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Article

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

The impact of environmental crimes and profitability on environmental disclosure in Malaysian SME sector: The role of leverage

Shayuti Mohamed Adnan¹, Waleed M. Alahdal^{1,2*}, Bakhtiar Alrazi^{3,4} and Norhayati Mat Husin^{3,4}

Abstract: This research investigates the intricate connections between environmental crimes, profitability, leverage, and environmental disclosure in Small and Medium Enterprises (SMEs) in Malaysia from 2014 to 2019. The study adopts legitimacy theory as its theoretical lens. This study focuses on the analysis of 116 SMEs that have been convicted by the Department of Environment (DOE) in Malaysia. The data used in this analysis includes information on environmental crimes from court cases published by the DOE, as well as company and financial attributes obtained from the Companies Commission of Malaysia. Additionally, environmental disclosure metrics were collected from corporate websites. In total, there are 696 observations included in this study. The study utilizes panel data analysis to uncover the fundamental dynamics. The results of the study indicate that companies that have been convicted of wrongdoing tend to offer limited levels of environmental disclosure on their digital platforms. It is worth noting that guilty firms that are larger and more profitable tend to demonstrate increased levels of environmental disclosure. The correlation between environmental crimes and leverage has been identified as a significant factor in driving higher levels of environmental disclosure. However, the relationship between leverage, profitability, and disclosure levels did not have a similar interactive effect. The research recognizes that environmentally prosecuted enterprises face a perceived threat to their legitimacy. However, this acknowledgement is limited to a specific time frame and focuses on selected characteristics that explain differences in environmental disclosures. The information obtained necessitates a reassessment and potential improvement of existing requirements for disclosure to include provisions that prioritize sustainability, particularly within the private sector. This research contributes to the ongoing discussion on the paradox between environmental performance and transparency by focusing on a developing nation's context. It offers a more nuanced understanding of legitimacy theory within the specific operational environment of SMEs.

Subjects: Environmental Economics; Finance; Business, Management and Accounting;

Keywords: environmental crimes; SME; environmental disclosure; leverage

1. Introduction

Recently, there has been a significant increase in the worldwide discourse on corporate responsibility. This has brought attention to the pivotal function of environmental disclosure in addressing the lack of communication between firms and their stakeholders (Al-Ahdal et al., 2023) Elmagrhi et al., 2019; Ghaleb et al., 2021). Environmental disclosure is, ideally, an act of communicating a company's environmental performance and objectives. It serves as a measure of corporate accountability in relation to ecological sustainability. Nonetheless, the relationship between environmental disclosure and environmental performance continues to be a complex and intricate topic. Prior studies suggest a mutually beneficial association between environmental disclosure and environmental performance, wherein higher levels of environmental disclosure are indicative of superior environmental performance and vice versa (Alatawi et al., 2023; Elmagrhi et al., 2019). On the other hand, there is a viewpoint suggesting a lack of harmony between revealing information and actual performance. This perspective posits that companies tend to obscure negative environmental records by providing more detailed disclosures (Lin et al., 2021; Shahab et al., 2018).

The two competing perspectives stem from the stakeholder or accountability and legitimacy theory. According to Elmghamez et al. (2023), the accountability or stakeholder theory suggests that organizations, motivated by a sense of obligation towards their stakeholders, are inclined to provide greater transparency on their environmental practices as a demonstration of their dedication to environmental sustainability. Therefore, a positive association between environmental disclosure and performance is prevailed, as supported by Alatawi et al. (2023). On the other hand, according to legitimacy theory, it is suggested that companies may choose to disclose information about their environmental practices in order to uphold or restore their legitimacy, particularly when confronted with environmental conflicts or legal disputes (Cho et al., 2012; Deegan, 2002). The opposing school of thought suggests a negative or inconclusive relationship, often attributing this to companies' inclination to conceal unfavourable environmental practices through increased disclosure (Elmagrhi et al., 2019; Shahab et al., 2018).

As a result, the extant literature on the environmental performance-disclosure relationship has provided mixed findings. For example, Braam et al. (2016) found that firms with more significant greenhouse gas (GHG) emissions, waste and water consumption provided more extensive environmental disclosures. Romlah et al. (2002), in their study on the annual reports of 362 companies listed on the Bursa Malaysia, reported that companies with bad environmental records tended to produce more significant quality information to reduce political cost exposure. By contrast, Uyar et al. (2020) demonstrated evidence of the tendency to publish sustainability reports among firms with high sustainability performance. Nevertheless, Tadros et al. (2020) found no significant association. In a longitudinal research involving 529 companies between 2005 and 2011, Iatridis (2013) found contrary evidence. Better environmental performing companies (i.e., lower amounts of hazardous waste) were more forthcoming in using corporate disclosures to demonstrate their environmental responsibility. Therefore, this research provides additional empirical evidence and contributes to the never-ending debate on the issue. We uphold legitimacy theory. In addition, we offer an environmental performance-disclosure model that uses leverage as a moderating variable and provide panel data from SMEs in the developing country.

This research is pertinent because the empirical findings on this issue that have discovered a range of aspects, such as firm attributes, institutional context, ethical conduct, and governance framework showed inconsistent results (Chen et al., 2023; Dhaliwal et al., 2011; Lin et al., 2021). More importantly, a considerable proportion of the current empirical data is based on the circumstances of giant companies or multinational enterprises, so frequently disregarding the intricate dynamics that are relevant to SMEs (Iatridis, 2013; Tadros et al., 2020). If existed, a large number of prior studies are descriptive and draw on single rather than multiple-theory analysis (Alatawi et al., 2023). In addition, prior studies focus on data from limited number of interviews (Le et al., 2021). Consequently, there exists a gap in the literature regarding the understanding of disclosure practices among SMEs, particularly those encountering environmental legal issues. This situation

highlights the pressing need for a more comprehensive understanding of environmental disclosure standards, especially within varied operational environments.

This study addresses the pressing issue of SMEs in Malaysia, which is a developing economy characterized by a distinct combination of legal, economic, and environmental factors that influence corporate behaviour. The emphasis on SME, a sector that is typically overlooked in existing academic research due to the dominance of readily available databases of publicly listed corporations, offers an opportunity to gain a more detailed understanding of the dynamics of environmental disclosure in the face of diverse governmental and societal constraints.

Accordingly, through an analysis of the environmental disclosure methods employed by SMEs, this study aims to provide a novel viewpoint to the ongoing worldwide discourse surrounding corporate environmental responsibility. By conducting a thorough analysis of disclosure patterns in the context of legal and environmental challenges, our aim is to cultivate a comprehension of the interdependent or conflicting connection between environmental disclosure and environmental performance. This endeavour will advance the conversation towards a more knowledgeable and comprehensive understanding.

In essence, this research thoroughly examines the environmental disclosure practices employed by corporations operating in Malaysia, specifically those involved in environmental crimes. This research contributes significantly to the existing literature on environmental accountability, organizational transparency, and the involvement of key stakeholders, including creditors and shareholders, by conducting a thorough analysis and interpretation of panel data. We incorporated leverage as the moderating variable in the environmental disclosure model.

The research revolves around answering two research questions. First, it revolves around the identification of the distinctive characteristics exhibited by companies that have been accused in environmental crimes. This study aims to determine the degree to which these firms, when confronted with penalties, provide disclosure of environmental data in their yearly financial reports and on their official websites. The significance of this inquiry is heightened within the context of the current global environmental concerns, which are frequently interconnected with corporate activities. Second, what are the critical aspects of environmental reporting that effectively facilitate dialogue between investors and companies? The aforementioned concerns arise due to the increasing demands from stakeholders for companies to demonstrate responsible conduct and provide transparent disclosure regarding their environmental endeavours and achievements.

This investigation is driven by two empirical objectives. The primary objective of this study is to provide new empirical data to the current body of research that investigates the relationship between environmental disclosure and performance. Specifically, the focus is on SMEs in Malaysia, which is a developing country. The dataset utilized in this study possesses a longitudinal nature, as it includes SMEs that have been convicted of environmental offences. This characteristic provides a distinctive chance to examine the temporal aspects of environmental disclosure in the face of legal challenges. Furthermore, the present study aims to examine the moderating effect of leverage on the association between environmental crimes, profitability, and environmental disclosure. The incorporation of leverage as a moderating factor introduces a nuanced dimension to the discussion, which has the potential to reveal the impact of financial structures on the environmental disclosure practices of SMEs that are confronted with environmental legal issues.

The research findings suggest the prevalence of prosecution among private companies in industrial areas. We observed that polluters communicated the barest minimum concerning environmental issues in their corporate reports. The results are consistent with prior studies documented in publicly listed firms. Findings of the second objective show that large, profitable polluting companies with high occurrences of environmental crimes provide high environmental disclosure. The findings on the role

of leverage demonstrate that with leverage, a high recurrence of environmental crimes results in high environmental disclosure. In contrast, polluting companies with high leverage and profit did not manage environmental disclosure. The results confirmed the symbolic roles of environmental disclosure, which deviates stakeholders by portraying conformity to the environmental law. Robustness tests involving splitting samples into privately owned versus publicly owned companies confirmed the findings. These results are discussed from the legitimacy theory perspective.

This research provides the following contributions to the existing body of literature: first, it expands the existing discourse on environmental disclosure procedures, which has been concentrated on large or multinational firms in developed nations, by examining the practices of SMEs in Malaysia, a developing economy. Second, this study seeks to enhance comprehension of the intricate connection or potential discord between environmental disclosure and environmental performance by conducting a comprehensive examination of disclosure patterns within the realm of legal and environmental difficulties. Third, this study incorporates leverage as a moderating variable, so adding a nuanced dimension to the debate. This has the potential to shed light on the influence of financial structures on the environmental disclosure practices of SMEs when they encounter environmental legal challenges. Finally, the utilization of a longitudinal dataset offers a unique opportunity to investigate the temporal features of environmental disclosure in the presence of regulatory obstacles, hence enhancing the comprehension of environmental disclosure practices among SMEs by incorporating a temporal dimension.

The remaining sections of the paper are structured as follows. The literature review is discussed next, followed by the development of the hypothesis. Subsequently, the methods section will delineate sample selection and content analysis, while the penultimate section will present the findings. The final section concludes, highlights the limitations and reiterates the theoretical and practical implications.

2. Background of the study

In the dynamic economic context of Malaysia, there has been a notable advancement in the discussion pertaining to Environmental, Social, and Governance (ESG), Corporate Social Responsibility (CSR), and sustainability reporting (Alatawi et al., 2023; Tang, 2023). This progress can be attributed to legislative incentives and the worldwide movement towards enhanced transparency in reporting. Bursa Malaysia unveiled a gradual approach in 2015 to enforce more rigorous sustainability reporting standards for Public Listed Companies by issuing Sustainability Reporting Guide (Bursa Malaysia Securities, 2015). The adoption of International Financial Reporting Standards (IFRS) S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosures' is a significant achievement in this endeavour (Earnst & Yong, 2023). Nevertheless, there is still scope for enhancing the extent of information disclosure and compliance with global standards, emphasizing the need for a strong regulatory structure and increased consciousness among companies and interested parties (Setiarini et al., 2023). Significantly, the aforementioned regulatory objectives, while of great importance, are limited in scope to public listed companies so excluding the significant sector of SMEs from regulatory oversight. Malaysia, as it stands on the verge of fast industrialisation, has a multitude of environmental issues such as deforestation, water and air pollution, as well as obstacles in waste management. The increase in urbanization and industrial activities has resulted in a rise in pollution levels, further aggravating environmental challenges (Mohd Hasnu & Muhammad, 2022).

The need for a meaningful discussion regarding environmental responsibility among companies in Malaysia is even more pronounced due to the legitimacy problem that has arisen as a result of the 1MDB corruption scandal. According to Jones (2020), an analysis was conducted to provide light on the deficiencies in Malaysia's administrative frameworks, as shown by the 1MDB affair. While not explicitly focusing on environmental violations, these shortcomings in governance may reflect similar inadequacies in supervision within environmental regulations, therefore enabling

environmentally destructive practices to occur without sufficient scrutiny or accountability. This narrative highlights the underlying systemic challenges within Malaysia's regulatory frameworks, suggesting a potential expansion into the realm of environmental concerns.

Moreover, small and medium-sized enterprises, which constitute more than 90% of business establishments in Malaysia, play a crucial role in the country's economic structure by contributing to over 40% of the gross domestic product (GDP) prior to the onset of the pandemic (SME Corp Malaysia, 2022). Nevertheless, the outbreak of the pandemic in 2020 hindered the expansion of SMEs, hence requiring government involvement in the form of recovery measures amounting to billions of ringgits (Department of Statistics Malaysia, 2020). The rise of this worldwide phenomenon has motivated scholars to collect factual data from SME sectors, reevaluating whether the knowledge acquired from publicly traded corporations remains applicable to SMEs. As the implementation of economic revitalization initiatives unfolds, it is imperative to shift the emphasis towards sectors that make substantial contributions to the overall economic growth of the nation. This highlights the crucial importance of small and medium-sized enterprises in Malaysia's endeavor to revive its economy. The complete perspective presented here encompasses various aspects, including regulatory frameworks, environmental responsibility, and the significant contribution of small and medium-sized enterprises (SMEs). This perspective sheds light on the complex array of difficulties and opportunities that Malaysia faces as it strives for sustainable economic development.

3. Theoretical literature review

This study is grounded in two primary ideas, namely the accountability or stakeholder theory and the legitimacy theory, which form the foundational framework for its theoretical underpinnings. According to the accountability or stakeholder theory, organizations have a responsibility towards multiple stakeholders. Consequently, they are more inclined to provide greater transparency regarding their environmental practices as a demonstration of their dedication to environmental concerns. In contrast, legitimacy theory posits that organizations may utilize environmental disclosure as a strategic approach to uphold or restore their legitimacy, particularly when confronted with environmental conflicts or legal disputes (Cho et al., 2012; Deegan, 2002; Patten, 1994).

The concept of legitimacy theory, as originated by Suchman (1995), emphasizes offers a comprehensive structure for examining how firms endeavour to harmonize their value systems with society standards, particularly when confronted with challenges like environmental offenses. The research examines the strategic disclosure procedures employed by SMEs in Malaysia and investigates the impacts of environmental crimes, profitability and leverage. The chosen approach is in line with the fundamental principles of legitimacy theory. This phenomenon allows for a comprehensive examination of how these corporations strategically handle society attitudes by means of environmental disclosure in order to regain or retain their legitimacy.

Legitimacy enables a thorough analysis of the various substantive and symbolic tactics utilized by companies to effectively navigate and maintain their legitimacy in the face of environmental challenges. The concept of the "symbolic" legitimizing technique, as examined by De Villiers and Van Staden (2006, 2011) and Silva (2021), underscores the manner in which organizations might employ environmental disclosure to redirect scrutiny or modify public perceptions while maintaining their fundamental operating methods. This aspect is highly relevant to our inquiry into the potential prevalence of greenwashing operations in the Malaysian small and medium-sized enterprise sector.

However, it should be noted that while accountability theory is indeed applicable, it may not offer a comprehensive framework for analyzing the strategic utilization of environmental disclosure in response to environmental offenses and financial pressures. The central focus of this theory revolves around the responsibilities of entities to provide an account of their actions to stakeholders (Al-Ahdal et al., 2023; Gray et al., 1996). Although it includes elements of disclosure, its primary focus is not on the strategic control of society attitudes, which is a key feature of our research.

Furthermore, the significance of legitimacy theory in the Malaysian SME sector is amplified due to the increasing societal and governmental demands for environmental accountability (Fatima et al., 2015). There is a notable absence of academic literature about the utilization of legitimacy theory in the context of Malaysian small and medium-sized enterprises, particularly in relation to environmental disclosure in the face of environmental crimes. Accordingly, this study addresses this disparity and enhance comprehension about the implementation of legitimacy management techniques, as delineated in legitimacy theory, within the distinct socio-economic and regulatory context of Malaysia.

4. Empirical literature review and hypotheses development

4.1. Environmental crimes and profitability on environmental disclosure

Environmental crimes refer to actions that contravene environmental legislation and are acknowledged for their adverse impacts on the ecological domain (White, 2008). From the standpoint of legitimacy theory, engaging in such behaviours poses a risk to the overall approval of corporations in society, prompting a need to either uphold or regain legitimacy by implementing more comprehensive methods for disclosing environmental information (Deegan, 2002; Suchman, 1995). The research literature has emphasized the significant effects of regulatory frameworks on the practices of corporate sustainability reporting (Comyns, 2016; De Aguiar & Bebbington, 2014; Freedman & Park, 2014; Mion & Adaui, 2019, 2020). Chen et al. (2022) demonstrated a beneficial influence of environmental regulations on the environmental performance of small and medium-sized enterprises in China, confirming the positive association between rigorous regulatory frameworks and improved corporate transparency.

Companies that are involved in environmental crises frequently face scrutiny from several stakeholders, such as investors, regulators, and the general public (Holder-Webb et al., 2009). In order to mitigate the potential negative impact on their reputation, firms may choose to enhance their environmental disclosures as a strategy to restore public confidence and maintain their social license to operate (Cho et al., 2012). The examination of legitimacy theory in accounting history reveals a practical perspective on environmental management. This is demonstrated by Patten's (1994) influential study on the oil spill incident involving BP, which resulted in a significant increase in the practice of sustainability reporting following the catastrophe.

Moreover, within a more current framework, Silva (2021) provided a comprehensive analysis of the fundamental principles of legitimacy theory by investigating the response of FTSE 100 firms to Sustainable Development Goals (SDGs) indices. The research findings indicate that there is a prevalent use of symbolic disclosure, which is generally apart from significant operational changes. These findings highlight a tendency to employ symbolic legitimization tactics, with the goal of satisfying stakeholders while maintaining the status quo mindset. The contrast between substantive and symbolic disclosure techniques sheds light on the intricate dynamics that form the basis of corporate disclosure behavior in the face of environmental controversies.

Despite the existence of a positive association between environmental crimes and disclosure, certain cases demonstrate a contrasting perspective in which companies restrict disclosure in order to conceal their wrongdoing and avoid legal consequences (Lyon & Maxwell, 2011). The study conducted by Lin et al. (2021) revealed a significant inverse correlation between air pollution levels and the extent of environmental disclosure among Chinese companies working in industries with high pollution levels. This finding highlights the need of considering contextual factors when examining disclosure practices.

Moving from China to Malaysia, research on the topic of environmental disclosures, ESG and sustainability reporting has gained significant attention in academic studies (Ali et al., 2022; Rosman et al., 2023; Wahyuningrum et al., 2023). In a bibliometric research conducted by Wahyuningrum et al. (2023) on environmental sustainability in ASEAN countries, it was observed

that Malaysia ranked second in terms of citation count within the given context. However, a significant proportion of the publication relied on data sourced from publicly listed companies. The empirical evidence regarding the correlation between environmental performance and transparency has yielded consistently inconclusive results (Ali et al., 2022; Zahid et al., 2019). Based on the theoretical framework, empirical evidence, and contextual complexities within the Malaysian small and medium-sized enterprise (SME) sector, we propose the following hypothesis:

Hypothesis 1: Companies that have a greater frequency of engaging in environmental crimes will have elevated degrees of environmental transparency in their reporting.

Cho and Patten (2007) argued that less financially successful companies may strategically increase their environmental disclosure in order to mitigate unfavourable impressions and establish their legitimacy. The perspective posits negative relationship between profitability and environmental disclosure. However, according to Dhaliwal et al. (2011), the interaction between profitability and environmental disclosure reveals a narrative in which corporations show themselves as socially responsible entities, a position that is seen as advantageous in terms of public perception and financial outcomes. Companies that have strong profitability profiles generally have the financial flexibility to allocate resources towards environmentally friendly activities. These companies are motivated to report and promote these initiatives to their stakeholders. The theoretical perspective is reflected in the empirical story, as highlighted by Dhaliwal et al. (2011), who emphasize the inclination of financially secure companies to engage in comprehensive environmental disclosure.

The aforementioned contradiction serves to exemplify the strategic aspect of environmental disclosure, which is customized to correspond with a company's financial position and the associated strategic necessities. The small and medium-sized enterprise (SME) sector in Malaysia plays a crucial role in the country's economy. Currently, there is a significant opportunity for these businesses to align themselves with societal and governmental sustainability goals. In doing so, it becomes essential for them to prioritize environmental disclosure, as it enhances their overall relevance and impact.

Hypothesis 2: There exists a positive relationship between the profitability of companies and the extent of their environmental disclosure.

4.2. The moderating influence of leverage

The intricate relationship among leverage, environmental disclosure, and corporate action gives rise to a multifaceted narrative. According to Clarkson et al. (2008), a high level of leverage frequently leads to heightened attention from creditors who are worried about the potential impact of environmental difficulties on the company's ability to repay its debts. This examination may prompt companies to enhance their disclosure policies in order to satisfy creditors and other stakeholders. On the other hand, companies may choose to limit the amount of information they disclose in order to prevent a potential increase in their cost of capital, particularly if the disclosure reveals ecologically harmful behaviours (Dhaliwal et al., 2011).

In this context, the utilization of leverage has the potential to exert a substantial influence on a company's disclosure practices in relation to environmental offenses or financial performance. According to Al-Ahdal et al. (2020), companies that have a significant amount of debt may choose to increase their environmental disclosure efforts after engaging in environmental misconduct in order to maintain their credibility with stakeholders. On the other hand, Osazuwa and Che-Ahmad (2016) found that leverage does not support the relationship between environmentally friendly practices and firm value. The examination of leverage dynamics and its influence on corporate disclosure behaviour holds significant relevance in the context of the Malaysian small and medium-sized enterprise (SME) sector. This is due to the sector's unique financial limitations and relatively less structured disclosure processes.

Hypothesis 3: Companies characterized by a significant degree of leverage and involvement in environmental crimes are expected to exhibit elevated levels of environmental disclosure.

Hypothesis 4: Companies characterized by elevated leverage and profitability are expected to exhibit increased levels of environmental disclosure.

5. Research design

5.1. Data and sample

The sample consisted of companies with court case data provided by DOE Malaysia from 2014 to 2019. These were the cases available to us during the data collection process. Furthermore, there was a lag between the year companies committed the crimes and the court cases data made available to the public. The companies were prosecuted under several sections of the Environmental Quality Act 1974. They committed offences such as; licensing, water pollution, air pollution, noise pollution, scheduled waste, environmental impact assessment and other crimes. The first sample selection was 423 companies, consequently referred to as “polluters”. The following process involves selecting companies that provide websites or means of disclosure. That left us with 137 companies. We then obtained the financial data of these companies from the Companies Commission of Malaysia. The sample was purposefully chosen because we deleted companies that did not provide any environmental data over six years. The final sample selection was 116 with a total observation of 696. The sample represents 0.1% of the total 907,000 SMEs population reported by SME Corporation website in 2021.

5.2. Measurement variables

We adopted the content analysis method to measure environmental disclosure. Content analysis is the process of codifying information into pre-determined categories to glean patterns when presenting and reporting the information (Al-Ahdal & Hashim, 2022; Gray et al., 1995). The first step was to identify the reports for analysis. We chose annual reports because the reports remain the most preferred medium in communicating sustainability information to the stakeholders (Kasbun et al., 2016; Mohamed Adnan et al., 2018; Momin et al., 2017;). With the call for more integrated reporting (IIRC, 2013), it would have been expected that companies utilise annual reports to disclose their financial and non-financial information instead of preparing a stand-alone sustainability report. In addition, we analysed corporate websites due to their significant use in social and environmental reporting (Cho & Roberts, 2010; Patten & Crampton, 2003; Rowbottom & Lymer, 2019). In recent years, social media such as Facebook, Twitter and LinkedIn have exploded. However, its usage in sustainability reporting is limited (Lodhia et al., 2020). For these reasons, we focused on disclosures in annual reports and corporate websites only.

The second step was to measure the extent of environmental disclosures. The index, based on the Global Reporting Initiative (GRI) sustainability reporting guidelines, consists of 24 items that measure environmental disclosures in 11 categories. The categories include disclosures on material used, recycling activities, energy saved and consumption, water usage and recycling, biodiversity protected or restored, emissions, waste, and other environmental disclosures on products and service. We added an item that measures any rhetorical information on environmental initiatives. For this category, we analysed any philosophical sentences such as “we are a green company”. We used dichotomous scoring to measure the environmental information (see Appendix A). A score of one (1) was awarded if the item being reported, otherwise a score of zero (0) was assigned. Due to this, the maximum possible score for each company was 25. Thirdly, we considered environmental crimes and profitability measured by ROA as independent variables (Dhaliwal et al., 2011; Lin et al., 2021) while the control variables such as firm size and growth (Fan et al., 2020). However, we used financial leverage, as a moderator variable (Al-Ahdal et al., 2020; Sharif et al., 2012). Table 1 provides a summary of the measurements for each variable.

Table 1. Measurement of variables

Variables	Measurement	Sources	References
Dependent variables			
Environmental disclosure (EDI)	Environmental disclosure Index (11 items) (see Appendix A)	Firms Corporate Website	Fatima et al. (2015), Al-Swidi et al. (2023).
Independent variables			
Return on Assets (ROA)	Determines how effective assets are utilised to produce returns. ROE = Profit after Tax/Total Assets.	Companies Commission Malaysia	(Alodat et al. (2023), Al-Ahdal et al. (2020).
Environmental Crimes (EC)	Number of court cases/penalty given by the department of environment in the period of 7 years	Department of Environment Malaysia	Maume and Greife (2023) Van Uhm and Nijman (2022).
Control variables			
Firm Size (FS)	Natural logarithm of aggregate assets	Companies Commission Malaysia	Al-Ahdal and Hashim, (2022), Alodat et al. (2023)
Growth (GROWTH)	Current year profit as opposed to the last year profit, denominated in percentage	Companies Commission Malaysia	Bisztray et al. (2023), Mansikkamäki (2023).
Moderator Variable			
Leverage (LEV)	It is determined by overall debt to aggregate assets.	Companies Commission Malaysia	Al-Homaidi et al. (2021), Farhan et al. (2023)

5.3. Model specifications

From the literature (Al-Ahdal & Hashim, 2022; Lin et al., 2021), we derived two different econometric models, as follows: one model that analyse the direct effect and one model that analyse the moderating effect. The multiple regression model was developed and executed cross-sectionally for the six years. The model is built by modelling EDI for firm i in year t as a dependent variable, independent variables (EC, ROA), control variables (FS, GROWTH, EF) and moderator variable (LEV). The panel data equation for the ROE model can be expressed as follows:

$$EDI_{it} = \alpha + \beta_1 EC_{it} + \beta_2 ROA_{it} + \beta_3 FS_{it} + \beta_4 GROWTH_{it} + \beta_5 EF_{it} + \varepsilon_{it} \quad (1)$$

$$EDI_{it} = \alpha + \beta_1 EC_{it} + \beta_2 ROA_{it} + \beta_3 FS_{it} + \beta_4 GROWTH_{it} + \beta_5 EF_{it} + \beta_6 ECLEV_{it} + \beta_7 ROALEV_{it} + \varepsilon_{it} \quad (2)$$

6. Empirical results and discussion

6.1. Descriptive statistics

Table 2 reports the descriptive statistics of the variables used in this study. Starting with the dependent variable, EDI, it has a mean value of 1.2055, indicating that, on average, the companies in the dataset exhibit a moderate level of environmental disclosure. The variable ranges from a minimum of 0.00 to a maximum of 2.00, suggesting variability in the extent of environmental disclosure among the companies. The standard deviation of 0.51680 indicates a moderate amount of variability around the mean value. Moving on to the independent variable, EC, it has a mean of 1.2227, slightly higher than the EDI variable. The range of the variable spans from 0.00 to 7.00, indicating variability in the frequency of fines among the companies. The standard deviation of 0.82102 suggests a relatively higher amount of variability compared to the EDI variable.

Regarding profitability (ROA), the mean is -1.8096 , indicating a negative average return on assets. The variable ranges from a minimum of -18.66 to a maximum of 0.51 , reflecting a wide range of profitability levels among the companies in the dataset. The standard deviation of 5.551 suggests a relatively high amount of variability around the mean while the moderating variable, LEV, it has a mean of 1.4135 , indicating a positive mean value. The variable ranges from a minimum of -74.28 to a maximum of 51.81 , indicating significant variation in the level of leverage among the companies. The standard deviation of 8.213 suggests a relatively high amount of variability around the mean.

The control variable FS has a mean of 7.74 , indicating that, on average, the companies are of a moderate size. The variable ranges from a minimum of 3.08 to a maximum of 14.87 , suggesting variability in the sizes of the firms. The standard deviation of 1.21852 suggests a relatively low amount of variability around the mean. Finally, the control variable Growth has a mean of $-652,779$, indicating a negative average growth rate. The variable ranges from a minimum of $-2,773,440$ to a maximum of $1,920,120$, demonstrating a wide range of growth rates among the companies in the dataset.

6.2. Correlation

Table 3 reports the Pearson Correlation matrix which provides insights into the relationships between the variables in the dataset. In this analysis, the focus is on the correlations between the variables EDI, EC, ROA, LEV, FS, and Growth. EDI and EC are positively correlated ($p = 0.173^{**}$) at the 1% significance level. This suggests that companies with a higher number of fines tend to have a slightly higher level of environmental disclosure. Furthermore, the correlation coefficient between EDI and ROA is ($p = 0.008$), indicating a very weak positive correlation, which is not statistically significant. In addition, the correlation coefficient between EDI and LEV is ($p = -0.022$), and the correlation coefficient between EDI and FS is ($p = -0.053$), indicating a weak negative correlation and it is not statistically significant. The correlation coefficient between EDI and Growth is ($p = 0.004$), indicating a very weak positive correlation, which is not statistically significant.

Meanwhile, the correlation coefficient between EC and ROA is ($p = -0.029$), indicating a very weak negative correlation, which is also not statistically significant. The correlation coefficients for the other variable pairs follow a similar pattern of weak correlations, which are mostly not statistically significant. Regarding LEV, it exhibits weak negative correlations with FS ($p = -0.028$) and EC ($p = -0.009$), implying that larger companies and those with fewer fines tend to have slightly lower levels of leverage. FS has a weak negative correlation with EC ($p = -0.125^{**}$), indicating that larger companies tend to have a slightly lower number of fines.

Overall, based on the Pearson correlation coefficients above, there seems to be a weak positive correlation between EDI and EC, and weak negative correlations between EDI and FS. The other correlations are generally weak and not statistically significant.

6.3. Diagnostic tests

In order to achieve the intended objective, a comprehensive examination was conducted on the diagnostic tests pertaining to the data distribution, including normality, outliers, linearity,

Table 2. Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Dev
EDI	696	0.00	2.00	1.2055	.51680
EC	696	0.00	7.00	1.2227	.82102
ROA	696	-18.66	.51	-1.8096	5.55115
LEV	696	-74.28	51.81	1.4135	8.21337
FS	696	3.08	14.87	7.7472	1.21852
Growth	696	-2773440	1920120	-652779	2758098

Source: The authors.

Table 3. Correlation matrix

		EDI	EC	ROA	LEV	FS	Growth
EDI	Pearson Correlation	1					
EC	Pearson Correlation	.173**	1				
ROA	Pearson Correlation	.008	-.029	1			
LEV	Pearson Correlation	-.022	-.009	-.021	1		
FS	Pearson Correlation	-.053	-.125**	.004	-.028	1	
Growth	Pearson Correlation	.004	-.010	.013	.016	-.053	1

** Correlation is significant at the 0.01 level (2-tailed).

Source: The authors.

heteroscedasticity, autocorrelation, and multicollinearity (Ayyangar & Park, 2007). In relation to the concept of normality, the results obtained for kurtosis and skewness, as well as the univariate approach for detecting outliers, collectively indicated the absence of any significant issues. The findings of the correlation matrix analysis provided additional confirmation that there was no evidence of multicollinearity in this study since none of the variables exhibited a correlation coefficient over 0.80 (Ben Barka & Legendre, 2017). In addition, the variance inflation factor (VIF) was employed to identify the presence of multicollinearity. A VIF value exceeding 10 is indicative of a substantial degree of multicollinearity, as stated by Gujarati and Sangeetha (2007). According

to Table 4, it can be observed that there is no evidence of multicollinearity. Additionally, both autocorrelation and heteroscedasticity tests were conducted, and the results confirmed the absence of these problems. Moreover, the model was found fit and statistically significant at $p < 0.01$ with an F-value of 6.77, indicating that it was statistically valid, and the R^2 within the model was 48%. R^2 , in particular, demonstrated that differences in the independent factors explained over 48% of the variation in the dependent variable.

Table 5 presents the findings from the regression model exploring the direct relationship between EDI and the variables EC, ROA, LEV, FS, and Growth. The constant term (C) is 1.03, indicating the expected value of EDI when all independent variables are zero. All coefficients have relatively high t-Statistics, with values much larger than 2 to 68.25, suggesting strong statistical significance, except for LEV and GROWTH. The coefficient for LEV has a (t-statistic = 1.49), suggesting that it is not statistically significant at the conventional significance level of 0.05. Meanwhile, the coefficient for GROWTH has a (t-statistic = -0.52), indicating that it is not statistically significant. The results show that the variable EC, representing the number of fines, has a positive and significant relationship with EDI (t-statistic = 68.25, p -value ≤ 0.05). This suggests that an increase in the number of fines is associated with higher levels of environmental disclosure. The coefficient for EC is 0.06, suggesting that for each unit increase in NOF, EDI is expected to increase by 0.06 units. The results are in line with (Chen et al., 2022; Xu et al., 2023).

On the other hand, the variables ROA, LEV, and Growth do not show a statistically significant relationship with EDI. This indicates that the profitability, leverage, and growth rate do not have a significant impact on environmental disclosure in this model. The result is contracted with (Plumlee et al. (2015). The variable FS, representing firm size, demonstrates a negative and significant relationship with EDI (t-statistic = -3.54, p -value ≤ 0.05). This implies that larger firms tend to have lower levels of environmental disclosure compared to smaller firms. The coefficient for FS is -0.01, indicating that for each unit increase in FS, EDI is expected to decrease by 0.01 units.

Table 4. Diagnostic Tests 6.4 direct relationship

Models	Breusch-Pagan/ Cook-Weisberg	Durbin-Watson Test	Variables	Variance Inflation Factor	Skewness	Kurtosis
Model1	0.2005	1.414	EC	1.008	1.039	3.325
Model2	0.2053	1.434	ROA	1.016	0.460	3.584
			LEV	1.000	0.023	2.471
			FS	1.016	0.629	2.681
			Growth	1.007	1.878	6.963

Table 5. Regression model EDI

Variable	Coefficient	t-Statistic	Prob.
C	1.03	59.29	0.00
EC	0.06	68.25	0,00
ROA	0.00	9.25	0.00
LEV	0.00	1.49	0.14
FS	-0.01	-3.54	0.00
GROWTH	0.00	-0.52	0.60
R-squared	0.48		
Adjusted R-squared	0.41		
F-statistic	6.77		
Prob(F-statistic)	0.000		
Durbin-Watson stat	1.414		

Source: The author

Furthermore, the R-squared value of 0.48 indicates that 48% of the variation in EDI can be explained by the independent variables included in the model. The Adjusted R-squared value is 0.41, which is slightly lower than the R-squared value due to the number of independent variables included in the model. The F-statistic of 6.77 with a p-value of 0.000 suggests that the overall model is statistically significant, indicating that the independent variables jointly have a significant relationship with the dependent variable, EDI.

The results of the regression model suggest that the EC and FS have a significant direct relationship with environmental disclosure (EDI). However, variables such as ROA, LEV, and Growth do not have a significant impact on environmental disclosure in this model. These findings provide insights into the factors influencing environmental disclosure practices in the context of the variables examined in the analysis.

6.4. Moderating relationship

Table 6 presents the results of the regression model examining the moderating relationship between the independent variable (EC, ROA) and the moderating variable LEV on the dependent variable EDI. The coefficient for the constant term (C) is 1.029, with a (t-statistic = 57.679), and a (p-value = 0.000), indicating statistical significance. The coefficient for EC is 0.066, with a (t-statistic = 33.234), and a (p-value = 0.000), indicating a positive and significant relationship between the number of fines and environmental disclosure while the coefficient for ROA is 0.000, with a (t-statistic = 0.584), and a (p-value = 0.560), suggesting that return on assets does not have a significant impact on environmental disclosure in the presence of other variables in the model.

The result for LEV is -0.002 , with a (t-statistic= -9.694), and a (p-value= 0.000), indicating a negative and significant relationship between leverage and environmental disclosure. This implies that as leverage increases, environmental disclosure tends to decrease. The interaction term EC*LEV has a coefficient of 0.002 , a (t-statistic= 9.685), and a (p-value= 0.000), indicating a significant interaction effect between the number of fines and leverage on environmental disclosure. The results match with (Plumlee et al., 2015). This suggests that the relationship between the number of fines and environmental disclosure depends on the level of leverage. The positive coefficient indicates that the positive relationship between the number of fines and environmental disclosure becomes stronger as leverage increases. Further, the result for the interaction term ROA*LEV is 0.000 , with a (t-statistic= 0.560), and a (p-value= 0.576), indicating that the interaction effect between return on assets and leverage is not significant in predicting environmental disclosure.

Regarding the FS is -0.008 , with a (t-statistic= -3.655), and a (p-value= 0.000), indicating a negative and significant relationship between the firm size and environmental disclosure. It suggesting that larger firms tend to have lower levels of environmental disclosure while the GROWTH is 0.000 , with a (t-statistic= -0.514), and a (p-value= 0.608), indicating that the growth rate does not have a significant impact on environmental disclosure in this model.

The R-squared value of 0.56 indicates that 56% of the variation in environmental disclosure can be explained by the independent variables included in the model. The Adjusted R-squared value is 0.46 , which is slightly lower than the R-squared value due to the number of independent variables included in the model.

6.5. Sensitivity tests

6.5.1. An alternative measure of environment (environmental fine)

This study has used alternative measures of EC to evaluate the interaction effects of the relationship between environmental crimes and environmental disclosures. Environmental fine (EF) was used as an alternative measure. The results of Table 7 demonstrate that EC has a positive relationship with EF. The result is significant at $p=0.02$ level with a coefficient of 0.02 . This means that as environmental crimes increase, the fine also increases. The impact of ROA on EF is statistically insignificant, consistent with the previous model. The effects of controlling variables were also consistent in that the coefficient of FS is negative, significant

Table 6. The moderating effect of leverage

Variable	Coefficient	t-Statistic	Prob.
C	1.029	57.679	0.000
EC	0.066	33.234	0.000
ROA	0.000	0.584	0.560
LEV	-0.002	-9.694	0.000
EC*LEV	0.002	9.685	0.000
ROA*LEV	0.000	0.560	0.576
FS	-0.008	-3.655	0.000
GROWTH	0.000	-0.514	0.608
R-squared	0.56		
Adjusted R-squared	0.46		
F-statistic	5.86		
Prob(F-statistic)	0.00		
Durbin-Watson stat	1.434		

Source: The authors.

at the 0.00 level. The overall results using alternative measure suggests that the model is robust and match with the amin model.

6.5.2. Subsample analyses on medium and small enterprise

This study divided the sample into two subsets: small groups and medium groups. The small groups are those firms that are not subsidiaries of other companies. Their ownership is solely individual. The medium groups are either the subsidiaries of listed companies in Malaysia or their parent companies located overseas. Institutional shareholders own firms in medium group. The analysis aims to examine heterogeneity and validate the findings in Table 5. The results of Table 8 confirm the regression model in Table 5, indicating no heterogeneity in the analysis. When sample bias is considered in assessing the influence of EC on EDI, the results show the significant, positive impact of EC on EDI in both groups suggesting that an increase in the number of fines results in an increase in environmental disclosure. For the small group, LEV influences the EDI positively ($P < 0.05$, co-efficient = 0.000). ROA does not affect the EDI. The results of ROA are consistent in both groups, indicating the robustness of the model in Table 5. The control variables show somewhat mixed findings, but the results are consistent with prior literature on the influence of ownership structure on environmental disclosure. For the Medium group, the coefficient for FS is -0.13 ($p < 0.001$), suggesting a negative association between firm size and EDI. Finally, GROWTH does not exhibit statistically significant relationships with EDI. The R-squared values for the small and medium groups are 0.11 and 0.15, respectively; the F-statistics are statistically significant for both groups, suggesting that the overall models are valid and the results are robust.

6.6. Discussion on the empirical findings

Based on the findings, it can be observed that companies exhibiting significant levels of leverage tend to exhibit a decline in their environmental disclosure practices subsequent to the occurrence of an environmental crime. This finding presents a counterpoint to the previously examined perspective that high-leverage corporations would enhance their disclosure practices in order to instill confidence in their creditors. In contrast, the results indicate that these companies may have a strategic objective of mitigating potential adverse responses from creditors through the minimization or concealment of information pertaining to their environmental transgressions. Such an instance demonstrates greenwashing strategy.

This phenomenon can be comprehended within the framework of the heightened examination that high-leverage corporations encounter from their creditors. It is possible that these enterprises may experience apprehension regarding the disclosure of unfavourable environmental information due to potential consequences such as the imposition of stricter loan terms, heightened capital costs, or even the removal of financial support (Dhaliwal et al., 2011).

Table 7. Regression model (EF)

Variable	Coefficient	t-Statistic	Prob.
C	-0.24	-3.54	0.00
EC	0.02	2.39	0.02
ROA	0.00	0.50	0.62
LEV	0.00	-1.49	0.14
FS	0.05	5.39	0.00
GROWTH	0.00	-0.24	0.81
R-squared	0.38		
Adjusted R-squared	0.31		
F-statistic	5.46		
Prob(F-statistic)	0.000		
Durbin-Watson stat	1.92		

Source: The authors.

Table 8. Regression model (EDI) for sub-samples

Variables	Small (private ownership)		Medium (subsidiaries of listed companies/Institutional Ownership)	
	Coefficient	Prob.	Coefficient	Prob.
C	0.976	0.000	2.16	0.00
EC	0.036	0.000	0.18	0.00
ROA	0.000	0.901	0.01	0.13
LEV	0.000	0.008	0.01	0.20
FS	0.000	0.647	−0.13	0.00
GROWTH	0.000	0.010	0.00	0.52
R-squared	0.11		0.15	
Adjusted R-squared	0.08		0.11	
F-statistic	2.30		4.33	
Prob(F-statistic)	0000		000	
Durbin-Watson stat	1.26		1.50	

Source: The authors.

Moreover, these findings can also be associated with legitimacy theory. Organizations may adopt diverse ways to uphold their legitimacy, contingent upon their specific contextual conditions (Patten, 1994). In this scenario, corporations with significant influence may perceive less disclosure as a more efficacious strategy for upholding their credibility among creditors subsequent to an environmental transgression.

The findings underscore the significance of considering contextual factors when comprehending the correlation between environmental offenses, leverage, and environmental disclosure. The results of this study make a noteworthy scholarly contribution by emphasizing the variability in the influence of environmental crimes on disclosure, which is contingent upon a company's amount of leverage. Further research should delve into supplementary variables that may exert an impact on this correlation, including the legal framework, the gravity of the environmental transgression, and the particular requirements and responses of the creditors.

The absence of statistically significant findings in the examination of the relationship between leverage and profitability on environmental disclosure implies that there may not be a discernible simultaneous impact of these two variables on a firm's environmental disclosure procedures. Both profitability and leverage play significant roles in the financial profile of a corporation. Nevertheless, these entities are associated with distinct stakeholder concerns and influences. The relationship between profitability and shareholder interests is frequently observed, whereas leverage is more closely associated with creditor concerns (Brammer & Pavelin, 2006). The implications of the data suggest that there is no significant interaction between these two distinct elements in terms of their influence on environmental disclosure.

There exists a potential for the autonomous operation of profitability and leverage on environmental disclosure. For example, organizations that are more financially successful may possess greater financial means to allocate towards environmental projects and to communicate these endeavors, irrespective of their degree of financial leverage (Clarkson et al., 2008). In a similar vein, enterprises with significant leverage may exhibit a greater inclination to reveal their environmental policies in order to satisfy creditors, irrespective of their profitability levels (Dhaliwal et al., 2011).

7. Summary and conclusion

This study examines the relation between environmental disclosure, environmental crimes, and financial factors within the context of small and medium-sized enterprises in Malaysia. The

investigation spans the period from 2014 to 2019 and incorporates multiple sources of data from the Companies Commission of Malaysia, the Department of Environment and hand-collected data from the company's corporate website. Through our research, we have gained comprehensive empirical evidence for corporate behaviours pertaining to environmental disclosure, particularly in situations involving legal prosecution and financial leverage.

Results found a statistically significant inverse relationship between companies with high debt levels and their level of environmental disclosure after committing an environmental offence. Also, a clear association has been found between occurrences of environmental crimes and the degree of environmental transparency, with the impact of a firm's leverage ratio serving as a moderating variable. Further, contrary to the prevailing notion that high-leverage firms would enhance their level of transparency to maintain the trust of their creditors, our data suggests the potential use of a greenwashing tactic. This approach involves the possibility for these entities to minimize or conceal adverse environmental data with the intention of evading unfavourable responses from their lenders.

The study's findings enhance the current understanding of legitimacy theory by illustrating the influence of various contextual circumstances on businesses' endeavours to uphold legitimacy in the aftermath of environmental transgressions. More importantly, the different financial profiles exhibited by small and medium-sized firms play a significant role in shaping their respective attitudes towards environmental disclosure. Accordingly, the results portray the significance of customising sustainability reporting standards, especially for SMEs. Customizing specific criteria can improve the congruence with the distinct interests and apprehensions of significant stakeholders, thus fostering a more lucid framework for corporate disclosure concerning environmental matters.

This study provide support for the notion that sustainability reporting requirements for small and medium-sized enterprises should be customised to align with the specific interests and concerns of key stakeholders. Small and medium-sized enterprises typically have limited contractual relationships with their stakeholders. Hence, the imperative to uphold legitimacy is confined solely to the regulated and cultural context. While the concerns of creditors and shareholders on environmental issues may be minimal, the collective ecological harm caused by these companies is deadly.

Despite its significant contributions to both theory and practice, the results of this study should be interpreted with few limitations. First, the scope of our analysis is restricted to the geographical confines of Malaysia, with a specific temporal emphasis on the period from 2014 to 2019. To effectively extrapolate our research outcomes to various geographical areas or historical eras, it is imperative to meticulously examine the distinct regulatory and economic circumstances prevailing in the respective local setting. In addition, the study collected longitudinal data from companies that had engaged in environmental misconduct. The analysis did not include information regarding the specific sorts of offences, the degree of severity of the crimes, or the size of the crimes.

Accordingly, our study provides several avenues for future research. First, further examination should include additional variables such as the severity of environmental crimes, their magnitude and types. In addition, the distinct responsibilities and responses of the creditors and owners of the SMEs may yield more insights into the relationship between environmental crime, financial leverage, and environmental disclosure. In addition, by extending the scope of this inquiry to different geographical or regulatory contexts, a more comprehensive understanding of the observed phenomena could be achieved.

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Shayuti: Conceptualization, Introduction, Writing-Original

draft preparation. **Alrazi:** Writing-Reviewing and Editing.

Alahdal: Methodology, Validation, Formal analysis. **Husin:** Conceptualization, Writing-Reviewing and Editing.

Alahdal, Methodology, Supervision and Editing.

Data availability statement

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

Ethical approval

There are no human subjects in this article and informed consent is not applicable.

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Appendix

Table A1. Environmental disclosure index

Environmental Performance Indicators	Code	Maximum
Materials used	E1	5-point scale
Percentage of input that is recycled	E2	5-point scale
Discussion on recycling efforts (recycled inputs/recycled waste)	E3	5-point scale
Direct/indirect energy consumption	E4	5-point scale
Energy saved due to conservation and efficiency	E5	5-point scale
Initiatives to reduce energy consumption	E6	5-point scale
Water used disclosure	E7	5-point scale
Water recycling	E8	5-point scale
Impacts on biodiversity	E9	5-point scale
Habitats protected or restored	E10	5-point scale
Strategies or plans for managing impacts on biodiversity	E11	5-point scale
Greenhouse gas emissions	E12	5-point scale
Initiatives to reduce greenhouse gas emissions	E13	5-point scale
Other emissions disclosure	E14	5-point scale
Impacts of emissions on climate changes or country	E15	5-point scale
Wastewater disclosure	E16	5-point scale
Weight of waste and disclosure method.	E17	5-point scale
Disclosure on significant spills/ environmental accidents	E18	5-point scale
Hazardous waste disclosure	E19	5-point scale
Initiative to mitigate environmental impacts of product/ service	E20	5-point scale
Product packaging impact on the environment	E21	5-point scale
Fines or sanction for environmental citation	E22	5-point scale
Impacts of transportation of goods or employees	E23	5-point scale
Total environmental expenditures	E24	5-point scale