Environmental Disclosures and Size of Selected Indian Firms

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Abstract

Business responsibility is an easily said but hard to assume construct of sustainability literature. Out of the nine principles of Business Responsibility Reporting (BRR), the sixth principle envisages the environmental concerns of the businesses. The objective of this study is to explain the response of corporate entities towards Environmental Concerns (EC). The environmental concern of an organization has been gauged through environmental disclosures by these firms under the sixth principle of BRR. The general lack of emphasis on environmental disclosures still remains to be a key challenge to encourage Indian corporate houses to develop and adopt clean technologies, energy efficiency and renewable energy initiatives. The role of clean technologies/environmental technologies is pivotal in ensuring adequate environmental disclosures. But the moot point is, do the firms of certain size would disclose more on EC. There is plenty of literature which suffices the relationship of size and environmental disclosure but by appearing green (disclosures) an organization cannot be green. An organization will be green through its clean technology and energy initiatives. There is a major shift in the sustainability literature by focusing on prevention rather than damaging and curing later. Clean energy initiatives are the first steps to towards preventing/minimizing the environmental damage. Therefore, the next important question arises what explains the variation in clean energy initiatives in an organization. Is it the size of the firm or regulation which leads to disclosing environmental concern (EC.?) The relationship between size of the firm and environmental disclosures related to EC has been found to be significant by applying't' test in the selected sample of 40 companies, while the variation in clean technology

initiatives in the same sample has been measured using binary logistic regression. Out of the two independent variables i.e. size and environmental concern it is established that instead of size it is the regulation which significantly pushes companies towards clean technologies and energy initiatives.

Keywords: Environmental disclosures, Clean Energy Initiatives, Binary Logistic Regression

Introduction

The lack of environmental disclosures still remains to be a key challenge to encourage Indian corporate houses to develop and adopt clean technologies, energy efficiency and renewable energy initiatives. It is important for businesses to assess the environmental risks and issues at local and global level. In order to meet this sustainability challenge it is pertinent to involve internal as well as external stakeholders of the business to preserve environment (Miles & Datta, (2012). Although under the National Voluntary guidelines (NVGs) as formulated by Ministry of Corporate affairs emphasis has been laid upon sustainability disclosures but the quality, sufficiency, adequacy, accuracy and details of disclosure parameters still needs a validation. Most often annual reports do not adequately capture environmental performance, hence leading us to believe that whatever performance these companies are boasting of isn't the true one (Chaterjee, 2012). Before the advent of NVGs 2011, India had no formal environment performance disclosure guidelines for listed companies in their annual reports. However under the requirements of companies act 1956 companies would at the most disclose energy conservation measures adopted by them (Khandelwal, 2011). Subsequently SEBI mandated these guidelines under clause 55 of listing agreement and mandated it for top 100 companies by market cap to disclose about environmental concerns (EC) under business Responsibility framework.

Review of literature

Cohen, (1998), has reviewed vast economics literature on monitoring and enforcement of environmental policy. In his paper he has studied both public and private mechanisms designed to compel firms to comply with both formal and informal environmental regulations. He has studied both positive theories based on incentives as well as normative theories based on punishment. Considering the fragmented nature of literature inventory on environmental enforcement this article puts everything together and helps in understanding what impedes environmental enforcement. Gupta (n.d.) analyzed the Indian corporate sector with respect to environmental

disclosures and found that only of few companies were voluntarily disclosing on environment. The major reasons identified for this were lack of environment legislations mandating such disclosures. A positive relation was found between Large High polluting Industries with high debt equity ratios and environmental performance. Mathews, (2000), delves upon the aspects of social and environmental accounting. This paper examines the social and environmental accounting literature over period of 25 years (1970-1995). This paper also explores the involvement/adaptation of cost and management accounting techniques in these emerging fields. Although a lot of management accounting information is generated for the internal use of the management and not for other stakeholders but nevertheless the benefits of saving environmental cost (damages) cannot be ruled out. Khanna, (2001), points towards the shift in the approach towards environment protection from regulation driven to being self-regulated one i.e. from 'government push' to 'business led.' This paper provides a glimpse of non-mandatory approaches and their implications towards economic and environment performance. A study by Nurhayati et. al. (2006) found that size of the firm and type of the Industry explains better the extent of Natural Environmental disclosures in Indonesian companies than others. The mattered most because the larger firms are more under public scanner and are subjected to regulatory scrutiny. Montabon et al (2006) has researched Environment Management Practices from 45 corporate reports based on their environmental reporting data. Their study found a relationship in EMPs performance measures as depicted in the earlier studies. Brammer and Pavelin (2008), the paper studies the quality of disclosure along the five aspects of quality of disclosure. These aspects such as group-wide environmental policies, environmental impact targets and environmental Audit are studies with respect to the size of the firm and its nature of business. It was found that larger firms in the sectors related to environmental concerns have high quality of disclosures on the other hand media exposure had no role play in ensuring environmental disclosures. Beck, Campbell and Shrives (2010), this paper applies content analysis to study the environmental disclosures. It found a few significant differences in the environmental reporting between United Kingdom and German companies over a period of five years. They found that diversity of information has widened over a period of time. Dawkins and Fraas (2011), have studied relationship between corporate environmental performance and the level of voluntary environmental disclosures. They have meaningfully approached towards the environmental strategies and disclosures of the companies in enhancing the company visibility and climate change visibility leading to enhanced environmental performance. Amongst the various environmental items studied are beneficial products and services, pollution prevention, recycling, clean energy, substantial emissions, climate change

etc. Galani et. al. 2011, studies Environmental disclosures of companies in Greece with respect to their firm sizes and found a positive relation between size of the firms and their level of environmental disclosures. They also studied profitability (EBIDITA) and listing status but their failed to explain the level of environmental disclosures in a firm. The paper also revealed that only 5 % companies disclosed expenditures related to environment protection. Oba & Fidido (2012) studied environmental disclosures in Nigeria for businesses in two Industry types i.e. Oil and natural gas and Construction. The environmental disclosures for both Industries were scanty but oil and natural gas Companies faired better than Companies in Construction sector. The study recommended an existence of a formal framework to increase the comprehensiveness of disclosures. It also suggested corporates to perceive environmental reporting to be their moral and corporate duty. Schot, J. (1992), this paper focuses on constructive technology assessment and active management of process of technological change. Technological assessment (TA) helps government in framing strategic technology policies and changing the technological environment. This is very useful especially in case of clean technologies like solar energy or nuclear energy by inviting opinions from various interested groups. Here the government acts as a creative social regulator of technological change. It also acts as a practical instrument for public policy making. In this scenario Government through its policies and regulations becomes an actor of stimulating shift towards clean technologies. Kemp, (1994), delves upon the technological shift from hydrocarbon based technologies to more sustainable environment friendly technologies. But this shift is going to be gradual because there is cost attached to these technologies. As far as technologies based on renewable sources are concerned except for hydro-power and nuclear power other sources are yet to be cost efficient apart from other policy and regulation thrusts required to bring them in vogue. Institutional and public policy support are required for fundamental changes in energy technologies which yield environmental benefits. Zhang (2008), in his study has highlighted the Environmental issues faced by the Asian region. This region is in a state of dilemma that whether it should try to uplift its world's one third poor population through industrial development or should walk on the path of sustainable development. However there are options for sustainable development by way of national responses towards policies on environmental concerns, emission control, use of bio fuels and unconventional energy resources. He has also talked about private sector engagement through drawing the attention of financial institutions towards Environmental Performance to be an importance indicator. He has specifically emphasized upon right policy mix backed by local, national and regional cooperation towards maintaining environment quality

Hypothesis

H1: There is significant mean difference between environmental concerns (ECs) of firms of larger size

H2: The size of the firm and ECR (predictor variables) are not independent of clean technology & energy initiatives (response variable) i.e. All beta coefficients are not equal to zero.

Methodology

Objectives of the study

The key objectives of this paper are as follows:

1. To find the nature of Environmental Concern (EC) in the annual reports of selected Indian companies.
2. To gauge the extent of EC (Environmental disclosures) in the annual reports of selected Indian companies.
3. To identify whether the environmental disclosures vary across the size of a firm.
4. To find if companies of certain size and with Environmental Concern Regulation (ECR represented through Environmental disclosures except clean technology and energy initiatives) are undertaking clean technologies & energy initiatives (CTEI).

Broad Research Statement

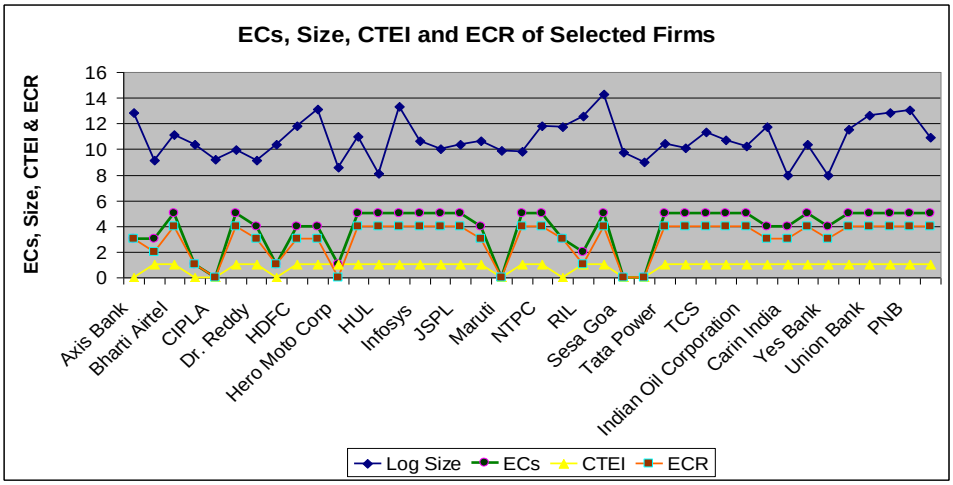
Environmental Concern (Environmental disclosures) in annual reports are significantly different based upon the size of the firm and predicting whether or not a firm would undertake Clean technology & energy initiatives (response variable) given its size and Environmental Concern Regulation (ECR) (predictor variables)

Sample Selection and Data Collection

Since the objective of this study is to explain the response of firms towards Environmental Concerns (ECs). The environmental concerns of an organization are gauged through environmental disclosures by these firms under the sixth principle of BRR. Data has been collected from the annual reports of selected 40 firms regarding environmental disclosures under five parameters where in, the first one is related to clean technology, energy efficiency and renewable energy initiatives, the second is related to projects related to clean development mechanism with a mention of environmental compliance report, the third is related to identification and assessment of potential environmental risks, the fourth one relates to extension of ECs to the Group/Joint Ventures/Suppliers/Contractors/NGOs/others and the fifth and the last is related to strategies/ initiatives to address global environmental issues such as climate change, global warming, etc. The

general lack of emphasis on environmental disclosures still remains to be a key challenge to encourage Indian corporate houses to develop and adopt clean technologies, energy efficiency and renewable energy initiatives. It is

Figure 1



important for businesses to assess the environmental risks and issues at local and global level. In order to meet this sustainability challenge it is pertinent to involve internal as well as external stakeholders of the business to preserve environment (Miles & Datta, (2012). Although under the National Voluntary guidelines (NVGs) as formulated by Ministry of Corporate affairs which helped shape BRR, emphasis has been laid upon sustainability disclosures but the quality, sufficiency, adequacy, accuracy and details of disclosure parameters still needs a validation. Very often annual reports do not adequately capture environmental performance, hence leading us to believe that whatever performance these companies are boasting of isn't the true one (Chaterjee, 2012). Nevertheless the role of clean technologies/environmental technologies is pivotal in ensuring adequate environmental disclosures.

Research Method and Statistical Model

Analysis of data and hypothesis testing has been done by using an Independent sample t-test which is a parametric test. Hypothesis formulation and testing on the sample data is pertinent to settle on the validity of results. The Independent t test studies each variable in isolation by comparing the means of two groups and establishing whether or not they are statistically different. In order to find if the firms of certain size would disclose more on Environment Concerns (ECs) an independent sample t test has been used to analyze the mean differences of the data on the basis of size of the firm. There is plenty of literature which suffices the relationship of size and

environmental disclosure but by merely appearing green (disclosures) an organization cannot be green. An organization will be green through its clean technology and energy initiatives. There is a major shift in the sustainability literature by focusing on prevention rather than damaging and curing later. Clean energy initiatives are small but significant steps towards preventing/minimizing the environmental damage. Therefore, the next important question arises what explains the variation in clean energy initiatives in an organization, is it the size of the firm or regulation with respect to disclosing environmental concern. The variation in clean technology initiatives in the selected sample has been measured using binary logistic regression. Out of the two independent variables i.e. Size and Environmental Concern Regulation (ECR) (Environmental disclosures under BRR regulation as mandated by SEBI except CTEI disclosure) the binary logistic model intends to find whether size or the regulation pushes companies to shift towards clean technologies and energy initiatives.

Logistic regression equation/model:

$$logit(p) = a + b1x1 + b2x2$$

$$logit(p) = a + b1EC + b2Size$$

Model Variables

Table 2

Variables Incorporated	Explanation	Proxy	Nature of Variables
Dependent Variable Picked			
CTEI	Clean Technology and Energy Initiatives	If Disclosed then 1 otherwise 0.	Dichotomous
Independent Variables Picked			
Size	Total Assets of the Firm	Log Size	Continuous – Interval Variable
ECR	Environmental Concern Regulation (Environmental disclosures under BRR except CTEI disclosure)	No. of disclosures	Continuous - Interval Variable

Empirical Results and Discussion

Result of‘t’ test

Since the literature affirms that the firms of certain size would disclose more on EC an independent sample‘t’ test has been used to analyze the mean differences of the data on the basis of size of the firm. The relationship between size of the firm and environmental disclosures related to EC has been found to be significant by applying‘t’ test in the selected sample of 40 companies. There is a significant difference in the scores for larger (M=4.45, SD=.887) and smaller (M=3.15, SD=.477) firms (refer

Table 2); t (25.374) =2.515, p = 0.019 (refer Table 3.) This implies that firms of larger size disclose more on Environmental concerns (ECs.)

Table 3
Group Statistics

	Log Size	N	Mean	Std. Deviation	Std. Error Mean
ECs	>= 10.50000000	20	4.45	.887	.198
	< 10.50000000	20	3.15	2.134	.477

Table 4
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
ECs	Equal variances assumed	31.444	.000	2.515	38	.016	1.300	.517	.254	2.346
	Equal variances not assumed			2.515	25.374	.019	1.300	.517	.236	2.364

Result of Binary Logistic Regression

The variation in clean technology initiatives in the selected sample has been measured using binary logistic regression. Out of the two independent variables i.e. Size and Environmental concern (Environmental disclosures under BRR regulation as mandated by SEBI, it is found that instead of size it is the regulation which significantly pushes companies towards clean technologies and energy initiatives. The results of Binary Logistic Regression are as follows:

Case Processing Summary

Table 5

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	40	100.0
	Missing Cases	0	.0
	Total	40	100.0
Unselected Cases		0	.0
Total		40	100.0

a. If weight is in effect, see classification table for the total number of cases.

The minimum ratio of valid cases to independent variables for logistic regression is 10 to 1, with a preferred ratio of 20 to 1. In this analysis, there are 40 valid cases and 2 independent variables. The ratio of cases to independent variables is 20 is to 1, which satisfies not just the minimum requirement but also the preferred requirement (Table 4.)

Goodness of Fit of the Model

Table 6

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients		
			Constant	LogSize	ECnew
Step 1	1	24.449	.199	-.145	.853
	2	20.813	1.421	-.308	1.242
	3	20.140	2.867	-.471	1.482
	4	20.081	3.597	-.551	1.579
	5	20.080	3.699	-.562	1.592
	6	20.080	3.701	-.562	1.592
	7	20.080	3.701	-.562	1.592

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 40.032

d. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Our Initial - 2 log likelihood is 40.032 but after the independent variables are entered into the Block 1, the - 2 log likelihood again measured is 20.080 (Table 5). The difference between ending and beginning -2 log

likelihood is the model chi-square that is used as the test of overall statistical significance.

Table 7
Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	19.952	2	.000
	Block	19.952	2	.000
	Model	19.952	2	.000

In our model, the model chi-square is 19.952 (40.032 – 20.080), which is statistically significant at $p<0.05$ (Table 6). This validates the relationship between the dependent and the chosen set of independent variables.

Strength of the Model

Table 8
Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	20.080[a]	.393	.621

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

The model summary table above shows the Cox & Snell R Square and Nagelkerke's R Square, which is a modification of former and considered as a better indicator. These are considered to be the measures of strength of association of the model. These are called as Pseudo R squares and their values are generally much lower that the R squares in the Ordinary Least Square Regression. Their values lie between 0 and 1. Since Nagelkerke's R Square is .621, it implies that the model moderately explains the variance by 62% (Table 7.)

Table 9
Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	1.767	8	.987

Another measure of Goodness of Fit test is Hosmer-Lemeshow test (Table 8). It indicates how well the model with predictors fits the data over the null model with no predictors. An H-L goodness-of-fit test statistic which is greater than .05 is specified for well-fitting models. This implies that we

fail to reject the null hypothesis that there is no difference between observed and model-predicted values.

Table 10
Classification Table

Observed			Predicted		
			CTEI		
			0	1	Percentage Correct
Step 1	CTEI	0	6	2	75.0
		1	2	30	93.8
	Overall Percentage				90.0

a. The cut value is .500

The classification table (Table 9) is another measure of fitness of model. It doesn't have any significance value but it's a rudimentary way of finding out the overall percentage of model fit which is 90%. This implies that 90% of companies which have undertaken CTEI and have disclosed them have been accurately classified as having done a disclosure (1) and not done a disclosure (0). Moreover out of the total companies which have undertaken CTEI and disclosed them (1), 93.8 % have been accurately predicted.

This table also talks about the sensitivity, specificity and predictive values of the test itself. Following are the calculation of these test characteristics:

Sensitivity [Observed (1) Predicted (1)]

It refers to the 'True Positive' out comes of our test i.e. 30/ (31+2) = 93.75%. It refers to the statistical power of a test. This implies that companies which have undertaken CTEI have been 93.75 % correctly predicted.

Specificity [Observed (0) Predicted (0)]

It refers to the 'True Negative' outcomes of our test i.e. 6/ (6+2) = 75%. This implies that companies which haven't undertaken CTEI have been correctly predicted.

False Positive [(Observed (0) Predicted (1)]

It refers to False positive outcomes of our test i.e. 2/ (6+2) = 25%. It falsely asserts that companies haven't undertaken CTEI but they have been predicted to have it. It's an error or mistake in detection very much similar to type I error. Putting it simply in 2 out of 8 it is wrongly predicting CTEI when it's not there.

False Negative [(Observed (1) Predicted (0)]

It refers to False Negative outcomes of our test i.e.2/ (2+30) = 6.25%. It falsely asserts that companies haven't undertaken CTEI when they are observed to have it. It's a mistake like an undiagnosed disease similar to type II errors. It pinpoints towards the failure of policy to unearth the difference between appearing green and being green. But in our case only 2 companies out of 32 companies is wrongly predicted bringing down the percentage of false negatives to mere 6.25%. It's an encouraging result.

Hence, if it is argued that our companies are a population that lacks clean technology energy initiatives (CTEI) and it depends upon Environmental Concern Regulation (ECR) disclosures mandated under business responsibility reporting and size of the firm to ensure replenishment of this lacking, we will have to scan the predictability of the model. Therefore in order to gauge to what extent this study is successful in diagnosing this we look up to the sensitivity and specificity of the model. Though a test with highest sensitivity and specificity is considered best for diagnosing but it is tough to get one in real life situations. Fortunately in this study sensitivity (93.8%) and specificity (75%) both are high with low possibility of either type I error (25%) or type II error (6.25%) in our hypothesis testing.

Relationship of Individual Independent variables with the dependent Variable

First of all we will examine the multi-collinearity in the table given below. It is detected by examining the standard errors for the beta coefficients. A standard error of more than 2.0 indicates multi-collineraity amongst the independent variables. Hence results for such variables are not interpreted. But in our model none of the variables have Standard error more than 2.0 implying that there is no such numeric problem as multi-collineraity (Table 10). Now let's interpret variables in equation one by one.

Table 11

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Log Size	-.562	.498	1.275	1	.259	.570
	ECR	1.592	.529	9.045	1	.003	4.913
	Constant	3.701	4.818	.590	1	.442	40.470

a. Variable(s) entered on step 1: Log Size, ECR.

Size The independent variable size has been controlled by taking its log and also it is centralized to purge out numeric problems like multi-collinearity The Probability of Wald statistic for variable size is 0.259 which

is higher than the level of significance of 0.05 leading to acceptance of null hypothesis that the beta coefficient for size is equal to zero (Table 10.) This is a scant reflection of the relationship that companies which have larger size would undertake clean technology energy initiatives (CTEI.)

Environment Concern Regulation (ECR)

The Probability of Wald statistic for variable EC without CTEI is 0.003 which is significant at p value equal to or less than 0.05 leading to rejection of null hypothesis that the beta coefficient of environment concern (EC without CTEI) is equal to zero (Table 10.)

Conclusion

The study is based on two hypotheses, one which examines if the firms of certain size would disclose more on ECs using an independent sample t test. The relationship between size of the firm and environmental disclosures related to EC has been found to be significant which is evidenced in literature e.g. Nurhayati et. al. (2006), Brammer and Pavelin (2008), Galani et. al. (2011.) Since disclosures are just a way of appearing green but in order to become green an organization should undertake clean technology and energy initiatives. In order to capture this major shift in the sustainability literature, variation in clean technology initiatives in the selected sample has been measured using binary logistic regression. Out of the two independent variables i.e. size and environmental concern regulation (ECR), it was found that it's not size but the ECR that is pushing companies to move towards clean technologies and energy initiatives. The study also leaves ample scope for future studies with larger sample size to find which other firm characteristics apart from size leads to improved ECs and which other independent variables would push adoption of clean technology energy initiatives (CTEI) amongst firms.

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