

# Relationship Between Environmental Cost Disclosure and Financial Performance of Manufacturing and Construction Firms Listed in Nairobi Securities Exchange; The Moderating Effect of Firm Size

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## Abstract

Environmental issues have become increasingly prominent, driving the need for companies to operate transparently and responsibly. This study investigated the moderating effect of firm size on the relationship between environmental cost disclosures and financial performance among manufacturing and construction firms listed on the Nairobi Securities Exchange in Kenya. The study was guided by the stakeholder's theory. Using a combination of explanatory and longitudinal research designs, the study analyzed data from audited annual reports of manufacturing and construction firms from 2014 to 2021. Data was coded into STATA version 17 and analyzed using both descriptive and inferential statistics. Results indicated that financial performance positively and significantly correlated with environmental costs ( $r=0.460$ ,  $p < 0.01$ ), firm size ( $r=0.416$ ,  $p < 0.01$ ). Also, environmental costs disclosure positively and significantly correlated with firm size ( $r=0.213$ ,  $p < 0.05$ ). The study further established that environmental cost disclosure ( $\beta = 0.1273701$ ,  $p\text{-value} < 0.05$ ) had a positive and significant effect on the financial performance of manufacturing and construction companies listed in Nairobi securities exchange. Further, the study found that firm size moderated the relationship between environmental cost disclosure ( $\beta = 0.0041$ ,  $p < 0.05$ ) and financial performance of manufacturing and construction companies listed in Nairobi securities exchange. This result suggests that the impact of environmental cost disclosure on financial performance is indeed influenced by firm size. Managers should prioritize the transparent reporting of environmental costs, as these disclosures have been shown to positively impact financial outcomes. Hence, firms can demonstrate their commitment to sustainability

and responsible business practices, which in turn can attract investors and stakeholder trust.

**Keywords:** Firm size, environmental cost disclosure, manufacturing and construction companies, financial performance, Nairobi securities Exchange

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## Introduction

Environmental concerns have become a significant focus in present-day business operations as organizations across the globe face increasing pressure from stakeholders, including governments, investors and the public, to adopt sustainable practices (Blowfield & Blowfield, 2013; Bendell, 2017; Duttagupta, Islam, Hosseinabad & Zaman, 2021). A company's profitability is heavily impacted by the type of business it conducts as well as by pertinent political, legal and environmental laws that are an essential part of the public policy that guides its operations. The risks that are special to a firm are determined by its unique nature, and these risks are critical factors that impact profitability. Higher financial risks have the potential to provide significant gains but can also

represent serious challenges to a company's profitability.

According to Cho, Roberts and Patten, (2010), environmental disclosure is a compilation of data about the environmental management performance and activities of a company in the past, present, and future. Stakeholders can receive this information via a variety of reporting methods. Various techniques are used by organizations to disclose their environmental information. These approaches can include the use of an integrated environmental section within the company's annual report and financial statements, or the creation of a separate environmental report (ACCA, 2001).

Among the many advantages of environmental disclosure is that it can act as an internal incentive for businesses to keep improving. It can increase

profitability by cutting expenses or creating new sources of income (De Beer & Friend, 2006). Improving environmental disclosure can also make a company more appealing to investors by reducing financing costs and reducing perceptions of corporate risk. Reporting on an organization's effects on the environment, including pollution reduction, carbon management, emissions control, recycling, and waste management (Schaltegger & Csutora, 2012; Qian, Hörisch & Schaltegger, 2018). preservation of wetlands and wildlife, is included in corporate environmental disclosure. The popularity of corporate sustainability disclosure has developed as a result of stakeholders' growing demand for information and the requirement for transparency in corporate reporting (Hossain, 2016). Some scholars argue that environmental cost disclosure leads to improved financial performance, as it promotes better stakeholder relationships, enhances corporate reputation, and leads to cost savings through improved operational efficiency (Derila, Evana & Dewi, 2020; Mikial, Marwa, Fuadah & Meutia, 2019; Al-Waeli, Ismail, Hanoon & Khalid, 2022). On the other hand, there are concerns that the costs associated with environmental initiatives may negatively impact financial performance, particularly in the short term.

Manufacturing and construction firms, which are traditionally known for their resource-intensive and environmentally impactful operations, are increasingly under scrutiny for their environmental practices. Kenyan listed firms are adopting environmental accounting disclosure, which is gaining popularity. This tendency can be linked to increased public awareness of issues like global warming, climate change, rising educational standards, and the growing

need for knowledge (Sidorova & Gurvitsh, 2012). As a result, stakeholders are pressuring businesses to provide more information, which forces them to take an active role in sustainable reporting.

This study used firm size as a moderating variable, which is defined as the entire value of a firm's assets. Leledakis, Davidson, and Smith (2018) define a moderating variable as an indicator of how an independent variable affects a dependent variable. Lee (2009). Because they can innovate more and have lower manufacturing costs, larger companies are often thought to perform better than smaller ones (Mutunga & Owino, 2017). Moreover, Leledakis, Davidson, and Smith (2018) contend that a company's size has a big impact on its financial performance.

Moreover, Ebiringa (2013) pointed out that there is a strong consensus in the research about how firm size affects corporate environmental disclosure policies. Since larger companies typically provide more information, this effect is generally seen as beneficial. This relationship can be explained by at least three main factors. First off, because of the possibility of higher lawsuit and government agency inspection due to their increasing visibility, larger corporations are usually more willing to share information in order to reduce political costs. Second, these companies bear less of the expense of increased levels of disclosure because of their more sophisticated internal reporting systems. Finally, because smaller businesses face greater competitive disadvantages in their individual industries, they are frequently more likely to withhold important information.

The Vision 2030, the Kenya Industrial Transformation Programme (KITP) and most recently Big 4 Agenda have all been designed by the

Government to revamp the manufacturing sector. As expressed under the Medium-Term Plan 3 Concept Note, 'the low and declining shares in manufacturing, industrial and exporting sectors in GDP constitute a major challenge to economic growth'. Increasing the size of the country's manufacturing sector with an emphasis on exported goods is one of the Big Four Agenda.

Kenya's construction industry is partly governed by the National Construction Authority (NCA), which was established through Act of Parliament No. 41 in 2011. The main responsibility of the NCA is to register contractors and builders authorized to operate in Kenya. The Economic Survey (2016) reported that the building and construction sector witnessed a growth of 13.6 percent in 2015., up from a 13.1 percent expansion recorded in 2014. This increase was partly driven by ongoing projects such as the Standard Gauge Railway (SGR) construction and roadworks undertaken by both the County and National governments. Additionally, cement consumption rose by 9.9 percent, increasing from 5.2 million tonnes in 2014 to 5.7 million tonnes in 2015. Kenya's manufacturing GDP contribution has been on a steady decline from 12.05 % recorded in 2011 to 7.61% in 2020 (KAM 2022). Construction industry has declined slightly by 5% from 28% in the year 2020 as compared to 2019 (KAM 2021).

According to data from NSE, financial performance of manufacturing and construction firms have been declining over time for instance Return on Assets for Bamburi cement was 9.29% in 2014; 14.24% in 2016 and 1.26% in 2018. On the other hand, ROA for East Africa Breweries was 11.38% in 2014, 12.47% in 2016 and 10.52% in 2018. On the other hand ROA for Carbacid Investments Ltd

was 20.7% in 2014, 12.41% in 2016 and 8.94% in 2018.

Athi River Mining, Bamburi Cement Ltd, Crown Paints Kenya PLC, E.A. Portland Cement Ltd, and E. A. Cables Ltd are the five listed construction and allied firms at the NSE. Additionally, nine manufacturing firms are listed, including British American Tobacco Kenya Ltd, B.O.C Kenya Ltd, Carbacid Investments Ltd, Mumias Sugar Co. Ltd, Eveready East Africa Ltd, Unga Group Ltd, Kenya Orchards Ltd, East Africa Breweries Ltd, and Flame Tree Group Holdin. For firms in the manufacturing and construction sectors, the pressure to disclose environmental costs is particularly pronounced due to the high environmental risks associated with their operations, including emissions, resource depletion, and waste generation. Furthermore, the government, via the National Environmental Management Authority, has reported that only 20% of organizations have complied with environmental information disclosure requirements and have implemented the proposed programs aimed at environmental protection. Various studies examining the impact of environmental accounting disclosures on firm financial performance have produced mixed results, showing positive, negative, or neutral associations, which highlights the inconsistency in the findings. This study therefore examined the relationship between environmental cost disclosure and financial performance among manufacturing and construction firms listed on the Nairobi Securities Exchange (NSE), with a particular focus on the moderating effect of firm size.

## Literature Review

### Theoretical review

The stakeholder theory, introduced by Edward Freeman in 1983, categorizes stakeholder management into two models: a corporate social responsibility model and a business planning and policy model. The first model emphasizes stakeholder analysis, focusing on the development and assessment of corporate strategy decisions that require the approval of specific groups essential for the company's survival. This paradigm identifies owners, consumers, suppliers, and public groups as stakeholders. Although these groupings are not naturally antagonistic, management must always take into account the possibility of their having competing interests when coming up with plans to match the firm's resources with its surroundings (Deegan and Gordon, 1966).

The second model incorporates external factors that could present the company with hostile problems in addition to corporate planning and analysis. Regulatory agencies, environmental activists, and special interest organizations focused on social issues are examples of adversarial groupings that this model identifies (Guthrie and Parker, 1990). This expanded viewpoint emphasizes how important it is for businesses to take a broader range of factors into account when developing their strategic plans and making decisions.

With the help of the second model, managers and accountants may create strategic plans that are flexible enough to adjust to shifting social demands from non-traditional stakeholder groups. Corporate environmental reporting is one way that organizations can satisfy their stakeholders' demands. A business that gives environmental

information is acknowledging the right of its stakeholders to know about the effects of its operations on the environment.

This openness helps level the playing field for different stakeholders and lessen information asymmetry. In exchange, companies can anticipate a number of advantages such as better hiring practices, higher employee retention rates, improved reputation and image, reduced capital expenditures, increased financial performance, and the ability to draw in investors, which in turn encourages their endorsement and support (Deegan, 2009; Gray et al., 1996).

Nevertheless, the stakeholder theory faces criticism for suggesting that business organizations exist solely to maximize profits. Critics argue that prioritizing moral responsibility could distract managers from their core objectives, potentially reducing shareholder returns, raising product prices, and decreasing wages. Additionally, the inclusion of all stakeholders may create an unmanageable scope for managers (Toukabri, Ben & Jilani, 2014). The simplicity of the stakeholder theory has also been a point of contention (Fassin, 2008). Despite these criticisms, the theory serves as a relevant approximation of reality (Fassin, 2008) and continues to support social and environmental reporting in management research (Harrisson & Freeman, 1999).

This theory is anchored to the study since by firms disclosing environment accounting information the stakeholders will be able to release the resources that they control for purpose of investment by the entity. This will lead to increased profitability by the corporation and thus necessitating the corporation to engage in more environmental reporting practices so as to justify their profits.

## Empirical review

### Environmental cost disclosure and firm performance

Sahibzad and Abdul (2016) looked at how US firm performance was affected by environmental disclosure in 2015. Market share was the dependent variable in their analysis, and the independent variables were waste disposal, water usage, and greenhouse gas emissions. Reductions in water usage, greenhouse gas emissions, and waste disposal were found to have a substantial positive association with each other. This suggests that these reductions improve company performance by raising the value and demand for products overall.

Nwaiwu and Oluka (2018) studied into the connection between financial success and costs to the environment disclosure in the Nigerian oil and gas industry in a different study. They used time series data gathered from the Central Bank of Nigeria's annual financial reports and its economic assessment. Using the Statistical Package for the Social Sciences (SPSS) version 22, the researchers performed multiple linear regression analysis and calculated Pearson's product-moment correlation coefficient. According to their econometric findings, financial performance metrics are positively and significantly impacted by appropriate disclosure of environmental expenses.

Using a sample of 70 oil businesses, Ezugwu and Egbere (2014) conducted a study on environmental cost management and its effect on the profitability of the Nigerian oil sector. The Value of Flared Quantity of Gas (VQGF), the Value of Gas Utilized (VQGU), and the Value of Oil Spilled (VQOS) were established by the researchers as the independent variables, and the Value of Profit of Gas Produced (PROF) was designated as the dependent variable. The

study discovered a strong correlation between environmental cost management techniques and the profitability of Nigeria's oil industry through the use of multiple regression analysis.

Gatimbu and Wabwire (2018) investigated how the financial performance of listed firms on the Nairobi Securities Exchange is affected by corporate environmental disclosure. Their analysis relied on longitudinal secondary data collected from the annual reports and financial statements of these companies. Content analysis of sampled listed companies' annual reports was undertaken to examine environmental disclosure practices. A checklist of environmental disclosure items and categories was developed and environmental disclosure indices computed. The findings revealed that environmental disclosure had positive significant effect on the mean financial performance.

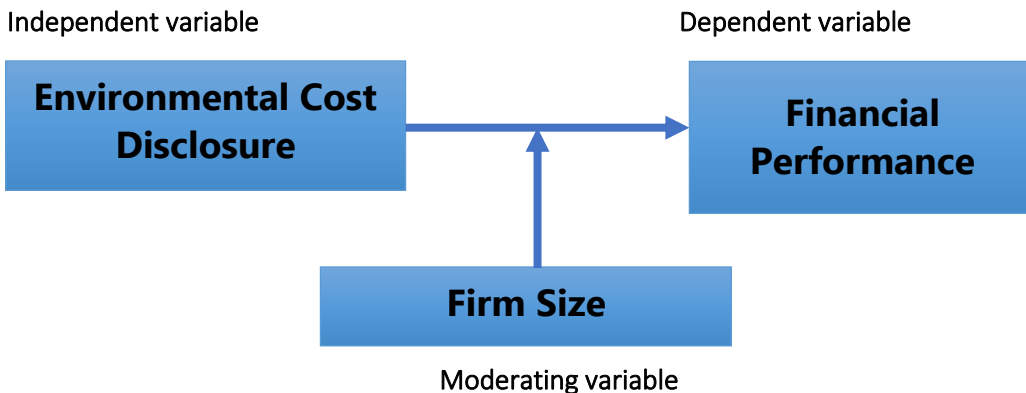
Al-Waeli *et al* (2020) in their study investigated the relationship between environmental costs and the financial performance of industrial companies in Iraq. Multiple Regression Techniques and correlation was used in the data analysis. The results indicated that Image and Relationship Costs and Contingent Environmental Costs had no significant impact on financial performance as demonstrated in the model; however, the effect test showed that potentially hidden Costs significantly had positive effect on Iraqi company's financial performance with possible effects on their future earnings (ROA). While Conventional Costs and External Costs were both found to have a significant effect on the financial performance and earnings.

### Conceptual Framework

A conceptual framework is described as a presentation model which

conceptualizes or represents the relationship between variables diagrammatically (Geçici & Türnüklü, 2021). The main aim of the conceptual framework is to assist the reader to quickly visualize the proposed relationship at a glance. Figure 1 shows the

relationship between the independent variables and the dependent variable of the study. Environmental cost disclosure was an independent variable, the moderating variable was the firm size and financial performance was the dependent variable.



**Figure 1:** The moderating effect of firm size on the relationship between environmental cost disclosure and financial performance of manufacturing and construction firms

## Methodology

An explanatory and longitudinal research design was employed in this study. Investigating causes and reasons, explanatory research provides evidence to either validate or refute a theory or forecast (Kassa, 2021). On the other hand, a longitudinal research design concentrates on gathering numerical data for the same variable across a longer time frame. Because the current study used a panel data collection that covered eight years, from 2014 to 2021, this design was especially appropriate.

The target population comprised nine manufacturing and five construction firms listed in Nairobi Securities Exchange, (NSE, 2021). The period of the empirical analysis was from 2014 to 2021. This will result into 112 observations.

Secondary data was collected from 14 companies registered on the

Nairobi Securities Exchange audited annual reports for each of the firms, standalone sustainability reports and company websites. A content/document analysis guide was used as the data collection technique in this study. This technique was appropriate because, in compliance with Kenyan company law, all audited information about these companies is available to the public.

Data was analysed using both descriptive and inferential statistics with an aid of STATA version 17. Hypothesis testing was tested inferential statistics, which includes techniques like multiple regression analysis and Pearson correlation.

The relationship between the independent variables environmental cost and the dependent variable, financial performance, was evaluated using a multiple regression models stated below.



Direct effect

$$FP = \beta_0 + \beta_1 X_1 + \varepsilon \dots \dots \dots \text{Model 1}$$

Moderating effect

$$FP = \beta_0 + \beta_1 X_1 + \beta_2 M + \beta_3 X_1 * M + \varepsilon \dots \dots \dots \text{Model 2}$$

Where;

FP = Financial Performance

X<sub>1</sub> = Environmental Costs disclosure

$\beta_0$  = The constant of equation (represents the changes in performance that cannot be explained by independent variables in the model).

$\beta_1, \beta_2, \beta_3$  = parameters of estimate.

$\varepsilon$  = Error term

M = Moderator (firm size)

## Results and Discussion

### Descriptive statistics

The descriptive statistics presented in Table 1, indicated that the variable environmental cost disclosure has a mean value of approximately 1.46 with a standard deviation of 0.76. This suggests that, on average, firms provide a moderate level of information regarding the costs associated with their environmental initiatives. The relatively low standard deviation indicates that most firms' disclosures are closely clustered around the mean, implying a certain degree of consistency in reporting

practices. The range of disclosures, from a minimum of 0.096 to a maximum of 3.37, shows that while some firms provide very minimal cost information, others are quite detailed, reflecting variability in transparency and possibly differences in regulatory environments or internal policies.

Furthermore, Firm Size has a mean of 28.92 with a substantial standard deviation of 17.42, indicating significant diversity in the size of firms within the sample, ranging from 11.99 to 67. This suggests that the sample includes both smaller and larger firms, potentially influencing their disclosure practices due to differences in resources and reporting capabilities.

Lastly, Financial Performance is represented by a mean of 0.68 and a standard deviation of 0.48. The range of financial performance is from 0.096 to 3.37, indicating that while some firms perform very well, others show lower financial outcomes. The variability in financial performance could correlate with how much firms disclose about their environmental impact, as financially healthier firms might have more capacity to engage in extensive environmental reporting.

**Table 1:** Descriptive statistics

Variable	Obs	Mean	Std.dev	Min	Max
Environmental Cost Disclosure	112	1.455848	.7615398	.096	3.37
Firm Size	112	28.92171	17.41984	11.988	67
Financial Performance	112	.6777946	.4809721	.096	3.37

Source (Field Data, 2024)

### Correlation matrix

Pearson correlation coefficient was used to assess the strength and direction of the linear relationship between the pairs of variables. The

coefficients range from -1 to 1, where values closer to 1 or -1 suggest a strong linear relationship, and values near 0 indicate a weak or no linear relationship.



Table 2 below presents the correlation results.

**Table 2:** Correlation matrix

	Financial performance	Environmental cost	Firm size
Financial performance	1.0		
Environmental cost	0.460**	1.0	
Firm size	0.416**	0.213	1.0

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

\* Correlation is significant at the 0.05 level (2-tailed)

Source (Field Data, 2024)

Financial performance positively and significantly correlated with environmental costs ( $r=0.460$ ,  $p < 0.01$ ). This suggests that firms that are more transparent in disclosing their environmental costs tend to have better financial performance. Firm size also correlates positively with financial performance ( $r=0.416$ ,  $p < 0.01$ ). This indicates that larger firms tend to have better financial performance, possibly due to economies of scale or more significant resources that can be leveraged for better financial outcomes. Lastly, environmental costs disclosure positively and significantly correlated with firm size ( $r=0.213$ ,  $p < 0.05$ ), suggesting that larger firms tend to disclose environmental costs more transparently.

### Test for hypothesis

#### Testing for direct effect

$H_{01}$ : Environmental cost disclosure has no significant influence on financial performance of manufacturing and

construction firms listed in Nairobi securities exchange. The analysis in table 4 reveals a positive coefficient for environmental cost disclosure ( $\beta_1=0.1273701$ ,  $p < 0.05$ ). Since the p-value is less than 0.05,  $H_{01}$  is rejected, concluding that environmental cost disclosure has a significant positive impact on financial performance. This suggests that transparency in environmental costs is beneficial for firms, potentially enhancing their reputation and aligning with investor expectations regarding sustainability. Additionally, detailed environmental disclosures can lead to operational efficiencies, as firms that monitor and report their environmental impact are more likely to implement practices that reduce waste and improve resource management. The findings concur with those of Derila, Evana and Dewi (2020), Ismail, Hanoon and Khalid (2022), Shahwan and Esra'a (2021) who all reported that disclosing environmental cost improves firm performance.

**Table 3:** Hausman test

Test summary		Chi2(7)	Prob > chi2	
		45.11	0.0000	
Variables	FE (b)	RE (B)	Difference (b-B)	Std. Err.
Ecd	0.1273701	0.1566335	-0.0292634	0.0106558
Firm size	0.0057941	-0.0042198	0.0100139	0.0073747

Source (Field Data, 2024)

### Testing the moderating effect

The results for hierarchical regression are presented in Hierarchical Regression for Testing Moderating Effect firm size table 4. The hypothesis on moderation was tested as follows;

*H<sub>02</sub>: Firm Size Has No Moderating Influence on the Relationship Between Environmental Cost Disclosure and Financial Performance.* To test whether Firm Size moderates the relationship between Environmental Cost Disclosure (ECD) and Financial Performance. In Model 2, the interaction term *Ecd\_fs\_interaction* is statistically significant with a coefficient of ( $\beta = 0.0041$  ( $p < 0.05$ )). This result suggests that the impact of environmental cost disclosure

on financial performance is indeed influenced by firm size. Specifically, the positive coefficient indicates that as firms grow larger, the benefits of environmental cost disclosures on financial performance become more pronounced. For larger firms, environmental cost disclosures may be more effectively integrated into strategic planning and operational improvements, leading to enhanced financial outcomes. This finding rejects the null hypothesis *H<sub>02</sub>*, demonstrating that firm size is key in strengthening the relationship between environmental cost disclosures and financial performance. Larger firms likely have more resources and capabilities to leverage these disclosures, translating them into financial advantages.

**Table 4:** Hierarchical regression for testing moderating effect firm size

Variable	Model 1 Coef (Std. Err.)	Model 2 Coef (Std. Err.)
const	-0.467 (0.2206)*	-0.4884 (0.1898)*
Firm age	0.0272 (0.0046)**	0.0246 (0.004)**
Firm leverage	-0.0052 (0.0018)**	-0.0025 (0.0015)
Ecd		0.0808 (0.072)
Firm size		-0.0135 (0.0041)**
Ecd_fs_interaction		0.0041(0.0021)**
R-sq: within	0.0272	0.5434
R-sq: between	0.4823	0.6827
R-sq: overall	0.2957	0.6203
R-sq $\Delta$	0.00	0.0188
Wald chi2(10)	13.12	131.64
Prob> chi2	0.0014	0.0000
sigma_u	.27028876	.19667552
sigma_e	.32438822	.22130801
Rho	.40977387	.44127223

*\*\*significant at 0.05 level*

*Source (Field Data, 2024)*

The findings align with those of Amelia (2012), who examined the effect of firm characteristics, financial performance, and environmental

performance on corporate social responsibility disclosure intensity among manufacturing firms listed on the Indonesia Stock Exchange. Amelia

reported that firm characteristics, such as firm size, significantly influence both the financial and environmental performance of these firms. Similarly, Tarus (2020) investigated the impact of board size and firm size on environmental accounting disclosure among firms listed on the Nairobi Securities Exchange, Kenya. The study revealed that firm size had a significant and positive effect on environmental accounting disclosure, concluding that larger firms tend to provide more comprehensive environmental information in their reports.

## Conclusion

The positive impact of environmental cost disclosure on financial performance underscores the importance of transparency in environmental accounting. Firms that provide detailed information on the costs associated with their environmental initiatives tend to experience improved financial outcomes. This relationship suggests that stakeholders and investors value such disclosures, viewing them as indicative of responsible and sustainable business practices.

Firm size moderate relationship between environmental cost disclosures and financial performance. For larger firms, environmental cost disclosures may be more effectively integrated into strategic planning and operational improvements, leading to enhanced financial outcomes.

## Recommendations

Managers should prioritize the transparent reporting of environmental costs, as these disclosures have been shown to positively impact financial outcomes. Hence, firms can demonstrate their commitment to sustainability and

responsible business practices, which in turn can attract positive investor sentiment and stakeholder trust.

The moderating effect of firm size on the relationship between environmental disclosures and financial performance suggests that managers should align their reporting practices based on their firm's size. Smaller firms might focus more on detailed environmental evaluations, which are shown to be particularly beneficial for them. Larger firms, on the other hand, should emphasize compliance disclosures.

Additionally, regulatory bodies should consider providing incentives for firms that exceed regulatory requirements in environmental disclosures. Incentives such as tax breaks, grants, or preferential treatment in public procurement could encourage firms to adopt more comprehensive and transparent reporting practices. These incentives would not only promote better environmental performance but also enhance the overall quality of environmental disclosures, benefiting both the firms and their stakeholders.

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