Tests

4.5.1 Normality Test

The normality test was conducted using the Kolmogorov–Smirnov test.

Table 5. Normality Test Results

Test	Asymp. Sig. (2-tailed)	Standard	Result
Kolmogorov–Smirnov	0.200	> 0.05	Normal

Table 5 presents the results of the normality test conducted using the Kolmogorov–Smirnov method. The test shows an Asymp. Sig. (2-tailed) value of 0.200, which is higher than the significance threshold of 0.05. This result indicates that the residual data in the regression model are normally distributed. The fulfillment of the normality assumption suggests that the regression analysis can be conducted appropriately and that the statistical results obtained from the model are reliable for further hypothesis testing.

4.5.2 Multicollinearity Test

Table 6. Multicollinearity Test Results

Variable	Tolerance	VIF	Standard	Result
Transition Financing	0.691	1.446	VIF < 10	No Multicollinearity
Renewable Energy Investment	0.658	1.520	VIF < 10	No Multicollinearity
Climate Risk Management	0.712	1.403	VIF < 10	No Multicollinearity

Table 6 presents the results of the multicollinearity test for the independent variables in the regression model. The findings indicate that transition financing has a tolerance value of 0.691 and a VIF value of 1.446, renewable energy investment shows a tolerance value of 0.658 and a VIF value of 1.520, while climate risk management has a tolerance value of 0.712 and a VIF value of 1.403. All tolerance values are greater than 0.10 and all VIF values are well below the threshold of 10, indicating that there is no multicollinearity among the independent variables. This means that the variables of transition financing, renewable energy investment, and climate risk management do not have strong correlations with each other and can independently explain variations in financial performance within the regression model.

4.6 Multiple Linear Regression Analysis

Table 7. Regression Analysis Results

Variable	B	Std. Error	t-value	Sig.
Constant	0.812	0.401	2.025	0.046
Transition Financing	0.287	0.093	3.086	0.003
Renewable Energy Investment	0.321	0.088	3.648	0.001
Climate Risk Management	0.295	0.090	3.277	0.002

Table 7 presents the results of the multiple linear regression analysis examining the effect of transition financing, renewable energy investment, and climate risk management on financial performance. The results show that transition financing has a positive regression coefficient (B = 0.287) with a significance value of 0.003, indicating that transition financing has a positive and significant effect on financial performance. Renewable energy investment also demonstrates a positive and significant effect with a coefficient value of 0.321 and a significance value of 0.001, suggesting that higher investment in renewable energy contributes to improved financial

performance. Similarly, climate risk management shows a positive regression coefficient of 0.295 with a significance value of 0.002, indicating that effective climate risk management significantly enhances financial performance. The constant value of 0.812 indicates the baseline level of financial performance when all independent variables are assumed to be constant. Overall, these findings suggest that the three sustainability-related factors collectively play an important role in improving the financial performance of energy companies.

4.7 F-Test (Simultaneous Test)

Table 8. ANOVA Test

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	18.245	3	6.082	21.874	0.000
Residual	19.735	71	0.278		
Total	37.980	74			

Table 8 presents the results of the ANOVA test used to examine the simultaneous effect of transition financing, renewable energy investment, and climate risk management on financial performance. The results show an F-value of 21.874 with a significance value of 0.000, which is lower than the significance level of 0.05. This indicates that the regression model is statistically significant and that the independent variables collectively have a significant influence on financial performance. In other words, transition financing, renewable energy investment, and climate risk management simultaneously contribute to explaining variations in the financial performance of energy companies. These findings confirm that the regression model used in this study is appropriate and can effectively explain the relationship between the independent variables and the dependent variable.

4.8 Coefficient of Determination (R^2)

The results of the coefficient of determination analysis show that the model has an R value of 0.693 and an R Square value of 0.480, with an Adjusted R Square of 0.458 and a standard error of 0.527. The R^2 value of 0.480 indicates that 48.0% of the variation in financial performance can be explained by the independent variables in this study, namely transition financing, renewable energy investment, and climate risk management. Meanwhile, the remaining 52.0% of the variation in financial performance is influenced by other factors not included in the research model. These results suggest that the variables examined in this study have a moderate explanatory power in predicting the financial performance of energy companies.

Discussion

The results of this study indicate that transition financing has a positive and significant effect on financial performance. This finding suggests that companies that are able to access transition financing instruments are better positioned to manage the financial challenges associated with shifting toward cleaner and more sustainable energy systems. Transition financing provides energy companies with access to capital needed for sustainable investments while maintaining financial stability during the transformation process. These results are consistent with previous studies that emphasize the importance of sustainable financing mechanisms in improving investor confidence and strengthening corporate financial outcomes [26], [27].

The analysis also shows that renewable energy investment has a positive and significant influence on financial performance. This finding indicates that companies investing in renewable energy technologies tend to achieve stronger financial performance due to improved operational efficiency and reduced reliance on volatile fossil fuel markets. Renewable energy investments also contribute to long-term cost

advantages by utilizing more stable energy sources while simultaneously enhancing corporate reputation among investors and stakeholders who prioritize sustainability and environmental responsibility [11], [12].

Furthermore, climate risk management demonstrates a positive and significant relationship with financial performance. Energy companies that actively identify, evaluate, and mitigate climate-related risks are more capable of maintaining operational stability and minimizing potential financial losses. By implementing effective climate risk management strategies, companies can anticipate regulatory changes, adapt to environmental challenges, and strengthen their resilience against climate-related uncertainties. This proactive approach also helps maintain investor confidence and supports long-term corporate sustainability.

Overall, the findings highlight that sustainability-oriented strategies play an important role in improving corporate financial performance in the energy sector. The integration of transition financing, renewable energy investment, and climate risk management allows companies to align their financial strategies with global sustainability objectives while maintaining competitiveness in an increasingly evolving energy industry. These results emphasize that adopting sustainable financial and environmental practices is not only beneficial for environmental protection but also contributes to stronger financial performance and long-term business sustainability.

5. CONCLUSION

This study concludes that transition financing, renewable energy investment, and climate risk management have significant positive effects on the financial performance of energy companies in Indonesia. The findings indicate that access to transition financing enables companies to secure sustainable financial resources that support the shift toward low-carbon energy systems. In addition, investments in renewable energy technologies contribute to improved operational efficiency and strengthen the long-term competitiveness of energy companies. Climate risk management also plays a crucial role in enhancing financial performance by enabling companies to anticipate and mitigate climate-related risks that may affect operational stability and financial outcomes. Overall, the study demonstrates that integrating sustainable financial strategies, renewable energy investments, and effective climate risk management practices can strengthen corporate financial resilience while supporting the broader transition toward sustainable energy systems. Future studies are recommended to incorporate additional factors such as corporate governance, environmental policy frameworks, or ESG performance to provide a more comprehensive understanding of sustainability-driven financial performance in the energy sector.

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