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Climate Risk Disclosure and Firm Performance: Evidence from Malaysian public listed companies

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Abstract
This study examines the association between climate risk disclosure and firm performance among publicly listed companies in Malaysia. Regulators and market participants are increasingly concerned about how companies address climate risk and the potential benefits of doing so. This study focuses on three key components of climate risk disclosure: governance, strategy and risk management, and their impact on firm performance. Based on 214 observations, we find that only climate risk management is positively associated with firm performance. These findings offer policy implications for climate action that companies should consider, particularly in emerging markets and voluntary disclosure environments like Malaysia.

Keywords: climate risk; disclosure policy; firm performance; risk management

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1.0 Introduction

Climate change has emerged as one of the most pressing global challenges, with profound implications for economic stability, environmental sustainability and corporate operations. Businesses are increasingly exposed to a range of climate-related risks, including physical risks from catastrophic events or extreme weather and transition risks related to multiple shocks (Vestrelli et al., 2024). As the risks intensify, the disclosure of climate risk information has become a central mechanism for communicating an organisation's preparedness, governance and strategic resilience. The stakeholders also demand the disclosure of climate risk due to the increase in weather-related events and the severity of climate change impacts (Berkman et al., 2025). In 2024, the United States experienced 27 confirmed weather and climate disaster events, each resulting in losses exceeding $1 billion (NCEI, 2025). The examples of climate change and weather-related events are drought, flood, severe storm, tropical cyclone, wildfire and winter events. According to the Climate Risk Index 2026, most of the fatalities reported from flood events, which are 5,931 cases and affected 49.14 million people. Besides, the highest economic losses come from extreme weather like storms $172.6 billion and followed by floods $32.77 billion (Germanwatch, 2025). Even prior research has also shown that climate change events like El Nino and floods can adversely impact the financial performance of certain industries in Malaysia, like the agriculture industry (Alam et al., 2020).

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Hazard	Fatalities[132]	Affected[133] (million people)	Economic loss[134] (billion USD)
Drought	0	29.48	13.33
Flood	5,931	49.14	32.77
Heat wave	4,050	33.08	0*
Storm	2,591	47.97	172.60
Wildfire	170	0.138	4.78
Other[135]	3,440	6.86	0.345

*No data available for economic losses related to heat waves.

Fig. 1: Overview of fatalities, affected people and economic damage for six event types in 2024
(Source: Germanwatch, 2025)

Climate risk disclosures have several implications for the companies' financial or economic outcomes. First, climate risk disclosure can negatively impact firm value. Firms with greater exposure to climate risk have a lower market value due to cash flow impacts resulting from potential physical damage to facilities, increased operating costs, new regulatory costs, supply chain disruptions, changes in revenue streams and other future costs (Berkman et al., 2025). Second, effective carbon risk management can lead to lower credit risk assessment and lower cost of borrowing (Duong et al., 2025). The situation is more pronounced after the 2015 Paris Agreement. Third, stock prices tend to react negatively to climate risk disclosures when they are evaluated based on discussions of climate risks during conference calls (Bratten & Cheng, 2025). The findings indicate that investors are considering climate-related issues when making investment decisions, and high disclosures of climate risks may change investors' expectations.

At the global level, several initiatives have been taken to address climate risk issues. For instance, the Securities and Exchange Commission (SEC) in the United States has introduced a principle-based approach for the firms to self-identify climate-related risks material to their business in the 10K report (Vestrelli et al., 2024). Besides, the Financial Stability Board (FSB) established the Task Force on Climate-Related Financial Disclosure (TCFD) framework in 2015 to provide guidelines to companies in disclosing climate-related risks and opportunities information. In Malaysia, companies are facing increasing pressure to prioritise climate risk disclosure, and the government has set a target to achieve net-zero carbon emissions by 2050. The recent initiative taken by the regulator is developing the National Sustainability Reporting Framework (NSRF) by the Securities Commission (Securities Commission Malaysia, 2025). Starting in the year 2025, the companies in Malaysia shall address the IFRS Sustainability Disclosure Standards issued by the International Sustainability Standards Board (ISSB). There are two important components related to climate risks, which are IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosures. The full adoption of both IFRSs in Malaysia is expected in the year 2027. Although climate risk disclosure has been mandated in some countries, there is a variety of disclosure on climate risks, and it differs depending on the setting and context (Bratten & Cheng, 2025). Therefore, this study aims to examine how climate risk disclosure impacts firm performance, with a particular focus on the climate risk disclosure dimensions, which are governance, strategy and management.

This study differs from prior research in terms of both the variables employed and the theoretical emphasis. For instance, Pratama et al. (2025) examine the relationship between climate change management performance and firm value, measuring firm value using the price-to-book ratio. However, this study uses the component of the company's profitability rather than focusing on investors' perception (firm value). Further, this study focused on the comprehensiveness of climate risk disclosure components in order to obtain a deeper understanding of the impacts of each component. The analysis using cross-industries can give better support on the functions of climate-related disclosure as monitoring mechanisms (agency theory) and improving the quality of disclosure (signalling theory).

2.0 Literature Review

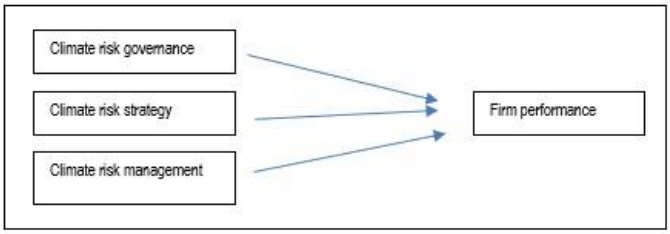

Fig. 2: Conceptual framework

The current state of research in the field of climate risk and firm performance is explored in the developed markets, particularly in the United States and China (Duan et al., 2025; Hamim & Mollah, 2025). The limited empirical evidence studied in developing economies,

particularly in Malaysia, where climate reporting remains voluntary and heterogeneous. Therefore, by integrating the agency theory and institutional theory in this study, we can offer new insights into how governance structure and strategic climate risk management can translate into financial performance outcomes. Prior studies also lack emphasis on the potential impacts of each component of climate risk disclosures, which are governance, strategy and management towards firm performance. The conceptual framework for this study is as per Fig. 2.

2.1 Climate risk governance

According to Hamim and Mollah (2025), climate risk governance refers to the board's awareness of climate change risks, opportunities, and regulatory directives, as well as the board's responsibility and commitment to addressing climate change risks and potential courses of action. Effective governance practices, especially those that give environmental, social, and governance (ESG) factors top priority, can greatly improve a firm's capacity to manage climate risks, which in turn can improve financial performance (Amel-Zadeh & Serafeim, 2019). The agency theory plays an important role in understanding climate risk governance and firm performance. Managers may not always act in the best interests of shareholders, particularly when it comes to long-term environmental issues (Pratama et al., 2025). Thus, it requires a strong corporate governance structure, like board dynamism and monitoring mechanisms, to see the impact on climate change and environmental mitigation strategies. Based on a panel of 4378 firm-year observations from the non-financial S&P 500 components over the period of 2011–2021, corporate climate risk governance is positively associated with environmental innovation (Hamim & Mollah, 2025). The findings indicated that firms with strong climate risk governance can be more environmentally friendly and innovative in reducing environmental costs and later reduce customers' burden. The board members tend to be more environmentally aware, and higher climate risk activism in the boardroom leads to environmental innovation. The executives in management teams with environmental protection backgrounds are more effective in guiding firms to formulate and implement strategies to address climate change (Duan et al., 2025). Additionally, auditors should consider how climate risks impact firms during the auditing process (Kamarudin et al., 2023).

2.2 Climate risk strategy

Businesses are better equipped to manage expectations and foster trust regarding their climate actions if they actively interact with stakeholders, including investors, consumers, and regulatory agencies. Furthermore, sustainable business initiatives aim to address climate change by investing in renewable energy, preventing pollution, recycling and reusing materials, controlling carbon emissions, and employing energy-efficient production (Hamim & Mollah, 2025). The TCFD, as a guideline for climate disclosure, divides the disclosure framework into four parts, which are governance, strategy, risk management, and metrics and targets (Yan et al., 2025). The framework helps companies identify and manage relevant climate risks from a corporate financial perspective. Companies tend to align their strategies with risk information and support both local and global agendas, including the goals of the Paris Agreement and the energy transition agenda (Bratten & Cheng, 2025). Nonetheless, climate-related disclosures remain symbolic, focused on high-level policy commitments rather than operational actions like scenario analysis, climate risk integration into planning, or performance-linked incentives (Pratama et al., 2025). The situation occurs when there is no mandatory reporting related to climate change risk.

2.3 Climate risk management

Effective climate change management by organisations necessitates a comprehensive approach that integrates environmental considerations into corporate governance structures and translates them into concrete actions (Pratama et al., 2025). Organisations should also incorporate climate-related risks and opportunities into their risk management frameworks and financial planning processes and provide a range of measures to address climate change. It includes an assessment of significant climate risks, such as likelihood of occurrence and how management addresses such risks (Kamarudin et al., 2023). Given the qualitative nature of the required disclosure and diffuse nature of climate risk, it is possible that managers might self-select to (not) disclose information on climate risk, and, in case of disclosure, managers can selectively decide on the extent to which they disclose (Berkman et al., 2025). The management of climate-related risks is essential for the sustainable development of organisations (Duan et al., 2025).

Disclosing climate risks can enhance the transparency and responsibility of firms, offering stakeholders more information regarding the company's environmental management and climate change adaptation strategies. Duong et al. (2025) explored carbon risk management in their study based on two components: preparedness and performance. First, the preparedness dimension consists of a firm's policies, programs, and management systems applicable to its operations to manage the material impact of risk. It includes the firm's practices to identify, assess, disclose, and manage its own operational energy usage and carbon emissions. Second, the performance dimension is comprised of both quantitative and qualitative indicators, which capture a firm's ability to manage its carbon risk, which includes the firm's ability to reduce its carbon intensity as compared to peers.

3.0 Methodology

This study employed a quantitative research approach by analysing a sample of 214 Malaysian publicly listed companies (excluding the financial industry) for the year 2024. This study excludes financial institutions since this sector is regulated by the Financial Services Act 2013 (FSA) and the Islamic Financial Services Act 2013 (IFSA). The data were extracted from the annual reports and financial statements of the sample companies. A content analysis was used to measure the level of climate risk disclosure (risk governance, risk strategy, and risk management). The items were coded using a binary value of 1,0 to examine the presence of information pertaining to climate risk activities performed by the companies. Meanwhile, firm performance variable is measured using Return on Asset (ROA).

Substantial research has used the returns on assets (ROA) as a metric for determining firm profitability. ROA is calculated as net income divided by the total assets. Then, correlation and regression analysis were conducted to examine the relationship between the variables.

4.0 Findings

Table 1 presents the descriptive statistics of the variables used for this study. The mean value for climate risk governance is 44.21%. Meanwhile, the average disclosure of climate risk strategy is 45.70%, and climate risk management is 47.66%. The results suggest that many companies provide minimal information on climate risks, which is below 50% disclosure for all dimensions. The average return on assets is 3.16%, the maximum value is 43.76%, and the minimum value is -61.84%.

Table 1. Descriptive statistics

Variables	Minimum	Maximum	Mean	Standard Deviation
CR Governance (%)	0	100	44.21	31.29
CR Strategy (%)	0	100	45.70	45.53
CR Management (%)	0	100	47.66	3.34
Return on Assets (ROA)	- 61.84	43.76	3.16	9.83

Table 2 reveals the mean scores for climate risk governance disclosures. The highest disclosure relates to the board's control over climate-related opportunities and risks (M=0.63), followed by management's role in identifying and resolving climate-related opportunities and threats (M=0.55) and the existence of climate-related risk management policies (M=0.50). The existence of a sustainability committee is below a moderate level (M=0.49), and the least is regarding the existence of a chief risk officer (M=0.05). These results suggest that while the governance function towards oversight of climate risk issues is commonly reported, the specific risk-related structure, like the chief risk officer, remains uncommon.

Table 2. Level of climate risk disclosure (climate risk governance)

Items	Mean (M)
The existence of a sustainability committee	0.49
The existence of a chief risk officer	0.05
The existence of climate-related risk management policies	0.50
Board's control over climate-related opportunities and risk	0.63
Management's role in identifying and resolving climate-related opportunities and threats	0.55

Table 3 shows the level of climate risk disclosure related to the climate risk strategy. The most disclosed item is the impact of climate-related risk and opportunities on the organisation's operation (M=0.50). This is followed by disclosures on their impact on strategy and financial planning, with the mean value for both being 0.477. Meanwhile, the disclosure of identification of short-term, medium-term term and long-term climate change risks (M=0.44) and lastly, the disclosure on strategic resilience under different climate-related scenarios (M=0.41). These results indicate that the climate risk-related strategy is moderately reported in the company's annual report.

Table 3. Level of climate risk disclosure (climate risk strategy)

Items	Mean
Description of how the organisation has identified short-term, medium-term or long-term risks and opportunities associated with climate change	0.44
Description of the impact of climate-related risks and opportunities on the organisation's operation.	0.50
Description of the impact of climate-related risk and opportunities on the organisation's strategy	0.47
Description of the impact of climate-related risk and opportunities on the organisation's financial planning.	0.47
Description of the organisation's strategic resilience when considering different climate-related scenarios	0.41

Table 4 presents the mean disclosure scores for climate risk management. The highest disclosed item is the consideration of existing and emerging regulatory requirements related to climate change (M=0.86), indicating strong attention to compliance matters. Other commonly reported items include procedures for determining and handling climate-related risks, with the mean value of M=0.44 and M=0.43, respectively. Then, followed by integrating the overall risk management process into climate risk activities (M=0.39), and the least reported item is the determination of risk tolerance, capacity and appetite for climate-related risk (M=0.26). It shows that the information pertaining to risk tolerance, capacity and appetite is less visible and low transparent to the stakeholders.

Table 4. Level of climate risk disclosure (climate risk management)

Items	Mean
The company's procedure to determine and evaluate climate-related risks	0.44
The company's procedure for handling climate-related risks.	0.43
Description of how the organisation's overall risk management is incorporated into the process for identifying, evaluating and managing climate-related risks.	0.39
Determine the risk tolerance, capacity and appetite for climate-related risk	0.26
The consideration of existing and emerging regulatory requirements related to climate change	0.86

Table 5 presents the results of the multiple regression analysis, which examines the effects of climate risk governance, strategy, and management on firm performance. The model is statistically significant (F=5.39, p<.001) and explains the variance of 7.1% in firm performance (R2=0.071). Among the predictors, only climate risk management has a statistically significant positive effect (B=0.120, p<0.001). Meanwhile, climate risk governance and climate risk strategy are not significant predictors of firm performance. These results highlight the central role of risk management-related disclosures – particularly regulatory compliance – in driving overall transparency in climate risk reporting. The results indicate that companies try to adapt to the needs of regulators and government with regard to climate risk management, which can later ensure good compliance. Besides, companies are more transparent and concerned about the importance of emphasising climate risk management in the annual report.

Table 5. Multiple regression

Variables	B	SE B	β	t	p
Constant	0.760	1.209		.628	.530
CR Governance	- 0.031	0.032	- 0.10	- 0.979	0.329
CR Strategy	- 0.042	0.030	- 0.195	- 1.412	0.159
CR Management	0.120	0.033	0.455	3.603	<0.001
R2= 0.071 Adjusted R2=0.058 F= 5.379, p<0.001					

5.0 Discussion

The level of climate risk disclosure among publicly listed companies in Malaysia remains uneven and reveals a spectrum of disclosure commitment across governance, strategy, and risk management domains. Based on the findings from the descriptive statistics in this study, climate risk management disclosures showed the highest score as compared to climate risk governance and climate risk strategy. Similarly, Pratama et al. (2025) also found that governance, strategy, and risk management concerning climate change have been implemented by only 20–40% of companies in three Southeast Asian countries (Malaysia, Thailand, and Indonesia) for the period 2022–2023. The findings of this study also reveal that there is a weak and statistically insignificant relationship between climate risk governance and firm performance among the 214 publicly listed companies in Malaysia.

Despite the growing global concern about board risk oversight and corporate sustainability governance structures, it is suggested that there are still inadequate and ineffective oversight structures and functions for climate risk. This result aligns with earlier research indicating that while climate governance frameworks such as board-level committees and policies exist, they often function symbolically and may not yet translate into tangible financial performance benefits (Chong et al., 2018). Further, the insignificant relationship between climate risk strategy and firm performance suggests that the integration of climate risks into strategy remains inadequate, which can be due to a symbolic purpose. Therefore, it will not affect firm performance.

Businesses that performed better financially in this study were those that scored higher on climate risk management items, such as considering existing and emerging regulatory requirements related to climate change. Ozkan et al. (2023) contend that good climate risk management is the cornerstone of environmental responsibility and directly affects profitability by lowering volatility and boosting reputational capital. These results are in line with their findings. In this regard, stakeholders and investors are rewarding Malaysian businesses that take climate risk seriously. Furthermore, structured frameworks for managing climate risk can lead to better credit terms and increase investor confidence (Pratama et al., 2025). Additionally, risk-aware firms are better prepared to handle environmental volatility and are therefore more financially sustainable over the long term (Alam et al., 2020). The main issue or problems with regard to the climate risk disclosure are the quantitative and qualitative nature of disclosure. There is a tendency for generic information or symbolic information which may not translate into real performance gain for the company. Furthermore, many studies shall be conducted to get more comprehensive information regarding climate risk that can transform into possible financial gains.

6.0 Conclusion and Recommendations

This study extends agency theory and signalling theory to the context of climate risk disclosure and firm performance. Consistent with agency theory, climate risk management disclosure, in particular related to regulatory compliance and operational processes, is the

most effective in influencing firm performance. Disclosure of climate risk management information can mitigate information asymmetry and reduce agency costs, therefore contributing to better performance outcomes. The non-significant effects of governance and strategy dimensions suggest that compliance and operational risk processes have a more direct link to firm performance as compared to oversight and long-term planning. Meanwhile, from a signalling theory perspective, detailed risk management disclosures serve as a credible signal of a firm's preparedness, capability and commitment to address climate risks. The situation can strengthen market value and stakeholder trust due to the quality of information.

Several practical implications come from the findings. First, the managers should prioritise robust and comprehensive disclosures on climate risk management practices, especially on regulatory compliance. Expanding transparency in governance and strategy dimensions, such as formalising risk appetite, having a dedicated chief risk officer, and reporting on scenario planning, could further reinforce stakeholder confidence and long-term resilience. For policymakers and regulators, the results highlight the importance of establishing clear, standardised disclosure guidelines to ensure consistency, comparability, and comprehensiveness in climate-related reporting. Therefore, it can enhance the usefulness of climate risk reporting for better-informed investment decisions and sustainable firm performance. This study also contributes to policy implementation pertaining to the disclosure policy. The current voluntary disclosure policy can provide different transparency approaches by the companies, which later may not align with their performance. Hence, regulators may decide to set it as a mandatory requirement in order to improve the company's climate change management.

This study is subject to several limitations. First, the analysis relies on secondary data derived from publicly available information, such as annual reports. This information may not fully capture the companies' internal practices for managing climate risks. Second, the results may not be generalised to other countries due to different economic, corporate governance structures and regulatory frameworks. Third, this study used binary content analysis in examining the extent of disclosure. The breath and other ways of measuring the extent of disclosure can be provided in future studies to examine the quality of climate risk disclosure by the companies. Future studies may gather the stakeholders' perception about the potential items valuable to be included in the climate risk disclosure. Besides, the non-financial implications of climate risk disclosure can also be explored in the future, such as reputation.

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Paper Contribution to Related Field of Study

This paper shall contribute to the field of enterprise risk management and corporate disclosure policy.

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