

Corporate Environmental Accountability (CEA) Assessment of the Corporate Organizations of Bangladesh

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<p>IJMER</p> <p>Volume. 8, Issue. 1</p> <p>March, 2025</p> <p>© IJMER. All rights reserved.</p>	<p>Abstract</p> <p>Due to unplanned industrialization and unsustainable commercial activities, Bangladesh is facing serious environmental problems. The research examines if there is any effect of different attributes and sub-attributes in various corporate organizations in Bangladesh. This study employs survey data from practitioners and specialists from the Department of Environment, the judiciary department, NGOs, environmental scientists, cost and management accountants, lawyers, industrialists, members of the chamber house (association of industrialists), social and political leaders, and academicians. Through the participatory process, 24 sub-attribute cost centers under six attributes cost centers were identified for CEA assessment. The weight of each sub-attribute and attribute was determined through a pair-wise comparison matrix. In this study, the weights of 24 sub-attributes have resulted in the CEA assessment scale and indicate their effectiveness in measuring the environmental accountability of different corporate organizations. This study uses a multi-criteria decision-making technique to assess Bangladesh's corporate environmental accountability (CEA). Analytical Hierarchy Process (AHP) was used. The results reveal that given the overall weights of all sub-attributes, it is pretty apparent that from the results, the Image/Relationship attributes are the most noteworthy, followed by Regulatory and Contingent. The authors suggest that there should be a unified framework for assessing corporate environmental accountability, and this work is an ongoing attempt to develop such a unified framework for corporate environmental accountability (CEA) assessment. The findings of this study suggest that the important considerations for each attribute cost center in different corporate organizations are identified.</p> <p>Keywords: Corporate Organization, Natural Environment, Environmental Management, Environmental Protection, Social Responsibility and Environmental Awareness.</p>
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1. Introduction

The environment has turned out to be a central apprehension in today's ecological, social and economic setup. Environmental issues and sustainable development are more important in our current world, and a large number of people are much more concerned with these. Islam et al. (2020) refer that most people now acknowledge that sustaining clean air, water and land is more significant than lowering the cost of production for consumers. Environmental awareness, to a certain extent, could be considered a budding value in our society. As a result, the preservation and enhancement of the environmental quality have become a gigantic issue for the corporate world (Lee, 2011). Business houses and corporate enterprises are held responsible for ensuring a sustainable environment as their activities exerts tension over the environmental composition. It is suggested that one of the primary reasons for its existence is to serve a social and environmental function and given the size of the public sector and its involvement in national economies, the public sector plays a crucial part in promoting environmental sustainability worldwide. (Adams, Muir, & Hoque, 2014; Ball et al., 2014). The paradigm of sustainable business development requires holistic, integrated modes of perception. One such mode is the environmental accountability of the corporate organization (Burnett & Hansen, 2008). In recent years, various tools like life-cycle-analysis, material flow analysis, environmental reporting, corporate environmental disclosure, environmental auditing, and environmental accounting were developed to compare and assess the ecological impacts of products as well as environmental accountability of the companies (Ahmad & Mousa, 2010; Clarkson et al., 2008; Cormier & Magnan,

2007). Rahman and Rahman (2020) suggest that most of the people are in favor of green reporting and its implications for the company and that the government is firm about its directions and protocols towards green reporting.

Environmental degradation has direct and indirect health impacts. Sultana et al. discuss how air and water pollution increased respiratory diseases and waterborne illnesses, highlighting the urgent need for comprehensive health and environmental policies. Over the years, corporate environmental accountability has developed to include environmental contemplation. Environmental issues such as environmental pollution and environmental litigations have become more prominent economic, social and political problems throughout the world, particularly in relation to trade and commerce (Burnett & Hansen, 2008; Walsh et al., 2003). These have forced business organizations to engage them to confirm some environmental responsibility in the form of environmental accountability and reporting (Cho & Patten, 2007). Rahman and Rahman (2020) emphasize that deforestation for agriculture and urban development threatens biodiversity and exacerbates climate change. The loss of habitat has led to a decline in various species, impacting local ecosystems and communities. Environmental accountability of the business organization principally refers to the responsibility of a business organization for the deterioration of the natural environment, implying the allocation of environmental costs to the economic activities that cause such deterioration. Environmental protection costs some other environmental cost drivers as well, and more precisely, environmental accountability of this important segment of the society has already been the purpose of several research (Clarkson et al., 2008; Cormier & Magnan, 2007; Larrinaga-Gonzalez & Bebbington, 2001). Research by Islam et al. (2020) shows that cities like Dhaka face severe waste disposal issues, with only about 50% of waste being managed properly. This leads to pollution and health hazards exacerbated by inadequate infrastructure. So, in this study, for the first time, an intention has been made to develop a tool for use in corporate environmental accountability (CEA) assessment that allows for comparative analysis and enables more in-depth exploration of the qualitative setting contributing to the quantitative outcome using Analytical Hierarchy Process (AHP). The study's results indicated that the Image/Relationship played the most significant role among the entire attributes cost center, where Remediation was the least important.

In order to determine the key criteria for the cost center for corporate environmental accountability (CEA) assessment, a series of thirty discussion events were planned with practitioners and specialists from the Department of Environment, the Judiciary Department, non-governmental organizations, environmental scientists, cost and management accountants, lawyers, industrialists, members of the chamber house (association of industrialists), social and political leaders, and academicians. Twenty-four sub-attribute cost centers were then finalized under the sphere of six attributes cost centers after the attributes and sub-attribute cost centers were tested in the field through ten focus group discussions (FGDs) with the corporate organization's low, mid, and high-level executives. The Analytical Hierarchy Process (AHP) is a popular and useful approach for decision-making regarding multiple criteria. AHP entails creating a matrix of pairwise comparisons between various attributes and sub-attributes. As shown in Table 2, ratings are methodically assessed to determine the relative importance of two criteria on a continuous scale from 1/9 (least important) to 9 (most important) (Saaty, 1977). This process creates the pairwise comparison matrix. The results clearly show that, when considering the overall weights of all sub-attributes, the Image/Relationship attributes are the most important (having a 25% weight), followed by Regulatory (having a 23%) and Contingent (18%). The vector of weights also shows that Remediation is the least important (having a 3% weight) to the CEA assessment (figure 3). In conclusion, given that businesses around the world are dealing with stricter environmental laws and regulations, heightened public awareness of the ecological effects of commercial and business operations, and growing investor pressure to reconsider their position on environmental issues like climate change. This research suggests that a unified framework for evaluating corporate environmental accountability (CEA) should be developed. Additionally, this work is an ongoing effort to establish such a unified framework for CEA assessment.

2. Literature Review

Corporate environmental accountability (CEA) has evolved from a supplementary aspect of corporate responsibility to a fundamental component of business strategy. As global environmental concerns rise, organizations increasingly find themselves accountable for their ecological footprint (Kramarz & Park, 2016). Corporate environmental accountability refers to the responsibility of organizations to disclose, manage, and mitigate their environmental impacts. Organizations seek to justify their operations to maintain legitimacy in the eyes of stakeholders. Theoretical foundations such as Stakeholder Theory play a crucial role in framing CEA, asserting that businesses must address the interests of all stakeholders, including those who are directly or indirectly affected by environmental practices (Konwar et al., 2024; Schaltegger, Hörisch, & Freeman, 2019). Stakeholder engagement is crucial in assessing environmental impacts. Business worlds are increasingly blamed for the environmental impact of their operational activities after the Earth Summit held in Rio de Janeiro in 1992, according to Belal (2000). The reason for this change can be partly explained by the so-called green revolution and the global environmental concern, especially environmental legislation; the possibility of an environmental crisis, as well as by a wider concern for issues of social injustice (Calculli et al., 2021; Ahmad & Mousa, 2010). Other factors include customer awareness, supply chain relations and activities of environmental campaigners like Greenpeace and the worldwide foundation for Nature. So, corporate environmental accountability has emerged during the last two decades in response to these mentioned issues (Moisescu & Gică, 2020). The rise in interest in response to these issues has a marked variation across corporations and countries. Society, particularly from developed countries, is highly concerned about the impacts on the quality of their life due to air, land and water pollution. As a result, for most of the world's developed countries, corporate environmental accountability has developed voluntarily (Perkins, 2007).

Bangladesh is still at its initial phase of industrialization. But it does not mean that the risk of environmental degradation from business operations is lower here. Rather, the problem of environmental degradation by the business operations is aggravated here to some extent due to poor and weak enforcement of legislation in Bangladesh (Syed, 2023; Hossain et al., 2020). One such incidence of environmental degradation by the business operations is the Buriganga River, Dhaka. About 60,000 tons of raw hides and skins are processed in these tanneries yearly, releasing nearly 95,000 L of untreated effluents into the open environment daily. Bangladesh is under the great menace of environmental stress from corporate business operations because it is the world's most densely populated country, which means if pollution occurs at any place by even one polluting agent, a large population remains at risk of being exposed to it. Bangladesh has been experiencing a shift from traditional agricultural sector to non-traditional industrial and service industries in recent years.

The Life Cycle Assessment method evaluates the environmental impacts of a product throughout its life cycle, providing a comprehensive view of corporate responsibility (Klöpffer, 2006). Studies highlight a positive correlation between transparency in environmental reporting and corporate reputation (Delmas & Blass, 2010). Companies that are more open about their environmental impacts often gain stakeholder trust. Several studies both at national (Belal, 2000; Imam, 1999) and international (Lee, 2011; Lucas & Wilson, 2008; Masanet-Llodra, 2006; Perkins, 2007) have been carried out related to the corporate world emphasizing different aspects of environmental accountability. Some pointed out the relationship between environmental management and financial performance (Xu & Chen, 2020; Voinea et al., 2020; Lucas & Wilson, 2008). Lee (2011) tries to explore motivations, barriers, and incentives for companies to adopt Environmental Management Cost Accounting and related guidelines. Perkins (2007) focuses on the uneven dynamics of corporate greening within a theoretical framework of convergence, firm specificity, and heterogeneity. However, most of the authors (Lehman, 1999; Masanet-Llodra, 2006; Yakhou & Dorweiler, 2004) focus on either the environmental management system developed, or environmental accounting used as a tool for environmental management systems in today's corporate world. In Bangladesh, all of the prior work (Belal, 2000; Imam, 1999) is on the company's disclosed environmental information in the directors' report or in the chairman's statement, or elsewhere in their annual reports. Research indicates that robust environmental accountability frameworks can lead to better compliance with environmental regulations, reducing the risk of fines and legal challenges (Gunningham et al., 2018). Investors increasingly rely on Environmental, Social, and Governance (ESG) Metrics criteria to assess corporate accountability, with numerous indices and rating agencies

providing benchmarks for performance (Berg et al., 2022; Eccles et al., 2014). All of the previous research concludes that the information disclosed is qualitative in nature, that companies did not follow any specific or standard reporting format, and most importantly, that not a single company disseminated any quantitative information on environmental items. Therefore, it is important to assess corporate environmental accountability (CEA) and scale up the corporate world's capacity to adapt to the newly emerged issues of environmental accountability.

A lack of standardized data makes it difficult to compare environmental performance across organizations (Hahn Kühnen, 2013). Some companies may engage in superficial environmental reporting to enhance their public image without making substantial changes (Lyon & Maxwell, 2011). Many organizations struggle to integrate environmental accountability into their core business strategies, leading to fragmented efforts (Benn et al., 2014).

The literature on corporate environmental accountability assessment reveals a growing recognition of its importance in enhancing corporate sustainability and stakeholder trust. While frameworks and methodologies are well-established, challenges such as data standardization and greenwashing persist. Future research should focus on investigating how corporate environmental accountability integrates with broader CSR efforts and the implications for corporate strategy (Bhat et al., 2024). Moreover, there is also a possibility for research on developing frameworks for assessing the real impact of corporate environmental initiatives on sustainability outcomes, including biodiversity and ecosystem services.

3. Materials and Methods

3.1. Data Collection and Research Design

A succession of 30 discussion events was organized with practitioners and specialists from the Department of Environment, the Judiciary Department, NGOs, environmental scientists, cost and management accountants, lawyers, industrialists, members of the chamber house (association of industrialists), social and political leaders, and academicians to make out essential criteria cost center for corporate environmental accountability (CEA) assessment. Through this participatory path, different attributes and sub-attributes cost center were branded for corporate environmentally assessment. The attributes and sub-attributes cost center were then tested in the field through 10 FGD (focus group discussion) with low, mid and high level executives of the corporate organization and subsequently, 24 sub-attributes cost center under the sphere of 6 attributes cost centers were finalized (Table 1). Sub-attributes of each attributes were evaluated to come across the environmental accountability condition or status of a corporate entity. The sub-attributes are the foundation of the CEA assessment tool that helps to spot the strengths, weakness, and gaps in the accountability assessment.

Table 1. Attributes and sub-attributes for CEA assessment in Bangladesh

Attributes	Sub-attributes
Regulatory	Monitoring, inspection and testing; Protective equipment; Certification and labeling; Environmental Management Plans
Internal Voluntary	Employee health and satisfaction, Environmentally driven R&D, Environmental audits, Feasibility studies
External Voluntary	Environmental studies and research, Environmental reporting, Environmental Training, Medical Surveillance
Remediation	Pollution treatment costs, Waste management costs, Environmental taxes and fees, Recycling
Image/Relationship	Corporate image, Relationships with investors, Relationship with customers, Relationships with regulators
Contingent	Penalties and fines, Future compliance, Personal damages, Natural resource and ecosystem damages

Analytical Hierarchy Process (AHP) was developed to enable an individual or group of individuals to define a specific problem and derive a solution based on individuals' or groups' experience of that problem, by Saaty (Saaty, 2008). AHP helps capture both subjective and objective evaluation measures, providing a useful mechanism for checking the consistency of the evaluations thus reducing bias in decision making (Wong & Li, 2008). The AHP technique is employed to rate a

set of alternatives or to select the best in a set of alternatives. The ranking is done with respect to an overall goal, which is broken down into a set of attributes and sub-attributes. In the present study, the data were collected from 6 types of corporate organization, viz., Shipping, Banking, Manufacturing, Telecommunication, Construction and Pharmaceuticals. Data were collected through structured interviews from 300 corporate executives encircling low, mid and high level management. The extent to which the interviewed corporate organizations were within the same category was fairly uniform. As random sampling is not required for the AHP, interviewees were not selected in the present study in a random fashion. Accordingly, executives with the greatest experience and respect within each corporate organization were purposely sought. Each interviewee was asked to compare a series of elements (attributes and sub-attributes) for AHP that would best explain the CEA. AHP methodology is already applied in different studies (Karimi et al., 2011; Leunga et al., 1998; Young et al., 2010). In this study, for the first time, AHP is being used to decompose corporate environmental accountability into a hierarchy that consists of different essential elements. In the context of this study, a simple three-level hierarchical structure was developed (Figure 1).

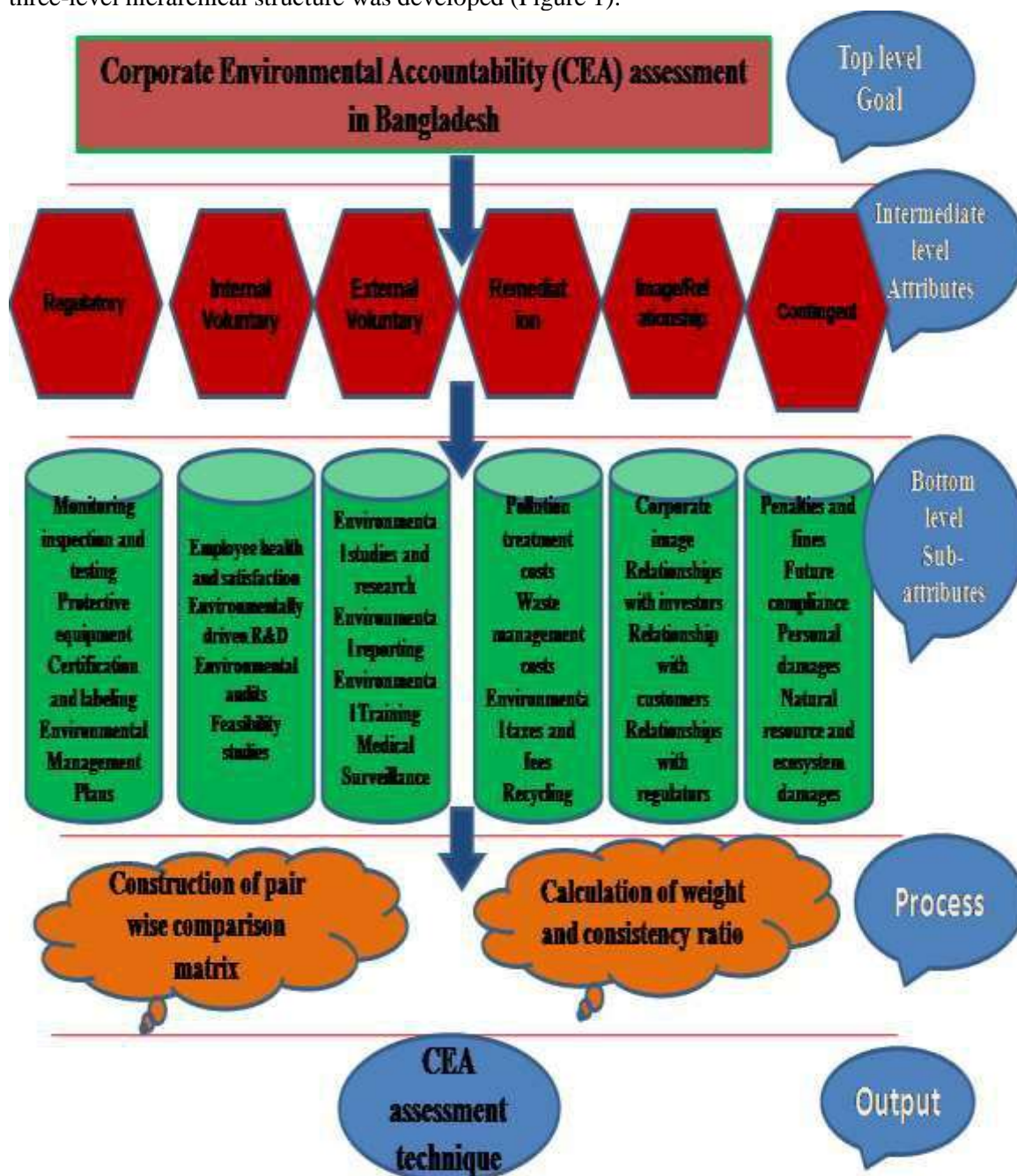


Figure 1. Analytical Hierarchy Process (AHP) tactic for Corporate Environmental Accountability (CEA) assessment in Bangladesh.

3.2. Analytical Hierarchy Process (AHP) and Data Analysis

AHP is widely used as an effective tool for multi-criteria decision making. AHP involves the construction of a pair-wise comparison matrix of different attributes and sub attributes. To develop the pair-wise comparison matrix, ratings are systematically scored for judging the relative importance of two criteria on a continuous scale from 1/9 (least important) to 9 (most important) (Saaty, 1977), as represented in the table 2.

Table 2. The fundamental importance scale used for judging the relative importance of two criteria in the decision making process.

1/9	1/8	1/7	1/6	1/5	1/4	1/3	1/2	1	2	3	4	5	6	7	8	9
Very				Strong					Moderate							
Extremely		strongly		ly		Moderately		Equally	y		Strongly		Very	Extremely		
													strongly			
Less										More						
important										important						

To some extent human judgment may inconsistent, and hence the comparison matrix. Particularly, a matrix A (i, j) is said to be consistent if all its elements follow the transitivity and reciprocity rules below:

$$i,j = A_{i,k} \cdot A_{j,k} \dots \dots \dots (1) \quad A_{i,j} = 1 / A_{j,i} \dots \dots \dots (2)$$

Where i, j and k are any alternatives of the matrix. A matrix is considered as consistent if it satisfies the following condition.

$$Aw = \lambda_{max} w \dots \dots \dots (3)$$

Where A is the comparison matrix, w is the eigenvector and n is the dimension of the matrix. For an inconsistent matrix, to overcome the inconsistency associated with the pair wise comparison matrix, Saaty (2003) shows that there is a relationship between the vector of weights, w and the matrix A.

$$Aw = \lambda_{max} w \dots \dots \dots (4)$$

Where w is the n- dimensional eigenvector associated with the largest eigenvalue λ_{max} . The measure of inconsistency is based on the observation that $\lambda_{max} > n$ for positive, reciprocal matrix, and $\lambda_{max} = n$ if and only if A is a consistent matrix. Saaty (2008) gave, a measure of consistency, called Consistency Index (CI) as a deviation or a degree of consistency using the following formula.

$$CI = (\lambda_{max} - n) / (n - 1) \dots \dots \dots (5)$$

To use the calculated Consistency Index, it compared with the random consistency index (RI) as represented in the table 3.

Table 3. Random consistency index (RI) for n= 1, 2, 3...10 used in the decision making process.

N	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Consequently, a Consistency Ratio (CR) is a comparison between Consistency Index and Random Consistency Index, to represent the consistent or inconsistent judgment as represented in the following formula.

$$CR = CI / RI \dots \dots \dots (6)$$

If the value of Consistency Ratio is smaller or equal to 10% or 0.10, the inconsistency is acceptable. Alternately, if the Consistency Ratio is greater than 10% or 0.10, the subjective judgment should be revised (Saaty, 1977).

24 sub attributes or criteria under 6 attributes were considered for CEA assessment in this study (table 1). Weights for each criterion was determined through pair-wise comparisons by 300 corporate executives encircling low, mid and high level management. The four sub-attributes of regulatory, internal voluntary, external voluntary, remediation, image/relationship, and contingent were computed at first and then combined all the 24 sub-attributes to assess the corporate environmental accountability (CEA) in Bangladesh. Data analysis for AHP process was performed using MS Excel spreadsheet and an example of worked spread sheet is presented in the table 4. Statistical analysis was performed using SPSS 18.

Table 4. Example of worked spread sheet for corporate environmental accountability (CEA) in Bangladesh

	Weight				Decimal				Normalized matrix				Priority vector
	M	P	C	E	M	P	C	E	M	P	C	E	
M	1	1	1	½	1.00	1.00	1.00	0.50	0.2	0.16667	0.33333	0.125	0.22
P	1	1	½	½	1.00	1.00	0.50	0.50	0.2	0.16667	0.16667	0.125	0.16
C	1	2	1	2	1.00	2.00	1.00	2.00	0.2	0.33333	0.33333	0.500	0.35
E	2	2	½	1	2.00	2.00	0.50	1.00	0.4	0.33333	0.16667	0.250	0.27
Sum	5	6	3	4	5.00	6.00	3.00	4.00	1.0	1.0	1.0	1.0	

Note: M= Monitoring, inspection and testing, P= Protective equipment, C= Certification and labeling, E= Environmental Management Plans.

max= 4.198, CI=0.066, RI=0.9, CR=7.3%

We sum each column of the reciprocal matrix and then we divide each element of the matrix with the sum of its column to have normalized relative weight. The sum of each column of normalized matrix is 1.

The normalized principal Eigen vector or priority vector obtained by averaging across the rows of normalized matrix. Since it is normalized, the sum of all elements in priority vector is 1. The priority vector shows relative weights among the attributes and sub-attributes that we compare.

$\lambda \text{ max} = (5.00 \times 0.22) + (6.00 \times 0.16) + (3.00 \times 0.35) + (4.00 \times 0.27) = 4.198$.

$CI = \lambda \text{ max} - n / n - 1 = 4.198 - 4 / 4 - 1 = 0.066$.

$CR = CI / RI = 0.066 / 0.9 = 7.3\%$

4. Results and Discussions

Obtained data from different managerial executives through a structured interview process and consequent data analysis revealed that the six attributes of cost center used during the present study provide an integrated approach for the corporate environmental accountability assessment. Explicitly, the present findings provide edifying examples of how different high, mid and lower-level corporate executives of various corporate organization in Bangladesh recognize the credence of cost center impact on their capacity to build and manage environmental accountability in their corporate organization in the context of present days highly interactive business, society and natural environment association. The weight of regulatory, internal voluntary, external voluntary, remediation, image/relationship and contingent attributes cost center and relevant sub-attributes cost center for corporate environmental accountability assessment as perceived by different executives of the corporate organizations of Bangladesh through pair-wise comparison matrix presented in table 5, 6 and 7. Monitoring, inspection, and testing account for 52.8% of shipping, followed by telecommunication (45.31%) corporate organization as perceived by their executives for assessing there environmental accountability. While protective equipment is the concern, different executives weighted it for environmental accountability as 33.9% (construction) followed by manufacturing (31.24%) (Table 5). Interestingly, corporate image cost centers were weighted as 71.2%, 56.1% and 42.1% for telecommunication, banking and construction, respectively, by their executives for assessing the corporate environmental accountability (Table 6).

Table 5. The credibility of different attributes cost center (Regulatory, Internal Voluntary and External Voluntary) and sub-attributes cost center on corporate environmental accountability assessment as perceived by different executives of the corporate organizations of Bangladesh

Corporate organization

Attribute s	Sub- attributes	Shipping		Banking		Manufacturin g		Telecommuni cati on		Pharmaceutic Constructionals	
		Weight s	%	Weight s	%	Weight s	%	Weight t s	%	Weight s	%

Regulato Monitorin

ry g, 0.5283 52.8 0.359 35.9 0.2812 28.12 0.4531 45.31 0.301 30.1 0.3332 33.2

	inspection and testing	Protective equipment	0.3007	30.0	0.240	24.0	0.3124	31.24	0.2673	26.73	0.339	33.9	0.3012	30.1
	Certification and labeling		0.1002	10.0	0.281	28.1	0.2913	29.13	0.2234	22.34	0.292	29.2	0.3121	31.2
	Environment Management Plans		0.0708	7.08	.120	12.0	0.1151	11.51	0.0562	5.62	0.068	6.8	0.0535	5.35
	Consistency ratio (CR)		0.0174		0.0132		0.0041		0.0013		0.0024		0.0321	
	Internal Voluntary	Employee health and satisfaction	0.578	57.8	0.667	66.7	0.3907	39.07	0.5531	55.31	0.3476	34.7	0.5142	51.4
	Environmentally driven R&D		0.256	25.6	.245	24.5	0.3231	32.31	0.0543	5.43	0.1634	16.3	0.3211	32.1
	Environmental audits		0.100	10.0	0.056	5.6	0.1541	15.41	0.2462	24.62	0.3254	32.5	0.1211	12.1
	Feasibility studies		0.066	6.6	0.032	3.2	0.1321	13.21	0.1464	14.64	0.2732	27.3	0.0436	4.36
	Consistency ratio (CR)		0.0043		0.0063		0.0112		0.0021		0.0116		0.0322	
	External Voluntary	Environmental studies and research	0.153	15.3	0.47	47	0.3346	33.46	0.3541	35.4	0.087	8.70	0.3314	33.1

Table 6. The credibility of different attributes cost center (Remediation, Image/Relationship and Contingent) and sub-attributes cost center on corporate environmental accountability assessment as perceived by different executives of the corporate organizations of Bangladesh

Table 7. The overall credibility of six attributes cost center of corporate environmental accountability assessment for different corporate organizations of Bangladesh during the present study

Table 7 outlines the results of the overall degree of different attributes for assessing the environmental accountability of the corporate organization. As shown in Table 6, the most popular attributes for assessing the corporate environmental accountability are the internal voluntary (31.2%) and

image/relationship (30.12%) in telecommunication, while they are lowest in shipping (18.1%) and manufacturing (12.3%), respectively.

The weights of 24 sub-attributes have resulted into CEA assessment scale and indicate their effectiveness in measuring the environmental accountability of different corporate organizations (figure 2). Image/relationship, regulatory and contingent with 24.8%, 22.1% and 17.8% weights, respectively, indicate their highest role in CEA assessment in shipping organizations, while remediation weights only for 1.88%. On the other hand, in case of banking and telecommunication, internal voluntary and image/relationship indicate their highest role in CEA assessment, while remediation holds the lowest. The executives of the manufacturing organization have given the highest weight to remediation (24.5%) and regulatory (23.1%) for CEA assessment, while making the Contingent (6.57%) the lowest. Image/relationship, internal voluntary and regulatory with 30.1%, 27.1% and 26.4% weights, respectively, indicate their highest role in CEA assessment in construction farms, while Contingent weights only for 1.07%. Image/relationship, contingent and regulatory with 22.1%, 20.6% and 20.5% weights, respectively, indicate their highest role in CEA assessment in pharmaceuticals organization, while remediation weights only for 6.98% (figure 2).

Figure 2. Corporate Environmental Accountability (CEA) assessment scale shows the effectiveness of six attributes cost center in different corporate organizations of Bangladesh.

In view of the overall weights of all sub-attributes, it is quite apparent that from the results that, the image/relationship attributes are the most significant (with 25% weight), followed by Regulatory (23%) and contingent (18%), while the vector of weights indicates the remediation is the least significant (with 3% weight) to CEA assessment (figure 3).

Figure 3. The integration process of 24 sub-attributes cost center of Regulatory, Internal Voluntary, External Voluntary, Remediation, Image/Relationship and Contingent cost center for corporate environmental accountability assessment in Bangladesh.

Using the 24 sub-attributes of cost center as the input helps to develop our understanding of how the governing and managerial body at different levels of different corporate organizations adapt and respond proactively to emerging environmental issues and sustainable business development. During the present study, AHP has been applied to data from a large qualitative study obtained through structured interviews with many corporate executives to comprehend more evidently what enhances or erodes a corporate organization's environmental accountability to adapt to the changing circumstances of worldwide environmental concern and sustainable development. Findings from the study highlight important considerations for each of the attributes cost center in different corporate organizations and suggest ways that the different corporate entities can develop and manage their environmental accountability. This approach, suggested here, may also be an important tool for different regulatory government organizations of Bangladesh, such as the Department of Environment (DoE), commerce and industrial ministry, to assist with the corporate environmental accountability development process in Bangladesh. The government can then consider what, specifically; different corporate organizations need to develop organization-wide environmental accountability at the policy level by providing support and different resources. We thus point out that this study contributes to this sphere of literature and to broader international arguments and conversations regarding how to construct and develop the environmental accountability assessment for corporate organization worldwide.

5. Conclusions

The purpose of this study is to find out the significance of each of the attributes and sub attributes cost centers in different corporate organizations. With the strategy of sustainable economic development, the policy of Bangladesh government is that social and economic growth should not sacrifice environment. To ensure a sustainable economic development through economic and commercial activities, corporate environmental accountability (CEA) assessment undoubtedly plays a crucial role. In this research, the multi-criteria decision making AHP technique was used to assess quantitatively the CEA of the different corporate organization of Bangladesh. Monitoring, inspection and testing; protective equipment; certification and labeling; and environmental management plans sub-attributes cost center perceived as dominant and environmental management plan is the least for CEA assessment in various organizations under regulatory attributes cost center. The obtained results

have reflected that the image/relationship attributes are the most significant, followed by Regulatory (23%) and contingent (18%), while the vector of weights indicates the remediation is the least significant to CEA assessment. This indicates that, at present, most of Bangladesh's corporate organizations have no environmental management plan.

Employee health and satisfaction; environmentally driven R&D sub-attributes cost center has been weighted most, while environmental audits and feasibility studies under internal voluntary attributes cost center were low rated for CEA assessment. In view of specific organization, image/relationship, regulatory and contingent attributes cost center with 24.8%, 22.1% and 17.8% weights, respectively, indicate their highest role in CEA assessment in shipping organization, while remediation weights only for 1.88%. In case of banking and telecommunication, internal voluntary and image/relationship indicate their highest role in CEA assessment, while remediation holds the lowest.

What is undoubtedly required is now further interest to building framework of these six attributes cost center into more systematic baseline measures in order to develop a standard criterion, so that a corporate entity can use them as a tool to assess its environmental accountability.

There is, of course, somewhat a very good scope for future research. New research can be conducted on Government Organizations, Non-Government Organizations, and Social Organizations. Furthermore, this research has been done on Shipping, Banking, Manufacturing, Telecommunication, Constructions and Pharmaceuticals where the research can be conducted only on one sector separately.

However, like many other research studies, there are limitations to this research. Only 30 discussion events were organized with practitioners and specialists. If these events could be more than 100, the result would be more accurate. Then such attributes and sub attributes were tested through 10 focus discussion group which could be around 30. Lastly, the research has been conducted on the said six sectors only where there are many other sectors available in the country.

The contribution of this study to the society is to make the society aware that the image/relationship attributes is the most significant attribute and different corporate entity must develop their environmental accountability.

In conclusion, as different companies worldwide are facing more stringent environmental laws and regulations, increased societal awareness regarding the ecological impacts of the commercial and business activities, and mounting pressures from investors to rethink their stance toward environmental issues like climate change. This research work suggests that a unified framework for assessing the corporate environmental accountability should be developed and this work is an ongoing attempt to develop such unified framework for corporate environmental accountability (CEA) assessment.

References

- Adams, C., Muir, S., & Hoque, Z. (2014). Measurement of sustainability performance in the public sector. *Sustainability Accounting, Management and Policy Journal*, 5(1), 46-67. <https://doi.org/10.1108/SAMPJ-04-2012-0018>
- Ahmad, N. S. M., & Mousa, F. R. (2010). Corporate environmental disclosure in Libya: a little improvement. *World Journal of Entrepreneurship, Management and Sustainable Development*, 6(1/2), 149-159. <https://doi.org/10.1108/20425961201000012>
- Ball, A., Grubnic, S., & Birchall, J. (2014). Sustainability accounting and accountability in the public sector. In *Sustainability accounting and accountability* (pp. 176-196). Routledge.
- Belal, A. R. (2000). Environmental reporting in developing countries: empirical evidence from Bangladesh. *Eco- Management and Auditing: The Journal of Corporate Environmental Management*, 7(3), 114-121. [https://doi.org/10.1002/1099-0925\(200009\)7:3%3C114::AID-EMA131%3E3.0.CO;2-E](https://doi.org/10.1002/1099-0925(200009)7:3%3C114::AID-EMA131%3E3.0.CO;2-E)
- Benn, S., Edwards, M., & Williams, T. (2014). "Organizational Change for Corporate Sustainability" By Routledge Taylor Francis Group LONDON AND NEW YORK. <https://doi.org/10.4324/9781315819181>

- Berg, F., Kölbel, J. F., & Rigobon, R. (2022). Aggregate Confusion: The Divergence of ESG Ratings. *Review of Finance*, 26(6), 1315-1344. <https://doi.org/10.1093/rof/rfac033>
- Bhat, A. A., Mir, A. A., Allie, A. H., Lone, M. A., Al-Adwan, A. S., Jamali, D., & Riyaz, I. (2024). Unlocking corporate social responsibility and environmental performance: Mediating role of green strategy, innovation, and leadership. *Innovation and Green Development*, 3(2), 100112. <https://doi.org/10.1016/j.igd.2023.100112>
- Burnett, R. D., & Hansen, D. R. (2008). Ecoefficiency: Defining a role for environmental cost management. *Accounting, organizations and society*, 33(6), 551-581. <https://doi.org/10.1016/j.aos.2007.06.002>
- Calculli, C., D'Uggento, A. M., Labarile, A., & Ribecco, N. (2021). Evaluating people's awareness about climate changes and environmental issues: A case study. *Journal of Cleaner Production*, 324, 129244. <https://doi.org/10.1016/j.jclepro.2021.129244>
- Cho, C. H., & Patten, D. M. (2007). The role of environmental disclosures as tools of legitimacy: A research note. *Accounting, organizations and society*, 32(7-8), 639-647. <https://doi.org/10.1016/j.aos.2006.09.009>
- Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, organizations and society*, 33(4-5), 303-327. <https://doi.org/10.1016/j.aos.2007.05.003>
- Cormier, D., & Magnan, M. (2007). The revisited contribution of environmental reporting to investors' valuation of a firm's earnings: An international perspective. *Ecological economics*, 62(3-4), 613-626. <https://doi.org/10.1016/j.ecolecon.2006.07.030>
- Delmas, M., & Blass, V. D. (2010). Measuring corporate environmental performance: the trade-offs of sustainability ratings. *Business Strategy and the Environment*, 19(4), 245-260. <https://doi.org/10.1002/bse.676>
- Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management science*, 60(11), 2835-2857. <https://doi.org/10.1287/mnsc.2014.1984>
- Gunningham, N., Kagan, R. A., & Thornton, D. (2018). "Social License and Environmental Protection: Why Businesses Go Beyond Compliance." *Law & Social Inquiry*, 29(2), 307-341. <https://doi.org/10.1111/j.1747-4469.2004.tb00338.x>
- Hahn, R., & Kühnen, M. (2013). Determinants of sustainability reporting: A review of results, trends, theory, and opportunities in an expanding field of research. *Journal of cleaner production*, 59, 5-21. <https://doi.org/10.1016/j.jclepro.2013.07.005>
- Hossain, S., Siddika, M. A., Koly, I. J., & Akter, K. (2020). Exploring the impact of environmental degradation on life expectancy in Bangladesh: An ARDL bounds test approach. *International Journal of Science and Business*, 4(12), 69-79. <https://doi.org/10.5281/zenodo.4266173>
- Imam, S. (1999). Environmental Reporting in Bangladesh. *Social and Environmental Accounting*, 19(2), 12-14. <https://doi.org/10.1080/0969160X.1999.9651615>
- Islam, M. J., Roy, S. K., Miah, M., & Das, S. K. (2020). A Review on Corporate Environmental Reporting (CER): An Emerging Issue in the Corporate World. *Canadian Journal of Business and Information Studies* 2(3), 45-53. <https://doi.org/10.34104/cjbis.020.045053>
- Karimi, A. R., Mehrdadi, N., Hashemian, S. J., Bidhendi, G. N., & Moghaddam, R. T. (2011). Selection of wastewater treatment process based on the analytical hierarchy process and fuzzy analytical hierarchy process methods. *International Journal of Environmental Science & Technology*, 8, 267-280. <https://doi.org/10.1007/BF03326215>
- Konwar, Z., Wei, Y., Wood, G., & Eng-Tuck Cheah, J. (2024). The public as a definitive stakeholder of corporate environmental sustainability practices: A cross-national institutional approach.

- Journal of Environmental Management, 370, 122666.
<https://doi.org/10.1016/j.jenvman.2024.122666>
- Kramarz, T., & Park, S. (2016). Accountability in Global Environmental Governance: A Meaningful Tool for Action? *Global Environmental Politics*, 16(2), 1-21.
https://doi.org/10.1162/GLEP_a_00349
- Klöpffer, W. (2006). The Hitch Hiker's Guide to LCA - An orientation in LCA methodology and application. *Int J Life Cycle Assessment*, 11, 142. <https://doi.org/10.1065/lca2006.02.008>
- Larrinaga-Gonzalez, C., & Bebbington, J. (2001). Accounting change or institutional appropriation?—A case study of the implementation of environmental accounting. *Critical perspectives on accounting*, 12(3), 269-292. <https://doi.org/10.1006/cpac.2000.0433>
- Lee, K. H. (2011). Motivations, barriers, and incentives for adopting environmental management (cost) accounting and related guidelines: a study of the republic of Korea. *Corporate Social Responsibility and Environmental Management*, 18(1), 39-49. <https://doi.org/10.1002/csr.239>
- Lehman, G. (1999). Disclosing new worlds: a role for social and environmental accounting and auditing. *Accounting, Organizations and society*, 24(3), 217-241.
[https://doi.org/10.1016/S0361-3682\(98\)00044-0](https://doi.org/10.1016/S0361-3682(98)00044-0)
- Leung, P., Muraoka, J., Nakamoto, S. T., & Pooley, S. (1998). Evaluating fisheries management options in Hawaii using analytic hierarchy process (AHP). *Fisheries Research*, 36(2-3), 171-183. [https://doi.org/10.1016/S0165-7836\(98\)00097-6](https://doi.org/10.1016/S0165-7836(98)00097-6)
- Lucas, M. T., & Wilson, M. A. (2008). Tracking the relationship between environmental management and financial performance in the service industry. *Service Business*, 2, 203-218.
<https://doi.org/10.1007/s11628-008-0035-5>
- Lyon, T. P., & Maxwell, J. W. (2011). "Greenwash: Corporate Environmental Disclosure Under Threat of Audit." *Journal of Economics & Management Strategy*, 20(1), 3-41.
<https://doi.org/10.1111/j.1530-9134.2010.00282.x>
- Masanet-Llodra, M. J. (2006). Environmental Management Accounting: A Case Study Research on Innovative Strategy. *Journal of Business Ethics*, 68, 393–408. <https://doi.org/10.1007/s10551-006-9029-1>
- Moisescu, I., & Gică, A. (2020). The Impact of Environmental and Social Responsibility on Customer Loyalty: A Multigroup Analysis among Generations X and Y. *International Journal of Environmental Research and Public Health*, 17(18), 6466.
<https://doi.org/10.3390/ijerph17186466>
- Perkins, R. (2007). Globalizing Corporate Environmentalism: Convergence and Heterogeneity in Indian Industry. *Studies in Comparative International Development*, 42, 279–309.
<https://doi.org/10.1007/s12116-007-9007-3>
- Rahman, M. M., & Rahman, M. S. (2020). Green reporting as a tool of environmental sustainability: some observations in the context of Bangladesh. *Int. J. Manag. Account*, 2(2), 31-37.
<https://doi.org/10.34104/ijma.020.031037>
- Saaty, T. L. (1977). A scaling method for priorities in hierarchical structures. *Journal of Mathematical Psychology*, 15(3), 234-281. [https://doi.org/10.1016/0022-2496\(77\)90033-5](https://doi.org/10.1016/0022-2496(77)90033-5)
- Saaty, T. L. (2003). Decision-making with the AHP: Why is the Principal Eigenvector necessary? *European Journal of Operational Research*, 145(1), 85-91. [https://doi.org/10.1016/S0377-2217\(02\)00227-8](https://doi.org/10.1016/S0377-2217(02)00227-8)
- Saaty, T. L. (2008). Decision making with the analytic hierarchy process. *International Journal of Services Sciences*, 1(1), 83-98. <https://doi.org/10.1504/IJSSCI.2008.017590>
- Schaltegger, S., Hörisch, J., & Freeman, R. E. (2019). Business Cases for Sustainability: A Stakeholder Theory Perspective. *Organization & Environment*, 32(1), 191-212.
<https://doi.org/10.1177/1086026617722882>

- Syed, R. F. (2023). Labor standards, labor policy, and compliance mechanism: a case study in Bangladesh. *Labor History*, 65(2), 256–272. <https://doi.org/10.1080/0023656X.2023.2272124>
- Voinea, C. L., Hoogenberg, B. J., Fratostiteanu, C., & Bin Azam Hashmi, H. (2020). The Relation between environmental management systems and environmental and financial performance in emerging economies. *Sustainability*, 12(13), 5309. <https://doi.org/10.3390/su12135309>
- Walsh, J. P., Weber, K., & Margolis, J. D. (2003). Social Issues and Management: Our Lost Cause Found. *Journal of Management*, 29(6), 859-881. https://doi.org/10.1016/S0149-2063_03_00082-5
- Wong, J. K., & Li, H. (2008). Application of the analytic hierarchy process (AHP) in multi-criteria analysis of the selection of intelligent building systems. *Building and Environment*, 43(1), 108-125. <https://doi.org/10.1016/j.buildenv.2006.11.019>
- Xu, L., & Chen, H. H. (2020). Exploring the relationships between environmental management and financial sustainability in the energy industry on JSTOR. *Energy & Environment*, 31(7), 1281-1300. <https://doi.org/10.1177/0958305X19882406>
- Yakhou, M., & Dorweiler, V. P. (2004). Environmental accounting: an essential component of business strategy. *Business Strategy and the Environment*, 13(2), 65-77. <https://doi.org/10.1002/bse.395>
- Young, K. D., Younos, T., Dymond, R. L., Kibler, D. F., & Lee, D. H. (2010). Application of the Analytic Hierarchy Process for Selecting and Modeling Stormwater Best Management Practices. *Journal of Contemporary Water Research & Education*, 146(1), 50-63. <https://doi.org/10.1111/j.1936-704X.2010.00391.x>