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Financial and non-financial disclosures on sustainable development: The mediating role of environmental accounting disclosure practices

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Abstract

Purpose: Environmental accounting is a complementary and contributory component of corporate governance that can achieve sustainable growth and development. This study investigates the financial and non-financial disclosures that influence sustainable development through the mediating effect of environmental accounting disclosure practices.

Research methodology: Self-administered questions in a closed-ended questionnaire were used, employing a five-point Likert scale to quantify opinions. Data were collected purposively and physically by the researchers from 338 respondents using a pretesting modified process, a pilot survey, a final survey, and finally analyzed using the PLS-SEM.

Results: Our study reveals that non-financial disclosure has both direct and indirect effects on sustainable development through environmental accounting disclosure practices, while financial disclosure only has indirect effects. Environmental accounting disclosure practices exert a statistically significant influence and predictive power on sustainable development.

Limitations: Our study is limited to listed textile companies, without considering non-listed textiles, ready-made garments (RMG), and other listed manufacturing companies in Bangladesh.

Contribution: The study findings convey a meaningful message to listed textile companies, their managers, researchers, regulators, and practitioners, urging them to integrate and enhance environmental practices for sustainability. These findings contribute significantly to the literature and may influence multinational buying companies.

Novelty: This pioneering accounting research aims to articulate the scale and theoretical validation of accountants' perceptions by studying the mediating effect of environmental accounting disclosure practices between financial and non-financial disclosures and sustainable development through PLS-SEM.

Keywords: *Environmental Accounting (EA), Environmental Accounting Disclosure Practices (EADPs), Financial Disclosure (FD), Non-Financial Disclosure (NFD) and Sustainable Development (SD)*

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1. Introduction

Manufacturing companies make a significant contribution to the global economy, including in developing countries, by supplying goods and services (Abdul-Rashid et al., 2017; Afrin et al., 2020). Solikhah and Maulina (2021) find that economic development and environmental destruction are positively correlated in developing countries. This correlation is why global warming and climate change have become pressing burning issues, generating stakeholder pressure on companies to disclose environmental aspects (Yeye & Egbunike, 2023). Bangladesh, as a developing country, relies heavily on the manufacturing and agricultural sectors. The nation faces various environmental hazards such as pollution, loss of biodiversity, coastal erosion, land degradation, climate change, poor waste management, and deforestation. (Belal et al. 2015). Owing to these environmental issues, environmental disclosure and sustainable development have gained importance in recent decades through international treaties (Gericke et al., 2019; Orajekwe & Ogbodo, 2023), including those applicable to Bangladesh.

Companies contribute significantly to environmental degradation (Jahanshahi & Brem, 2018) and face tremendous pressure to ensure sustainability in achieving their financial goals (Gimenez et al., 2012; Abdul-Rashid et al., 2017). National and global Scholars worldwide have presented various emerging ideas for promoting and implementing sustainable development. Environmental accounting is an important concept that incorporates the recording and reporting of environmental impacts from operational activities alongside traditional accounting (Chen et al., 2020). Globally, security and exchange commissions have imposed additional pressure by issuing policies and guidelines for listed companies and standard setters to disclose social and environmental information (Beretta & Bozzolan, 2008). While these existing guidelines and regulations may influence companies to abstain from damaging the natural environment, clear and significant guidelines for activities, recording, and reporting environmental and social responsibilities have not been issued in Bangladesh. Therefore, under voluntary consideration, companies often perceive it as ornamental and do not attach enough importance to disclosing pertinent environmental information (Ji et al., 2022). Consequently, the environmental disclosure patterns and content of annual reports across firms in an industry or overall are inconsistent, providing inconsistent and incomparable information (Ismail et al., 2021). Although environmental accounting and reporting practices may create accountability for managerial policymaking to protect the environment (Dissanayake et al., 2016; Masud et al., 2017), this reporting may have minimal or no impact on sustainable development (Gray, 2010).

Environmental information may take the form of both financial and non-financial information (Masud et al., 2017; Mondal et al., 2023), both of which are demanded by stakeholders to ensure sustainable value creation (Ismail et al., 2021). According to Lin and Qamruzzaman (2023), businesses in developing countries are more aware of environmental sustainability. Here, financial and nonfinancial disclosure items are vital environmental information for users. Non-financial, social, and environmental information, along with mandatory financial information, enhances stakeholders' understanding, a firm's image, green growth, sustainable development, and competitive position (Dissanayake et al., 2016; Masud et al., 2017; Mondal et al., 2023). This study first classifies the determinants of environmental disclosures in annual reports, and then defines and operationalizes them. Subsequently, the study clearly describes the concept and attempts to develop a testable conceptual framework. Consequently, the construction of variables and the creation of a questionnaire are presented in this study. Through the sequential development of the questionnaire, a pilot survey was conducted, and soon after, the final research was completed. To articulate the way To fill the research gap, the study findings contribute significantly to the literature. First, it provides new constructs and items to extend the existing scale and empirical evidence on environmental accounting and disclosure practices.

Therefore, for voluntary work, the question arises about which motivations or determinants influence individuals and what respondents have regarding these determinants. While there are many studies in the literature on the determinants of environmental disclosure based on financial and nonfinancial content analysis for sustainability, reporting a perception study through structural equation modeling is not available. Thus, the implication of a novel approach, PLS-SEM, through a new scale for environmental accounting disclosure as a substitute for disclosures in annual reports may be recognized as a new methodological contribution to the arena of environmental accounting research paradigms. The primary objective of this study is to develop a scale to measure environmental disclosure and sustainability determinants through theoretical grounding and empirical validation in compliance with sustainable disclosures. The disclosure items in annual reports (both financial and non-financial) cover or influence environmental accounting and disclosure practices. Additionally, environmental accounting and disclosure practices are a means of reporting sustainability issues and leading to sustainable development. These relationships represent the mediating role of environmental accounting disclosure practices between the disclosure aspects (financial and non-financial) and sustainable development. However, other studies (for example, Monteiro et al. (2023), Zhou et al. (2023), and Ali et al. (2022)) use environmental accounting disclosure as a mediating variable to explore the relationship between financial disclosure, non-financial disclosure, and sustainable development. To further extend the knowledge on environmental accounting disclosure and fill the research gap, this study also examines the mediating effect of environmental accounting disclosure practices between financial and non-financial disclosures and sustainable development.

2. Literature review

2.1 Environmental accounting disclosure practices and sustainable development

Environmental or ecological accounting deals with environmental costs and performance related to business operations and decisions, and meets the expectations of buyers, future generations, environmental protection groups, and other stakeholders. Environmental accounts were first introduced in Norway in the 1970s and have been gradually implemented in other countries (Shil & Iqbal, 2005). Recognizing the positive impacts of environmental accounting information, the UK, USA, Japan, Sweden, Canada, and some other countries have initiated research and accounts to protect the environment. Environmental and social disclosures have increased globally since their inception, in both developed and developing countries (Kabir and Akinnusi, 2012; Masud et al., 2017). To assess overall performance, organizations should disclose all positive and negative social and environmental information (GRI, 2013). 10). However, under voluntary practices, companies tend to disclose more positive information than negative information (Hamilton & Waters, 2022).

Environmental accounting reporting can help managers present business positions to stakeholders holistically and meaningfully (Modell, 2014). The UN summit in Rio in1992 set an action plan for sustainable development (SD) for organizations and governments from local to global levels, where economic and social issues are equally acknowledged alongside environmental issues. Subsequently, the economic, environmental, and social dimensions of sustainable development have been globally recognized and widely accepted (Afshar et al., 2019). Previous studies have indicated that the level of environmental accounting information disclosure is influenced by external and internal factors (Monteiro et al., 2023; Barbosa et al., 2021), financial and non-financial factors, and other disclosures (Mondal et al., 2023), including mandatory and voluntary disclosures.

2.2 Literature support for selecting population

Accounting professionals and financial expertise are essential for firms to monitor their financial performance (Bédard and Gendron, 2010). Helfaya and Moussa (2017) claimed that experts working in the finance and accounting divisions are likely to uphold a linkage between the financial and non-financial aspects to maintain stakeholders' interests. Accounting and finance experts are responsible for preparing statements and reporting financial and nonfinancial information to users. However, they may be reluctant if nonfinancial disclosures are deemed less reliable and costly (Dobija et al., 2023).Therefore, it can be said that disclosures influence Sustainable Development (SD), and experts make these disclosures. For this reason, we selected financial directors, CFOs, and accountants of listed textile companies in Bangladesh as the study population.

2.3 Financial disclosure (FD)

Financial disclosure refers to making financial information available to investors and stakeholders through financial statements (i.e., annual reports). This is an important tool for decision-makers to promote transparency and reduce agency problems that lead to improved long-term profitability (Lin &

Quamruzzaman, 2023). However, financial ability cannot ensure sustainable growth for a company because social and environmental aspects are also responsible for enhancing corporate value (Hamzah et al., 2022; Zulaecha & Murtanto, 2019). According to Plato Nova et al. (2018), financial performance and sustainable development are related, and financial reporting is essential for sustainability reporting in the triple bottom-line concept (Milne & Gray, 2013). Moreover, the implementation of Environmental Accounting (EA) has a positive impact on SD and financial performance (Dura & Suharsono, 2022). Furthermore, the application of environmental accounting can provide a better direction and fulfill its responsibility to stakeholders.

Financial statements provide information on finance, performance, and a company's cash flow for investors, creditors, and other stakeholders, enabling them to make informed economic decisions (Sadalia et al., 2017). However, most listed textile companies are not financially sound in terms of profit-earning capacity, and they are not efficient for sustaining over the long term (Mondal, 2021). Moreover, financial performance introduces unbridled needs, greed, and rapid technological developments. Similarly, Martínez-Ferrero et al. (2015) claimed that poor reporting quality of financial information might lead to standardized sustainable disclosure to overcome legitimacy issues; therefore, financial reporting quality could have a negative relationship with sustainability reporting. Based on the available literatures, it is not found that financial disclosure is linked with SD. Therefore, the following hypothesis was formulated:

H_1: Financial disclosure positively affects sustainable development.

H_2: Financial disclosure positively affects environmental accounting disclosure practices.

2.4 Non-financial disclosure (NFD)

Non-financial disclosure (NFD) refers to non-economic or non-financial information contained in annual reports or standalone reports that provide value to users. Non-financial disclosure has heightened interest in and practice of sustainability reporting, gaining popularity because of various stakeholders' needs and awareness (Saini et al., 2022; Caputo et al., 2021; Santamaria et al., 2021; Manes-Rossi et al., 2018). However, academics and researchers are still predominantly connected to financial disclosures (Saini et al., 2022). They also found that NFD influences environmental, social, and governmental practices and performance, adding value to both financial and non-financial reporting for decision-makers and impacting sustainability reporting. NFD is presented through sustainability reports to enhance a company's reputation and image, rather than focusing solely on social and environmental performance and its impacts (Cho et al., 2015; Patten & Zao, 2014). Non-financial disclosure achieves a higher level of economic, social, and environmental sustainability and promotes sustainability principles (Saini et al., 2022; Monteiro et al., 2022). This disclosure attracts companies' interest in disclosing non-financial indicators rather than financial ones, providing better measures of performance (Elmagrhi et al., 2019).

NFD plays a vital role in expanding the scope of companies to encompass environmental, social, ethical, governance, and risk factors to address the limitations of financial disclosure and meet stakeholders' interests. Therefore, the implementation of NFD and sustainability reporting can enhance Sustainable Development Goals (SDGs) (Lozano, 2015). Transparent non-financial reporting may be considered a representation of sustainable behavior (Helfaya & Whittington, 2019), but it is still a traditionally voluntary practice (Manes-Rossi et al., 2018). For this reason, mandatory regulations for NFD have been introduced in many countries to encourage contributions to disclosure and ensure SD (Pizzi et al., 2022). This is because the disclosure policy is considered a fragment of total sustainable corporate strategy (Dobija et al., 2023; Muttakin et al., 2018). Mio and Venturelli (2013) claimed that information should not be restricted to financial aspects; rather, it should consider social and environmental aspects that might be suitable for stakeholders to better understand a company's position. Therefore, the relationship between non-financial disclosure and sustainable development can be tested using the following hypotheses:

H_3: Non-financial disclosure enhances sustainable development.

H_4: Non-financial disclosure enhances environmental accounting disclosure practices.

2.5 *Significance of environmental accounting disclosure practices for sustainable development*

Sustainable development is an economic growth and scientific model that deals with development associated with the environment (Elmaghri et al., 2019), and achieving balanced corporate sustainability is a challenging issue. Therefore, environmental accounting should be considered as a separate entity for environmental protection measures and sustainability (Chen et al., 2020). Sustainability reporting focuses on financial and non-financial performance as vital elements of organizational transparency (Akter et. al., (2017). Moreover, green accounting may provide more accurate information regarding the environmental and social aspects that affect the SD of heavily polluting companies (Arrive & Feng, 2018). In this regard, Dhar et al. (2022) find that the quality of CSR disclosure significantly influences the enhancement of the execution of environmental accounting and a company's SD. Additionally, the effective use of environmental accounting has a positive influence on SD in businesses and nations (Dura & Suharsono, 2022; Dhar et al., 2022). Beredugo and Mefor (2012) identify a significant relationship between EA and SD reporting. Environmental disclosure practices focus on ecological benefits, reduce natural resource consumption and damage, increase awareness, and ultimately promote SD (Xiao, 2019). Xiao also argued that the application, development, and practice of EA would assist in achieving economic, environmental, and social harmony. Environmental accounting disclosure and performance have also been found to be positive and statistically significant (Zhang & Xie, 2021; Tadros & Magnan, 2019).

However, Ortiz-Martinez et al. (2023) examined NFD and CSR and revealed that sustainability positively influences both NFD and CSR. Rahman and Islam (2023) studied Bangladeshi chemical and pharmaceutical companies and they confirmed the partial mediation of energy efficiency between environmental accounting and its performance. After examining 302 Chinese listed companies' environmental information disclosure, Jiang et al. (2021) revealed that environmental information disclosure has a remarkable positive influence on high-quality development and intellectual capital has a mediation effect on that relationship. Ali et al., (2022) examined environmental management practice on financial and environmental performance with the mediating effect of Environmental, Social, and Governance (ESG) disclosures for 141 listed companies in Malaysia and found a significant mediation in the relationship. Darmayoga et al. (2020) found that Indonesian mining companies' environmental accounting disclosures are strong enough to mediate the consequences of environmental performance on company value.

Zhou et al., (2023) analyzed Bangladeshi manufacturing companies and found that companies' innovation performance fully mediates the relationship between sustainability performance and environmental social, and governance initiatives. Financial information disclosure is made concisely to comply with standards, rules, and regulations. By contrast, in most cases, non-financial disclosures are related to environmental, social, and corporate governance aspects that grossly denote sustainable reporting to safeguard and enhance human rights. Recently, non-financial disclosure has embraced EADPs or green accounting as a priority to ensure sustainable development.

Therefore, this study analyzes the mediating effect of EADPs through financial disclosure determinants, nonfinancial disclosure determinants, and SD aspects. However, it is assumed that the selected variables are interconnected and may have a mediating effect in supporting stakeholder theory (Ortiz-Martinez et al., 2023; Fatma et al., 2014). Based on this assumption, this study formulated the following hypotheses to examine the mediating power of environmental accounting disclosure practices between financial disclosure and sustainable development and non-financial disclosure and sustainable development. The hypotheses are-

H_5: Environmental accounting disclosure practices mediate the relationship between financial disclosures and sustainable development.

H_6: Environmental accounting disclosure practices mediate the relationship between non-financial disclosure and sustainable development.

For the aforementioned hypotheses, the following conceptual framework was developed:

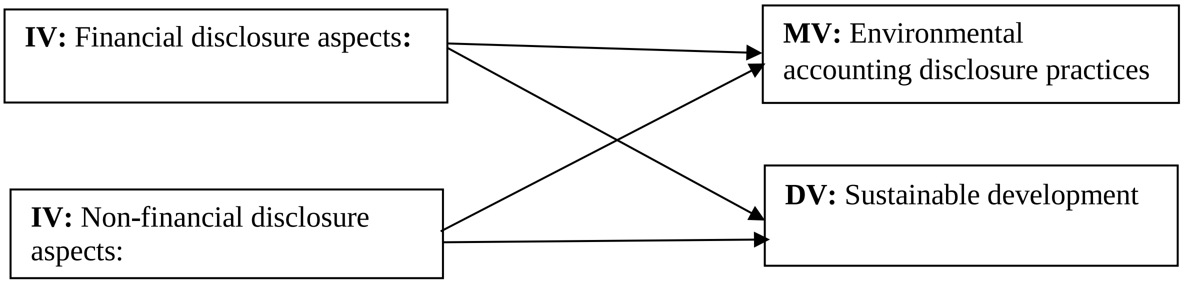

Figure 1: Proposed conceptual framework developed by the authors

3. Research methodology

3.1 Reasons for selecting listed textile sector

This sector contributes more than 82% to the exports of Bangladesh (Mondal, 2021; Mondal et al., 2023), provides significant employment opportunities, contributes to GDP, and earns foreign currency for the economic development of Bangladesh (Mondal, 2021; Mondal et al., 2023). Textile companies must comply with the requirements of multinational buying companies, but it is not obligatory to disclose publicly through annual reports. Conversely, according to the Companies Act of 1994 and the guidelines of the Bangladesh Securities and Exchange Commission, all companies in this sector are bound to publish their annual reports.

Moreover, environmental and social issues are receiving immense global attention, and Sustainable Development (SD) has become a widespread catchphrase in the field of development disclosure (Mensah & Casadevall, 2019). Since textiles are a highly polluting sector in Bangladesh, they face various pressures from multinational buying companies (MBCs), the government, and other stakeholders to disclose both financial and non-financial environmental information. Therefore, our study aims to explore the impact of respondents' perceptions of financial and non-financial disclosures on EADPs to ensure the SD of listed textile companies in Bangladesh.

3.2 Sample selection

It is assumed that, due to unwillingness, absence from the office, and being abroad for business purposes, not all expected respondents may provide their valuable opinions. Based on face-to-face conversations with company officials during the distribution questionnaires for pretesting the modified process and pilot survey, it was confirmed in most cases that their finance directors and chief financial officers were different individuals, and the number of accountants ranged from five to nine for each company. Thus, it is reasonable to assume that the average number of respondents may be between five and seven for each listed textile company. Based on this assumption, the sample of respondents for the study is presented in the following table for the 59 companies, including a sister company listed with the mother company.

Table 1. Respondents sample study

Particulars		Sample size	Percentage
Total expected sample	[6x59]	354	--
Total number of questionnaires have been distributed		438	100%
Less: Number of questionnaires were left over		75	17.12%
Total Respondents filled up and return to the researchers		363	82.88%
Less: Incomplete questionnaires		12	2.73%
Less: Similar responses having small standard deviation		13	2.96%
Finally accepted sample size		338	77.17%

Source: authors' compilation

The sample presented in Table 1 was deemed reliable, appropriate, and satisfactory. For instance, Boomsma and Hoogland (2001) argued that a sample size of 200-400 is suitable for inferential statistics, while for structural equation modeling, a sample size of 200 is considered reasonable and 300 is deemed good for statistical analysis, according to Kline (2023). The researchers chose financial directors, chief financial officers, and other accountants as respondents for the survey, who were directly and physically involved in collecting data from the sample respondents.

Table 2. Demographics of the respondents

Items or character	Classes	Frequencies	Percentage (%)
	Male	266	78.7
Gender	Female	72	21.3
	Total	338	100
	20- 30 years	29	8.6
	31-40 years	143	42.3
Age	41-50 years	104	30.8
	51- 60 and above	62	18.3
	Total	338	100
Education level	Graduate	29	8.6
	Post graduate	176	52.1
	PhD/ DBA	4	1.2
	CA/ CMA	117	34.6
	Others	12	3.6
	Total	338	100
Department/ designation	Directors	24	7.1
	CFOs	32	9.5
	Financial and accounts	249	73.7
	Independent directors	1	0.3
	Internal audit	32	9.5
	Total	338	100
Holding ISO certificate		Yes 78.7%	No 21.3%
Use of the technology or process sensitive to environment			Yes 100%
Social and cultural environment prevailing in the firm			Yes 100%
Regulatory environment for sustainability prevailing in the firm			Yes 100%
Reporting cultural of environmental factors for sustainability			Yes 100%
Policy for green productivity			Yes 100%
Do you have environmental accounting and disclosure practices?			Yes 100%

Source: authors' compilation as per surveyed data

Table 2 shows that the majority of respondents were male (78.7%) and within the age range of 31-50 years. Participants employed in the accounts and financial activities of the listed textile companies predominantly held postgraduate and CA/CMA degrees, working in various roles as accountants. However, a notable percentage of listed textile companies (21.3%, as shown in Table 2) operate without an ISO certificate. All respondents unanimously agreed (100%, as indicated in Table 2) that companies have an existing social and cultural environment, a regulatory framework for sustainability, a culture of sustainability reporting for the environment, and green production policies. However, they also concurred that they still utilize environmentally sensitive technologies and processes.

3.3 Scale development and Pretesting

Before conducting the pilot survey, the researchers reviewed the literature, identified, and formulated the questions. Subsequently, we established a data collection procedure and prepared a draft questionnaire. Subsequently, the study underwent a preliminary review by four (4) renowned professors to assess the formation, quantity, grouping, wording, and grammar of the questions, due to the lack of direct literature support. However, after modification, the study received valuable feedback from 18 independent experts in relevant fields, including academicians (6), chartered accountants (2), and CFO and accountants (10), in addition to the aforementioned four professors. These experts critically reviewed and examined the questionnaire, offering corrections in terms of wording, grammar, addition of new questions, and removal of existing ones. Following extensive correction, the questionnaire underwent a pre-test through a pilot survey involving 110 respondents, including five finance directors, 12 CFOs, and 95 accountants from listed textile companies in Bangladesh. At this stage, we received and considered suggestions from the respondents, leading to significant modifications. This research methodology played a crucial role in confirming the reliability and external validity of the research.

3.4 Development process of survey instrument

Typically, accounting functions and information disclosure in annual reports are categorized into financial and non-financial elements that can drive SD. The relationship between these elements was primarily explored in a secondary quantitative study. In this study, the hypotheses were tested using a questionnaire with self-administered items included to develop the construct. We used a five-point Likert scale to gauge respondents' opinions, ranging from strongly disagree (1) to strongly agree (5). The questionnaire comprised 20 demographic questions (6 for respondents and 14 for companies). Additionally, a screening question was added (*Do you have environmental accounting and disclosure practices?)* to confirm the company's engagement with the EADPs. All respondents unanimously affirmed their practice of EADPs (100%; see Table 2). The questionnaire in the final survey included 31 questions under four constructs (latent variables). The first construct represents sustainable development-related disclosure, the second refers to environmental accounting disclosure practices, the third focuses on determinants of financial disclosure, and the fourth relates to determinants of non-financial disclosure (Mondal et al., 2023). All questions on the constructs were self-administered.

Table 3. Explanation of variables

Variables	Reference/s	Acronym	Description
Dependent variable: Disclosure practices of SD or Sustainability reporting practices	Bananuka et al., 2023 Aguado-Correa et al., 2023	SD	Sustainable development is a type of development that ensures economic, social and environmental stability for the present and future, and its reporting is called sustainability reporting. In this context, the aspect of SD indicates the environmental disclosure intentions and activities of the textile companies that work towards enhancing SD.
Mediating Variable: Environmental Accounting Disclosure Practices	Monteiro et al., 2023 Olowookere et al., 2021 Darmayoga et al., 2020	EADP	EADPs refer to the manner in which companies' disclose environmental information, providing a transparent view of how they manage and address their environmental responsibilities. EADPs represent investigation into the perception of why and how textile companies practice and disclose environmental accounting disclosure.
Independent variable: Determinants of financial disclosures or financial reporting and disclosures	Mondal et al., 2023 Agyemang et al., 2023 Qaderi & Abdullah, 2023	FD	Financial disclosure involves revealing measurable and relevant financial details to users, ensuring accountability, transparency, and compliance with regulations. Here, we consider respondents' perceptions regarding the influence i.e., how much financial disclosure influences EADPs to enhance SD.
Independent variable: Determinants of Non-Financial disclosures or non-financial	Aguado-Correa et al., 2023 Mondal et al., 2023 Agyemang et al., 2023	NFD	Non-financial disclosure typically refers to the process of providing non-monetary information and activities of the firm that cover social, environmental, and governance aspects beyond traditional financial metrics. However, this paper regards non-financial disclosure as respondents'

information disclosures	Qaderi & Abdullah, 2023	perceptions' regarding how much non-financial disclosure influences EADPs to enhance SD.

Explanation of each measurement or indicators	
Items/ Indicators	**Definition**
Sustainable Development Disclosure Aspects (SD)	
SD 01	Ensuring overall sustainability of the firm and the nation through EADPs.
SD 02	Promoting environmental education and awareness of the citizen and stakeholders.
SD 03	Leading more technological, social, human and economical goodwill for sustainability.
SD 04	Impacts of true disclosures of environmental information are very high for SD.
SD 05	Disclosing pollution reduction, energy reuse and recycle information for SD.
SD 06	Ensuring ISO and GRI guidelines can increase SD.
SD 07	Working for overall sustainability.
Aspect of Environmental Accounting Disclosure Practices (EADPs)	
EADP 01	Disclosing inadequate environmental accounting information in our annual report.
EADP 02	Increasing the disclosure practices in firm's annual report.
EADP 03	Not reporting the EADPs through separate report or section.
EADP 04	EADPs are more costly than the benefits in firm.
EADP 05	Foreign buyers' compliance is getting more priority for EADPs.
EADP 07	Motivation is absent of stakeholders for reporting the EADPs.
Aspects of Financial Disclosure determinants (FD)	
FD 01	EADPs are related to profitability of firm.
FD 02	EADPs are related to liquidity of firm.
FD 03	EADPs are related to leverage of firm.
FD 04	EADPs are related to size of firm.
FD 05	EADPs are related to accruals of firm.
FD 06	EADPs are related to political costs of firm.
Aspects of Non-financial Disclosure Determinants (NFD)	
NFD 02	EADPs are related to age of firm.
NFD 04	EADPs are related to board size of firm.
NFD 05	EADPs are related to productivity and efficiency of firm.
NFD 06	EADPs are related to guidelines of regulatory bodies of firm.
NFD 07	Not following the GRI guidelines for social and environmental issues.
NFD 08	Internal factors negatively affect more than external factors.

Note: All the items are generated under self-administrated approach, presented concisely and items are deleted which are excluded from final analysis

4. Result and discussion

A conceptual model was developed to explore respondents' perceptions of how financial and non-financial aspects influence sustainable development through the mediating effect of EADPs. PLS-SEM is preferable for prediction (Hair & Sarstedt, 2021), high statistical power, complex models, sample size, flexibility (Hair et al., 2019), and prediction of managerial recommendations and implications (Ringle et al., 2023). To assess significance under multiple mediation models, bootstrapping results are employed for specific indirect effects, total indirect effects, and direct effects (Hair et al., 2021, p145). Therefore, Smart PLS 4 software was used to analyze the collected data through the measurement model (for model fit) and the structural equation model (for the relationship of variables or hypotheses). The researchers applied a reflective measurement model and 5000 self-directed subsample bootstrapping for path coefficients to ensure the significance level (t-value, R^2, and significance level) for estimation (Hair et al., 2019; Joseph et al., 2017).

4.1 Measurement model

The PLS-SEM measurement model was applied to identify the relationship between the items and latent variables by assessing item loading, internal consistency reliability, and convergent and discriminant validity (Fauzi, 2022; Chen et al., 2020; Abdul-Rashid et al., 2017). Table 4 presents the reliability, validity, and descriptive statistics of the measurement model. Table 4 presents the factor loadings, VIF, and descriptive statistics for each item. The mean values of financial disclosure, EADPs, and sustainable development were above the theoretical value of 3.50 (Chen et al., 2020), indicating a positive perception or attitude of the respondents. Moreover, non-financial disclosure moderately contributes slightly below the theoretical value for the three items. Although updated PLS-SEM can resolve non-normality problems (Fauzi, 2022; Hair et al., 2020), normally distributed data are expected. In Table 4, excess Kurtosis and Skewness indicate that there are no non-normality problems. However, for acceptability, six items were deleted (*) from the initial model to obtain a final model. Table 4 also presents the outer loading values, where all considered items meet the criterion of exceeding the minimum recommended value of 0.708 (Chen et al., 2020; Hair et al., 2020). Table 4 further reports the VIF values to address multicollinearity issues, with all the values being less than 3 (Shrestha, 2020), indicating no multicollinearity issues in the data. This implies that each construct is distinct and unique from the other constructs (Hair et al., 2020; Chen et al., 2020).

Table 4. Items, outer loading, VIF and descriptive statistics

Constructs	Items	Outer loadings	VIF	Mean	Median	SD	Excess Kurtosis	Skewness
Environmental Accounting Disclosure Practices	EADP1	0.783***	1.922	3.657	4	1.029	0.383	-0.843
	EADP2	0.785***	1.902	3.657	4	1.035	-0.179	-0.609
	EADP3	0.834***	2.272	3.737	4	1.029	0.353	-0.848
	EADP4	0.825***	2.260	3.547	4	1.003	-0.052	-0.502
	EADP5	0.754***	1.800	3.521	4	1.001	-0.309	-0.422
	EADP6*							
	EADP7	0.709***	1.701	3.589	4	0.853	0.634	-0.451
	EADP8*							
Financial Disclosures	FD1	0.800***	1.994	3.879	4	1.018	0.755	-1.007
	FD2	0.775***	1.869	3.947	4	0.953	1.323	-1.088
	FD3	0.803***	1.958	3.621	4	1.040	0.204	-0.667
	FD4	0.771***	1.854	3.76	4	1.148	0.044	-0.805
	FD5	0.760***	1.746	3.766	4	1.041	-0.204	-0.704
	FD6	0.816***	2.107	3.825	4	0.983	0.474	-0.770
	FD7*							
Non-Financial Disclosures	NFD1*							
	NFD2	0.736***	1.584	3.456	4	1.240	-0.699	-0.552
	NFD3*							
	NFD4	0.795***	2.227	3.340	3	1.107	-0.469	-0.348
	NFD5	0.726***	1.929	3.411	4	1.088	-0.225	-0.595
	NFD6	0.784***	2.093	3.580	4	1.064	0.157	-0.744
	NFD7	0.777***	2.202	3.547	4	1.000	-0.257	-0.461
	NFD8	0.737***	1.986	3.509	4	1.072	-0.309	-0.443
	NFD9*							
Sustainable Development	SD1	0.791***	2.216	3.814	4	1.028	0.208	-0.801
	SD2	0.809***	2.234	3.630	4	1.061	-0.108	-0.650
	SD3	0.799***	2.116	3.639	4	1.026	0.075	-0.667
	SD4	0.739***	1.692	3.571	4	1.118	-0.541	-0.395
	SD5	0.719***	1.648	3.568	4	1.105	-0.026	-0.655
	SD6	0.726***	1.624	3.598	4	0.987	-0.260	-0.478

	SD7	0.787***	1.929	3.553	4	1.106	-0.530	-0.471

Note: * Indicates items deleted from the final model.
Source: authors' compilation as per PLS output

Table 5. Reliability (Alpha), Internal consistency (CR) and Average variance extracted (AVE)

	Cronbach's alpha	CR (rho_a)	CR (rho_c)	AVE
EADP	0.873	0.879	0.905	0.613
FD	0.878	0.879	0.907	0.621
NFD	0.854	0.856	0.891	0.577
SD	0.884	0.885	0.909	0.59

Source: authors' compilation as per PLS output

Table 5 presents the reliability using two measurable methods: Cronbach's alpha, internal consistency (CR), and average variance extracted. The results indicate that both reliabilities (values of Alpha and CR) fall within the suggested range (Cronbach's Alpha higher than 0.7 and CR within the range of 0.70-0.95) and establishing the reliability of this study (Hair et al., 2020; Hair et al., 2019). Regarding convergent validity, the AVE assessment must meet the minimum cut-off criteria of 0.5 (Fauzi 2022; Hair et al., 2019). The AVE values for the selected constructs exceeded the recommended threshold, and thus, convergent validity.

Table 6. Analysis of the Fornell-Larcker criterion for considering discriminant validity (DV).

	EADP	FD	NFD	SD	DV Met
EADP	0.783				Yes
FD	0.635	0.788			Yes
NFD	0.762	0.505	0.760		Yes
SD	0.729	0.508	0.691	0.768	Yes

Source: authors' compilation as per PLS output

Discriminant validity (DV) comprises statistical properties, including the Fornell-Larcker criterion, cross-loading, and heterotrait-monotrait (HTMT) ratio (Fauzi, 2022; Hair et al., 2019; Joseph et al., 2017). However, HTMT is considered more acceptable and advanced (Fauzi, 2022). First, the Fornell-Larcker criterion (discriminant validity) in Table 6 presents the square root of the AVE value of each latent variable, which is higher within the respective column and row. The outer loading value within a particular latent variable was larger than the cross-loading values of other constructs in the model.

Table 7. HTMT ratio for discriminant validity.

EADP	EADP	FD	NFD	SD	DV Met
FD	0.719				Yes
NFD	0.869	0.582			Moderate
SD	0.820	0.574	0.778		Yes

Source: authors' compilation as per PLS output

Based on Findings 7, it can be asserted that the correlations of the heterotrait–monotrait ratios are sufficiently low, all below the recommended threshold of 0.85. Therefore, the discriminant validity of this model is deemed acceptable and adequate (Chen et al., 2020; Abdul-Rashid et al., 2017; Fornell and Larcker, 1981).

4.2 Structural model analysis

Partial Least Squares (PLS) structural equation modeling is a multivariate analysis technique that has been established in social science research (Hair et al., 2022). This model typically generates path coefficients for estimation and predictive power, presenting the causal relationships of the latent variables, as reported in Tables 8, 9, and 2.

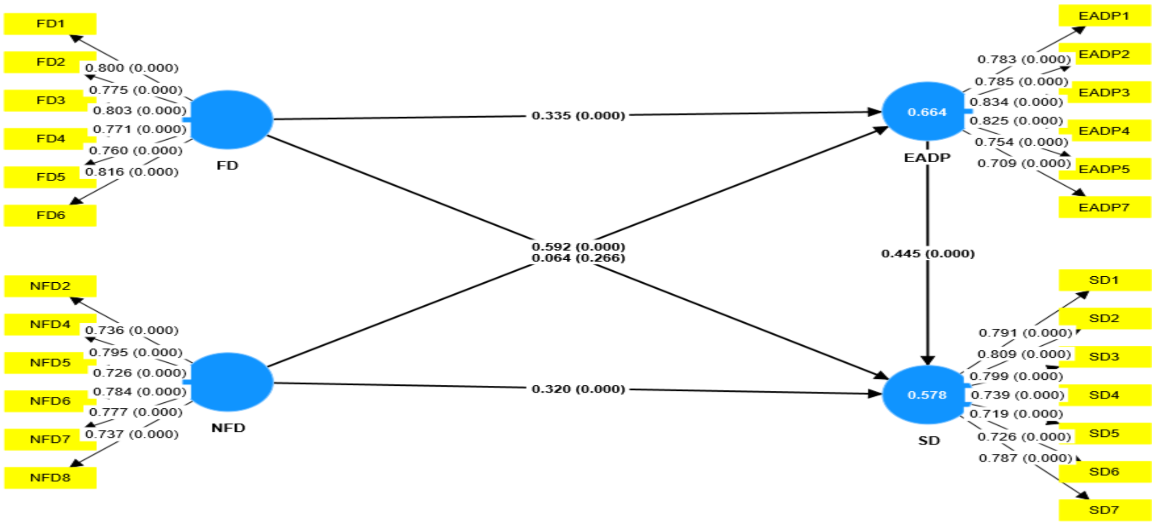

Figure 2: Structural Equation Model based on PLS output: independent variables (FD and NFD), dependent variable (SD), and mediating variable (EADP).

Initially, the study confirmed the acceptable criteria of validity and reliability in the measurement model, the absence of multicollinearity effects, and then considered the structural equation model to test the anticipated hypotheses (see Fig. 2). In the figure above, we observe how latent variables are related to each other, and how a construct is developed and validated with relevant items. Researchers are interested in establishing influential relationships between the perceptions of financial and non-financial disclosure determinants on EADPs. Additionally, this study aims to explore how the perception of financial and non-financial disclosure determinants, as well as EADPs, influences sustainability disclosure aspects.

From Figure 2, it can be asserted that FD and NFD (two independent variables) had a positive effect on EADPs. Once again, EADPs mediated the relationship between FD and SD, and NFD and SD positively.

4.3 Hypotheses testing using path analysis

Table 8: Path analysis

Hypothesis	Path relationship	Coefficient	SE	*t*-Value	2.5% CI	97.5% CI	Decision
H1	FD -> SD	0.064	0.058	1.113	-0.047	0.180	Reject
H2	FD -> EAPD	0.338***	0.046	7.225	0.249	0.431	Accept
H3	NFD -> SD	0.320***	0.050	6.460	0.219	0.419	Accept
H4	NFD -> EAPD	0.590***	0.045	13.062	0.497	0.674	Accept
H5	FD -> EADP -> SD	0.149***	0.031	4.753	0.095	0.218	Full mediation
H6	NFD -> EADP -> SD	0.263***	0.047	5.623	0.177	0.359	Complementary partial mediation

	R-square	R-square adjusted	P values
EADP	0.664	0.662	0.000
SD	0.578	0.575	0.000

Coefficient ***= *p* <0.000; *CI*=confidence intervals

Source: authors' compilation as per PLS output

SEM was used to test the hypotheses (Fig.2 and Table 8). The results represent the direct and indirect effects of the independent variables on the dependent variable (SD) through the mediating variable (EADP). Path coefficients indicate the directional relationship among the variables, with a positive coefficient value referring to an association in the same direction and a negative coefficient value indicating a relationship in the opposite direction (negative relationship). However, the results (see Table 8) display the path relationships and beta values (coefficients) with significance levels, standard errors, *t*-statistics, and confidence intervals. The *t-statistic* values were used to assess the significance level, with a *t*-statistic value higher than 1.96, representing statistical significance at a 95% confidence level. The confidence intervals of 2.5% and 97.5% indicate the expected range for the true population at the 95% confidence level. In first Hypothesis (H_1), we assume that financial disclosure has a positive effect on SD. However, this assumption was rejected in Table 8 (β= 0.064, t = 1.113, p < 0.266). Thus, we conclude that financial-related disclosures do not directly impact SD.

For the second hypothesis (H_2), we assume that financial disclosure has a positive effect on environmental accounting disclosure practices; this assumption is supported by the findings in Table 8 (β= 0.338, t = 7.225, p < 0.000). This result indicates that financial disclosures significantly influence environmental accounting disclosure practices. Similarly, we predicted (H_3) that non-financial disclosure enhances sustainable development, and this prediction is confirmed by the results in Table 8 (β= 0.320, t = 6.460, p < 0.000). This implies that non-financial disclosures in annual reports significantly contribute to a company's sustainable development. Moreover, this study found that non-financial disclosure determinants have positive and significant influences on environmental accounting disclosure practices (β= 0.590, t = 13.062, p < 0.000), thereby supporting Hypothesis 4. This suggests that when listed textile companies disclose non-financial information in their annual reports, it automatically enhances environmental accounting disclosure practices, and mediation analysis acts as a third variable to reveal the extended relationship between the independent and dependent variables (Rahman & Islam, 2023). This study analyzes whether environmental accounting disclosure practices mediate the relationship between disclosure and SD. The result of Hypothesis (H_5) (β= 0.149, t = 4.753, p < 0.000), reported in Table 8, claims the significant mediation of financial disclosure on sustainable development through environmental accounting disclosure practices. The total effect is significant, while the direct effect is insignificant, indicating the full mediating effect of environmental accounting disclosure practices (EADP) on the relationship between FD and SD. Therefore, H_5 is accepted.

Moving forward to the last hypothesis (H_6), it was assumed that environmental accounting disclosure practices mediate the association of non-financial disclosures and SD. The results reveal (β= 0.263, t = 5.623, p < 0.000; see Table 8) the significant indirect effect of non-financial disclosures (NFDs) and SD through EADP. Here, the total effect of NFD on SD was significant, along with significant direct effects. These findings support Hypothesis 6 as complementary partial mediation.

Table 9: F square and Q^2 value

	EADP	Effect/Predict	SD	Effect/ predict
EADP			0.158	Medium
FD	0.249	Medium	0.006	Weak
NFD	0.777	Strong	0.102	Medium
Q square (Q^2)	0.658	Strong	0.504	Strong

f^2 and Q^2 **:** Small effect > 0.01, medium effect > 0.14, and large effect > 0.34 (Gignac & Szodorai, 2016) and Weak > 0.02, moderate > 0.15, and strong > 0.35 (Hair et al., 2021)
Source: authors' compilation as per PLS output

The effect size of the construct (f^2 value), as shown in Table 9, indicates that all constructs are essential in the model to increase R^2 and Q^2 values. The same table presents the predictive powers of the dependent and mediating variables. The results show that both variables have strong predictive power.

These findings strongly support the claim that endogenous latent variables have future prediction ability.

4.4 Discussion

A few decades ago, sustainability primarily indicated financial health and soundness. Sustainability is of equal importance to the environmental, social, and economic aspects. Bangladeshi textile companies are dependent on multinational buying companies and currently need to fulfill their social, human rights, environmental, green technology, and other compliances. Thus, as a burning and complementary issue in sustainable development, EADPs may guide the textile sector on how much information should be disclosed to satisfy social communities, various pressure groups, and stakeholders. This study examines the mediating power of EADPs for financial and nonfinancial disclosure determinants with SD in listed textile companies in Bangladesh. The results indicate that EADPs have a significant positive effect on SD. This relationship is stronger when financial disclosure determinants indirectly influence SD.

In contrast, the relationship is strongest when non-financial disclosure determinants directly and indirectly influence SD. Therefore, the study findings suggest that when financial and non-financial disclosures are increased in the annual report, the company's EADPs ultimately increase. As EADPs are essential components of sustainable reporting, financial and non-financial disclosures can also lead to SD through EADPs. The results indicate that proper and sufficient practice of environmental disclosure can confirm the desired EADPs of various stakeholders and ensure SD by promoting sustainability reporting in the context of Bangladesh. Moreover, based on the findings (coefficient value and f-square value), non-financial disclosure is stronger than financial disclosure in enhancing EADPs and influencing SD. In this case, listed textile companies should consider incorporating more non-financial disclosures in their annual reports. Although most green and LEED textile factories are in Bangladesh, their environmental disclosures are not in accordance. Hence, there is a wide scope to uplift present environmental disclosures to align with qualitative and quantitative measures. For instance, they may incorporate environmental information, quantitative measures, and monetary values with all disclosure items in the annual reports or where possible.

Having an ISO certificate indicates that the company has maintained a certain product quality in line with green production processes and technologies. From the demographic findings, the study revealed that 21% of companies do not have an ISO certificate. Moreover, all respondents agreed that textile companies have environmental policies, preventive measures, regulations, and green productivity, and they are practicing environmental accounting disclosures. At the same time, they recognized that all the machinery and technologies they use are not environmentally accepted or green. Thus, before obtaining new standards or regulations, selected companies should work on ISO certificates, use green and modern technologies, and disclose environmental issues in a timely and adequate manner.

Akter et. al. (2018) recommended that the government, along with public and private organizations, should establish the necessity and outline to guide sustainability reporting to increase CSR in Bangladesh. The research findings suggest that companies should disclose more non-financial information, specifically addressing environmental accounting issues, to secure SD and support the above findings in an extended form. The management of textile companies may provide an impetus to disclose more non-financial information than they are currently disclosing, representing EADPs. These findings offer compelling evidence to management that more non-financial disclosures mean more EADPs, and this reporting enhances the sustainability and good corporate governance of textile companies.

Above the mentioned managerial implications, the study has a few important theoretical implications. We argue that textile companies alone cannot manage the driving force towards sustainability without environmental accounting standards. For this reason, we recommend these findings to the Bangladeshi government, regulators, and policymakers in the textile and environmental sectors to assess their influence and predictive power.. This assessment can lead to the establishment and imposition of more guidelines, including new indicators for Non-Financial Disclosures (NFD) and Environmental

Accounting Disclosure Practices (EADPs) to promote sustainable development. This recommendation forms a strong argument for mandatory environmental accounting standards to ensure the green production strategy of the Bangladeshi government.

This pioneering accounting research articulates the theoretical validation of accountants' perceptions to analyze the mediating effects of environmental accounting and disclosure practices between disclosures and SD through PLS-SEM. Moreover, the influence of EADPs on SD is a new concept, in addition to the relationship of EADPs with financial and non-financial disclosures, which is secondarily based on annual reports. Our research investigated the same relationship and influence to measure the respondents' perceptions and attitudes. Future researchers can use this as a basis for comparison analysis, acceptance, or rejection of the findings, and ultimately establish a strong theoretical contribution.

5. Conclusion

The economic benefits, development, and unwillingness of companies are responsible for social and environmental development. Thus, sustainability in manufacturing companies, owing to high pollution, has received immense pressure and attention from stakeholders in recent years. As a result, research on environmental accounting disclosure practices and sustainable development has gained increasing attention as a growing area among intellectuals and practitioners. Environmental accounting disclosures are mostly covered by environmental accounting and national practices. There are no established rules for environmental accounting disclosures for sustainable development in underdeveloped countries (Mondal et. al., 2023).

This study aims to reveal the influence of financial and non-financial disclosures on Sustainable Development (SD) through the mediating effect of EADPs. To achieve this objective, we propose a new framework model and examine it by using PLS-SEM. This study indicates that financial disclosure has no significant effect on SD. It is worth noting that non-financial disclosures significantly influences sustainable development. This study confirms the relationship between financial and nonfinancial disclosures and SD mediated by EADPs. Therefore, it can be concluded that more disclosure items influence environmental disclosure practices, leading to a statistically significant SD. Recently, multinational buying companies (MBCs) have been paying attention not only to the quality of products but also to environmental and social sustainability, human rights, safety and security, child labor, and so on. Thus, unlike other sectors, the SD of the textile sector depends on both national guidelines and the pressure from MBCs. From previous studies, we realize that the economic development of Bangladeshi textile companies directly and indirectly depends on societal and environmental development. Therefore, the study findings can confidently contribute value to the literature and may influence MBCs, policymakers, regulators, and, more importantly, Bangladeshi listed textile companies.

To expand on the analysis of these findings, future researchers can incorporate respondents' understanding of or attitudes toward environmental accounting and examine how this understanding influences EADPs. Environmental accounting disclosure practices are regulated by mandatory or voluntary regulatory frameworks, which are absent in our study. Thus, it might be applicable and interesting to add the regulatory framework as a control variable in the proposed model in later years. The current study is limited to listed textile companies in Bangladesh, and additional research should be directed towards all listed manufacturing companies in Bangladesh. Similar to the personnel in the finance and accounting departments of listed textile companies, perceptions can also be examined by academicians, accounting professionals, and regulators to see the mediating effect of EADPs between financial and non-financial disclosures and SD, along with moderating effects.

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Appendix 1: Initial model