

## Environmental Accounting and Firm Profitability: An Empirical Analysis of Selected Firms Listed in Bombay Stock Exchange, India

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### Abstract

*Environmental accounting is the ability to provide accurate information in the financial statements regarding the estimated social cost occasioned by the production externalities on the environment and how much deliberate intervention cost had been incurred to bridge the gap between the marginal social cost and the marginal private cost by a firm. The objective of this study is to establish whether there is any significant relationship between environmental accounting and profitability of selected firms listed in India. The data for the study were collected from annual reports and accounts of 14 randomly selected quoted companies in Bombay Stock Exchange in India. The data were analyzed using multiple regression models. The key findings of the study shows that there is significant negative relationship between Environmental Accounting and Return on Capital Employed (ROCE) and Earnings per Share (EPS) and a significant positive relationship between Environmental Accounting and Net Profit Margin and Dividend per Share. Based on this it was recommended that government should give tax credit to organizations that comply with its environmental laws and that environmental reporting should be made compulsory in India so as to improve the performance of organizations and the nation as a whole.*

**Keywords:** Environmental Accounting, Firm Profitability, Return on Capital Employed, Earnings per Share (EPS), Net Profit Margin and Dividend per Share

### 1. Introduction

Accounting for environment helps in accurate assessment of costs and benefits of environmental preservation measures of companies (Schaltegger, 2000). It provides a common framework for organizations to identify and account for past, present and future environmental costs to support managerial decision-making, control and public disclosure (KPMG & UNEP, 2006). The severity of environmental problems as a global phenomenon has its adverse impact on the quality of our life. Measures are being taken both at the national and international level to reduce, prevent and mitigate its impact on social, economic and political spheres (GRI, 2002; GR1, 2006).

The emergence of corporate environmental reporting (CER) in India has been an important development, both for better environmental management and overall corporate governance (Banerjee, 2002). Global awareness of stakeholders on corporate environmental performance has already made traditional reporting redundant. Corporate houses run into the risk of loss of faith of their stakeholders, if in future, environmental performance information is not included in their main stream reporting (Swift, 2001).

Simple adherence to mandatory environmental reporting is insufficient to meet the environmental disclosure expectation of stakeholders. Mandatory reporting is nothing but a minimum prescribed reporting requirement. Companies around the world aspire consciously for improved transparency in disclosure as their core competence (Williams, 2000). Environmental disclosure through internet would be the future of scientific reporting. A number of recent national and international surveys have identified increase in growth of companies reporting on internet (Isenmann, 2004).

Environmental reporting of Indian companies can be broadly categorized into two types' mandatory disclosure and voluntary disclosure. Preliminary investigation of this study shows that Indian companies practice more of voluntary environmental reporting in the form of satellite reporting, sustainability reporting, GRI reporting and internet reporting.

In year 2001, a country wide survey, the first of its kind, was carried out by Business Today, a business magazine, and The Energy Research Institute (TERI, 2001) to understand the environmental practices of corporate India. Findings of the survey revealed that more than 75% of the sample had environmental policy; about 70% have environmental audit system; 60% had an environment department; four out of every ten Indian Companies had formal environment certification (ISO 14001).

As per Indian Constitution, Article 51A of Directive Principles “It shall be the duty of every citizen of India, to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.” The constitutional provisions are backed by a number of laws - acts, rules, and notifications like Factories Act 1948; (Prevention and Control of Pollution) Act 1974; Forest (Conservation) Act 1980; Air (Prevention and Control of Pollution) Act 1981; Water Biomedical waste (Management and Handling) Rules 1998; Municipal Solid Wastes (Management and Handling) Rules, 2000; Ozone Depleting Substances (Regulation and Control) Rules 2000; Noise Pollution (Regulation and Control) (Amendment) Rules 2002; Biological Diversity Act 2002. The Department of Environment was established in India in 1980 to ensure a healthy environment for the country. This later became the Ministry of Environment and Forests (MOEF) in 1985. The EPA (Environment Protection Act), 1986 came into force soon after the Bhopal Gas Tragedy and is considered an umbrella legislation as it fills many gaps in the existing laws.

The Ministry of Environment & Forest, Government of India (GOI), has brought a number of regulatory and non regulatory initiatives, in its efforts in harmonizing environmental protection with economic development. In 1991 GOI has made its first public announcement about the need for environmental disclosure in annual reports. In addition to the above requirement, companies are required to prepare director's report as per director's report rules, 1988. Further, the Companies' Bill 1993 & 1997 had proposed the amendment of section 173 to disclose through its board of directors report the measures taken for protection of environment. There is also a mandatory requirement for Indian companies to report on conservation of energy, technology absorption, etc. in accordance with the provisions of Section 217 (1) (e) of the Indian Companies Act 1956.

In India, financial accounting & reporting guidelines are issued and governed by the Institute of Chartered Accountants of India (ICAI). Companies Act mandates the preparation of annual accounts of companies in accordance with the accounting standards issued by ICAI (Chatterjee, 2005). Specific environmental accounting rules or environmental disclosure guidelines, for communication to different stakeholder groups, are not available for Indian companies. There is no mandatory requirement for quantitative disclosure of (financial) environmental information in annual reports neither under the Companies Act nor as per Indian Accounting Standards (AS's) Further more there are 23 stock exchanges in India, governed by the Securities and Exchange Board of India (SEBI) Act 1992. Each of these stock exchanges has different listing requirements. However, there is no mandatory SEBI listing requirement for Indian companies, from these stock exchanges, to disclose environmental information. Therefore, any environmental disclosure by Indian companies is purely voluntary.

The paper is structured as follows: the second section deals with brief review of important theoretical and empirical literature on the effects of environmental accounting and disclosure on firm profitability; the third section describes the sample and variable definitions used in the study while in the fourth section the methodology employed is explained. The fifth section deals with analysis and findings of the study; and finally, the main conclusions and recommendations are discussed in the last section.

## **2. Review of Literature**

Over the past decades companies have recognized the benefits of environmental reporting. As a result, there was dramatic increase in the number of companies reporting in numerous ways. Early reporters are quick to realize that environmental disclosure is more of a governance and strategic issue than a simple reporting tool (Roome, 1992; Parker, 1997; Parker, 2000a). Regardless of the medium of reporting, companies are bound to satisfy country specific/ international reporting standards and requirements. It is important to understand as to how far standard setting improves credibility in reporting through major surveys. However, most studies are based on content analysis of annual reports.

Firstly, a survey by International accountancy firm KPMG (2005) shows that there is not just an increase in the number of corporate responsibility (CR) information in annual (financial) reports but also on the assurance.

There are standards available for assurance on non-financial information like the International Standard for Assurance Engagements (ISAE) 3000, and Accountability's AA1000 Assurance Standard. In 2005 survey number of companies issuing corporate responsibility reports is approximately 80% representing 21 nations in comparison to 2002 survey with only 50% companies in the reporting arena. This result supports the widespread understanding that multinational corporations publish more CR than other national companies. Prior research on internet based environmental disclosure concludes that multinational corporations of developed nations prefer digital reporting over print medium (Craven & Otsrmani, 1999, UNEP, 1999; Williams, 2000).

Secondly, GRI guidelines provide principles and detailed indicators for reporting on all aspects of CR performance. Sustainability Reporting Guidelines of the Global Reporting Initiative (GRI) developed through a multi-stakeholder process bring in dramatic increase in corporate reporting practices. There are 660 companies spread over 50 countries report on the basis of GRI guidelines. This widespread use of international guidelines by GRI assures comparability, which is one of the 11 major GRI Reporting Principles. Comparability among reports allows stakeholders to identify and differentiate between best and poor practices. It helps in benchmarking best practices among peer group. Dror & Fabrizio (2007) find that the third version of GRI guidelines in 2006 has facilitated more companies to publish CR reporting. Top 250 companies in the Fortune 500 adopt GRI guidelines for sustainability reporting. The main drivers of GRI Guidelines, as identified by Dror are: globalization, corporate governance, accountability, citizenship, national policy, international conventions, bridging the gap between sustainability and financial reporting. These include accounting regulations, financial risk management and management of intangible assets. Further, their study expects GRI guidelines to reap the following benefits such as: improved relationships with stakeholders; breaking down internal organizational insularity through information sharing; reduction of volatility and uncertainty in share prices; building brand image; and creation of competitive advantage.

Mitchell *et al.* (2006) examined the environmental disclosures of twenty Australian firms subject to a successful EPA prosecution between 1994 and 1998 using content analysis, finding the disclosures made by their sample firms to be predominantly positive in nature. Similarly, using content analysis, Cowan and Gadenne (2005) found a tendency by their sample Australian firms to disclose higher levels of positive environmental news. Finally, also using content analysis, Tilt (2001) found that even where a firm has a specific corporate environmental policy, they place a low priority on reporting environmental performance data to external parties. She concluded that Australian firms prefer to disclose their activities and specific programs, rather than their research and development, capital expenditure, policies or performance.

Bewley and Li (2000) appealed to voluntary disclosure theory to examine the environmental disclosures of Canadian manufacturing firms. They used the Wiseman index to measure the 1993 annual report disclosures of 188 firms and industry membership to proxy for pollution propensity. They found that firms with a higher pollution propensity and greater media coverage of their environmental performance are more likely to disclose general environmental information, a result also consistent with the socio-political theories. Similarly, Hughes *et al.* (2001) examined environmental disclosures made by U.S. manufacturing firms in 1992 and 1993 using a modified Wiseman index to measure disclosures in the president's letter, MD&A, and notes sections of the annual report, and the CEP rankings to proxy for environmental performance. They found that firms rated as poor by the CEP generally make the most disclosures.

Al-Tuwaijri *et al.* (2004) employed simultaneous equations approach to investigate the relations among environmental disclosure, environmental performance and economic performance. They used proxy for environmental performance using the percentage of total waste generated recycled as identified using the TRI database and measure environmental disclosure using a content analysis in four categories, potential responsible parties' designation, toxic waste, oil and chemical spills, and environmental fines and penalties, disclosures which are largely non-discretionary. Based on these proxies, Al-Tuwaijri *et al.* (2004) documented a positive association between environmental performance and environmental disclosure.

Topics of environmental accounting and reporting have received substantial interest from academic researchers for the past three decades (Rajapakse, 2003; Surman & Kaya, 2003; Thompson & Zakarai, 2004; O'Donovan & Gibson 2000). The results of different studies measuring the relationship between corporate financial performance and corporate social and environmental disclosure show mixed results.

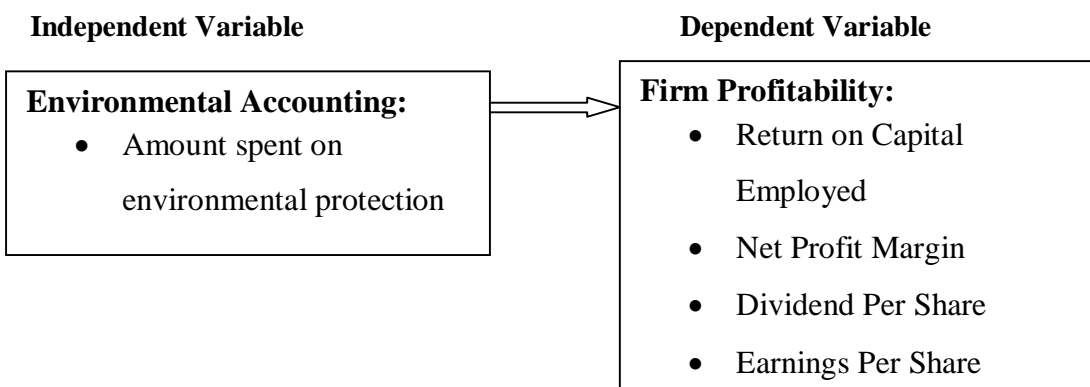
Among these researchers found a positive association between profitability and the extent of corporate social and environmental disclosure (Waddock & Graves, 1997) whereas Cowen *et al.* (1987) found no association between the variables. Again, the results Belkaoui and Kirkpik (1989) tend to be more intriguing. They showed a significantly pair-wise correlation, yet an insignificant negative regression co-efficient for return on assets and corporate social and environmental disclosure.

Social performance information, social audit, social accounting, socio-economic accounting, social responsibility accounting and social and environmental reporting have been used interchangeably in the literature. Corporate environmental disclosure is a part of social reporting and the environmental disclosures are mainly non-financial in nature. The extent of literature on corporate disclosure focuses on the determinants of voluntary disclosure and on the effect of voluntary disclosures on return earnings relation (Healy & Palepu, 2001; Lundholm & Myers, 2002). However, there is a lack of specific studies regarding Corporate Social and Environmental Disclosures (CSEDs) both in developed and developing countries.

Profitability as well as corporate financial performance was used by a number of researchers as an explanatory variable for differences in disclosure level. However, the relationship between corporate financial performance and corporate social and environmental disclosure is arguably one of the most controversial issues yet to be solved (Choi, 1998). The proponents argue that there are additional costs associated with the social and environmental disclosure and, the profitability of the reporting company is depressed. There are those researchers who used log of profits and among these researchers, Roberts (1992) has found a positive relationship between profitability level of a company and corporate social and environmental disclosure. However, Patten (1992) fails to find any significant positive relationship between profitability and corporate social and environmental disclosure. Several studies had been done on environmental/social accounting and disclosure in the financial statements.

Survey of empirical literature show that corporations are disclosing social and environment information in corporate annual reports and this has increased over years. It has been argued by the researchers that the level of Corporate Environmental Accounting and Disclosure is dependent on several corporate attributes and there are studies which empirically examined the extent of environmental disclosure and measured the relationship between environment disclosure and several corporate attributes. However, most of these studies concentrated on developed countries and very few studies focused on developing countries such as India. It has also been argued that corporate social and environmental disclosure may not apply universally to all countries which are in various stages of economic development and with corporations having differing levels of awareness and attitudes towards corporate environmental disclosure. It has also been observed that most of them were based on content analysis of annual reports. Content analysis is presently the most widely used technique for analysis of narratives in annual financial reports (Shil & Iqbal, 2005). Since this method is most used by authors, this study takes a little deviation from content analysis to examine the effect of the environmental accounting on profitability of selected Indian firms using multiple regression models.

**Figure 1 Conceptual Framework**



### 3.1 General Objective

The main objective of this study is to establish whether there is any significant relationship between environmental accounting and firm profitability in India.

### 3.2 Specific Objectives

- i. To investigate whether there is any significant relationship between environmental accounting and Return on Capital Employed (ROCE).
- ii. To establish whether there is significant relationship between environmental accounting and Net Profit Margin (NPM).
- iii. To determine whether there is significant relationship between environmental accounting and Dividend per share (DPS).
- iv. To examine if there is significant relationship between environmental accounting and Earnings per Share (EPS).

### 3.3 Research Hypotheses

- i.  $H_{01}$ : There is no significant relationship between Environmental Accounting and Return on Capital Employed.
- ii.  $H_{02}$ : There is no significant relationship between Environmental Accounting and Net profit Margin.
- iii.  $H_{03}$ : There is no significant relationship between Environmental Accounting and Dividend per Share.
- iv.  $H_{04}$ : There is no significant relationship between Environmental Accounting and Earnings per Share.

## 4. Research Methodology

### 4.1 Model Specification

In order to find out the relationship between different variables, the data were then analyzed using multiple regression analysis through the use of econometric model. The model is specified below:

$$ENVC = f(\text{ROCE, NPM, DPS, and EPS})$$

Where: ENVC, ROCE, NPM, DPS and EPS represent Environmental Cost of Companies; Return on Capital Employed; Net Profit Margin; Dividend per Share; and Earnings per Share respectively.

The econometric form of the model is as follows:

$$ENVC = a_0 + a_1ROCE + a_2NPM + a_3DPS + a_4EPS + \mu_t$$

Where:  $a_0$ ,  $a_1$ ,  $a_2$ ,  $a_3$ ,  $a_4$  and  $\mu_t$  represent intercept, Impact of Return on Capital Employed, Impact of Net Profit Margin, Impact of Dividend per Share, Impact of Earnings per Share and Error terms respectively. The apriori expectation is that Environmental Accounting has a positive relationship with the Return on Capital Employed (ROCE), Net Profit Margin (NPM) Dividend Per Share (DPS) and Earnings Per Share (EPS) in the period under study. Amount spent by each company as their environmental cost was used as proxy for environmental accounting while Return on Capital Employed (ROCE), Net Profit Margin (NPM), Dividend Per Share (DPS) and Earnings Per Share (EPS) were used as proxy for firm profitability.

### 4.2 Data and Variables

Data for this research study were secondary data generated from Annual Reports and Accounts of Fourteen (14) randomly selected companies quoted on the Bombay Stock Exchange for the year 2007. The companies were drawn from various sectors including automobile, tobacco, chemical, Fertilizer, cement, pharmaceutical, oil and gas exploration and refinery, engineering, Food and personal care products, Glass and ceramics, telecommunications, Cable and Electric Goods, Leather and Tanneries, Synthetic and rayon, textile spinning and textile weaving. The formulae for calculating the ratios are presented in table 1 below.

**Table 1: Measurement of Variables**

Variables	Formula
Return on Capital Employed (ROCE)	$\frac{\text{Profit before tax}}{\text{capital employed}} \times \frac{100}{1}$
Net Profit Margin (NPM)	$\frac{\text{Net profit}}{\text{Turnover / sales}} \times \frac{100}{1}$
Dividend Per Share (DPS)	$\frac{\text{Gross dividend - preference dividend}}{\text{No. of ordinary shares in issues and ranking for dividend}} \times \frac{100}{1}$
Earnings Per Share (EPS)	$\frac{\text{Profit after tax before extra ordinary items less preference dividend}}{\text{No. of ordinary shares ranking for dividend}} \times \frac{100}{1}$

### 5. Limitations of the Study

Empirical research on corporate environmental disclosure is available largely for developed nations and very few is available for Asian countries. This research is probably one of the very few initial research works with respect to environmental accounting by Indian corporate. Hence, the extent of prior research literature available on environmental accounting reporting by Indian companies is limited. The sample size considered for this research is too small to generalize and conclude for diverse sectors of Indian companies. There is scope for doing further theoretical and action research in this field.

### 6. Empirical Analysis

The results for different measures of environmental accounting and profitability of the firms including Return on Capital Employed, Net Profit Margin, Dividend Per Share and Earning Per Share are presented in the following section. First, the descriptive analysis is presented followed by multiple regression analysis to see the association between Net Operating Profitability and all independent variables. The data obtained from the various financial statements are presented in a tabular form as shown in table 1 below:

**Table 2: Descriptive Statistics of Variables for Various Firms**

Name of Organization	ENVC Rs.	ROCE %	NPM %	DPS Rs.	EPS Rs.
Asea Brown Boveri Limited	20,600,000	67	17	65	501
Bharat heavy Electrical Limited	19,400,000	19	5.5	60	388
Indian Tobacco Company Limited	14,000,000	75.5	9.9	55	2.12
Infosys Technologies	11,400,000	86.6	3.5	45	80
Hindustan Lever Limited	17,800,000	42.8	5.8	50	649
Hindustan Zinc Limited	52,900,000	34.5	15.5	70	926
Mahindra & Mahindra	58,500,000	8.7	27.6	45	11.1
Oil and Natural Gas Corporation Limited	7,600,000	52.5	6.5	30	35
Reliance Industries Limited	4,000,000	33.9	5.4	25	27
Sterlite Industries Limited	800,000	18.6	13.8	25	25
Sun Pharmaceuticals Industries Limited	1,700,000	37.6	1.6	20	5
Suzlon Energy Limited	4,00,000	44.4	15.8	40	78
Tata Motors	5,000,000	39.3	1.5	35	2
Wipro Technologies	31,600,000	31.2	27	55	315

**Source: 2007 Financial Statements of Various Companies**

In analyzing the data presented in the above table, the ordinary least square regression method was used with the E-View (3.1) version. The result of the data analysis is presented below.

**Table 3: Result of Regression Analysis**

Variable	Coefficient	Std Error	t-Statistic	Prob.
ENVC	8939618	7253516.	-1248435	0.3562
ROCE	-29863504	13093548	-3.579789	0.0250
NPM	85688928	45425547	2.633716	0.0410
DPS	73438732	1462412	4.802550	0.0021
EPS	-806577.6	387849.9	-1.964308	0.0872
R-squared	0.859172	Mean dependent var		16958142
Adjusted R-squared	0.777678	S.D dependent var		15885459
S.E of regression	8245645	Akaike info criterion		35.83694
Sum squared resid	5.98E+12	Schwarz criterion		37.17405
Log likelihood	-249.4506	F-statistic		12.95815
Durbin-Watson stat	2.149650	Prob(F-statistic)		0.001372

**Source: E-View output**

From the result above, the regression equation is rewritten as:

$$\begin{aligned} \text{ENVC} &= 8939618 - 29863504\text{ROCE} + 85688928\text{NPM} + 73438732\text{DPS} - 806577.6\text{EPS} \\ \text{T-Ratio} &= (-1248435) (-3.579789) (2.633716) (4.802550) (-1.964308) \\ \text{R-Squared} &= 0.859172 \text{ Adjusted R-Squared} = 0.777678 \text{ S.E of Regression} = 8245645 \\ \text{F-Stat} &= 12.95815 \text{ DW Statistic} = 2.149650 \end{aligned}$$

From the result presented above, all the variables except Return on Capital Employed (ROCE) and Earnings Per Share (EPS) are in line with the apriori expectation. It can also be seen that Environmental Accounting has a positive relationship with the Net Profit Margin (NPM) and Dividend Per Share (DPS) and a negative relationship with Return on Capital Employed (ROCE) and Earnings Per Share (EPS) in the period under study. Using the Coefficient of variation from the model presented above, it will be observe that autonomous Environmental Accounting which is represented by Environmental Cost (ENVC) is a negative 8839618 when all other variables are held constant.

Consequently, a unit change in Environmental Cost (ENVC) will lead to negative change of about 29863504 units in ROCE less the autonomous component provided all other variables arc held constant. Also, a unit change in ENVC provided all other variables are held constant will have a positive change of about 85688928 units in NPM less the autonomous component. Furthermore, a unit change in ENVC will lead to a positive change of about 73438732 units in DPS less the autonomous component. And a unit change in ENVC will lead to a negative change of 806577.6 units in EPS.

Using the T- Ratio to test for their statistical significance, it is evident that only NPM and DPS variables are statistically significant. This is due to the fact that their observed T- values are positive and above the "rule of thumb of 2". The other variables are statistically insignificant because their observed t-values are either negative or far less than the 'rule of thumb' of 2. From the R- squared of 0.859172, the regression co-efficient indicates that about 83% of the changes in the dependent variable are explained by the changes in the independent variables. The F- value of 12.95815 indicates that the parameter estimate cannot be dismissed at 5% level of significance. This is due to the fact that the calculated F- value is more than the critical K-value. The D.W statistic of 2.149650 indicates the absence of auto - correlation since it is up to rule of Thumb of 2. In the course of this research, some hypotheses were formulated and they include:

- Ho<sub>1</sub>: There is no significant relationship between Environmental Accounting and Return on Capital Employed.
- Ho<sub>2</sub>: There is no significant relationship between Environmental Accounting and Net profit Margin.
- Ho<sub>3</sub>: There is no significant relationship between Environmental Accounting and Dividend per Share.
- Ho<sub>4</sub>: There is no significant relationship between Environmental Accounting and Earnings per Share.

To test for the above hypotheses, the researcher had to consider the test of significance, which is the F-statistic. The tool of F-statistic helps in determining the overall joint significant of the explanatory (independent) variables on the dependent or explained variable. At 5% level of significance, K critical or F tabulated is 0.001 when comparing this with the calculated value from the above table, which is 12.95815. The decision rule is that, if the calculated value is greater than the tabulated, reject null hypothesis (Ho). Hence, the null hypotheses are rejected since f-cal (12.95815) is greater than the f-tab (0.001). It indicates that the explanatory variables are jointly significant at explaining or causing much variation in the dependent variable (Environmental cost). The null hypothesis is therefore rejected, which mean that Environmental Accounting has significant relationship with the various variables used in measuring firm profitability. It is also necessary to note that this relationship with the variables of corporate performance is either positive or negative.

## 7. Conclusion

Environmental costs cover all cost; incurred concerning environmental protection such as emissions treatment as well as wasted material, capital and labour which so called 'non product output' as a result of inefficiency production activities. Different firms may consider different elements into environmental costs but it is important that all significant and relevant costs are incorporated for sound decision making purpose. The general picture, which emerges from current reporting, is that since the disclosures of environmental information are voluntary, there is a diversity of reporting practice.



Large companies tend to report more environment information in their annual reports than the medium-scale businesses; and the disclosure, tend to be more qualitative than quantitative despite the fact that there is a significant relationship between environmental accounting and Firm Profitability.

## 8. Recommendations

Based on the findings of this study the following recommendations are made:

1. Government should make Environmental Reporting in annual reports compulsory since most organization hardly report their environmental activities in their report;
2. Government agencies should give tax credit to organizations that comply with its environmental laws of the land which will encourage environmental reporting.
3. Corporate organizations on their part should ensure that they comply with the environmental laws of the nation as it will go a long way in enhancing their performances.

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