

Impact of Environmental Accounting Measures on Environmental Costing Disclosure in Libyan Oil and Gas Industry

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ABSTRACT

The oil and gas industry is among the industries that have the greatest impact on the environment due to the nature of industrial processes. It also increases the amount of hazardous waste generated by the industry. In recent years, the focus has shifted to social and environmental issues and the need to disclose environmental information has emerged, both through annual financial reports, through other means of disclosure. Therefore, aim of this particular study is to identify the antecedents of weak environmental cost disclosure in Libyan oil and gas industry by examining the impact of environment accounting measures. The proposed design has five constructs as antecedents: Accounting Practices (AP), Accounting Standards (AS), Law and Policies (LP), Organisation Awareness (OA), Public Auditing (PA); and one outcome variable, Environmental Costing Disclosure. The population for this research is all the Libyan employees of financial accounting related jobs in oil and gas industry in Libya, and the samples were collected from seven organisations. Questionnaire is the main instrument for collecting data, the questionnaire is built based on different sources from previous studies. Participant opinion for the variables shows that Environmental costing disclosure has a lower rate of 46.2% and all other perceptions are in similar level. The five antecedents have significant relations and can explain up to 38% of the Environmental Costing Disclosure variance

Keywords

Accounting Practices, Accounting Standards, Law and Policies, Organisation Awareness, Public Auditing, Environmental Costing Disclosure, Oil and Gas, Libya

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Introduction

Environmental pollution has become an economic, social and political problem in the world due to the great damage done to the environment that led to an imbalance in the environment in the world (Schaltegger & Burritt, 2017). Therefore, many societies and organizations have taken practical steps to protect the environment and reduce the effects of pollution. There was a strong tendency for companies to disclose information about their policies, goals, environmental activities, environmental costs, consequences, and outcomes (Ioannou & Serafeim, 2017). The oil and gas industry is among the industries that have the greatest impact on the environment due to the nature of industrial processes. It also increases the amount of hazardous waste generated by the industry (Hosenuzzaman et al., 2015). In response, environmental accounting is rapidly evolving, especially in large companies that have found the right environment to be essential to competitive success (Russell, Milne, & Dey, 2017). Studies have proven that companies can improve their environmental performance by applying environmental accounting (Hackett, 2017). This has led to the need to reveal its various environmental activities in addition to paying attention to environmental costs, methods of measurement and disclosure, and their contribution to decision-making and performance evaluation (Schaltegger & Burritt, 2017). Studies also indicate that although environmental costs are important and now account for a large proportion of total corporate costs, managers are still ignoring them because the information provided by the traditional accounting system is incomplete (Unerman, Bebbington, & O'dwyer, 2018). In recent years, the focus has shifted to social and environmental

issues and the need to disclose environmental information has emerged, both through annual financial reports, through other means of disclosure (Schaltegger & Burritt, 2017). For its contribution in giving clear financial indicators about environmental performance.

The aim of this particular study is to identify the antecedents of weak environmental cost disclosure in Libyan oil and gas industry by examining the impact of environment accounting measures.

Literature Review

Environmental Costing Disclosure

Environmental Cost Accounting is the enhancement of environmental expense details right into existing price audit treatments. The disclosure of environmental information is one of the vital components in an environmental record. The significance of this disclosure is that it makes it possible for the events using the info to obtain an understanding of the company's stand on environmental preservation, and just how to particularly deal with environmental concerns (Figge & Hahn, 2013; Ojiakor, Obodoekwe, & Ozioko, 2018).

Environmental Cost Accounting manage environmental expenses in order to get to the complete expense audit. It is the recognition, analysis, and allowance of traditional prices, environmental expenses, and social prices to procedures, items, budget plans, or tasks (Schaltegger & Burritt, 2017). According to the polluter pays concept (PPP), each polluter needs to spend for the prices for managing the contamination arising from his procedure. Failing to birth these prices by the

polluter will certainly indicate that a few other celebration (a 3rd party) will certainly need to carry them - outside environmental expenses (Heine, Faure, & Dominioni, 2020). The term environmental price contends the very least two significant measurements: (i) It can refer entirely to prices that have straight influence, "personal expenses"; (ii) It can additionally consist of the expenses to people, culture, and the environment for which a business is not answerable "social expenses".

Environmental expenses are such expenses of company in a business targeted at satisfying environmental management duties, the application of nationwide environmental management plans, legislations and policies, and procedures in order to avoid unfavorable influence on the native environment (Ten Verge, 2017). It consists of such prices that take ideal steps to attain environmental goals. It likewise consists of the decrease of contaminant discharges, waste product recycling and disposal, environmental monitoring, environmental management tasks to sustain environmental and social damages settlement prices (Lewis, Gertsakis, Give, Morelli, & Sweatman, 2017).

Environment Performance of Industrial Companies in Libya

A relevance action of environmental efficiency is the main around the world Environmental Performance Index (EPI), which is a worldwide metrics for the environment arranged and taken care of by Yale facility for environmental regulation and plan. With twenty years of experience, the EPI exposes a stress in between two basic measurements of lasting advancement: (1) environmental wellness, which increases with financial development and success, and (2) ecological community vigor, which comes under pressure from automation and urbanization. Excellent administration becomes the important element needed to stabilize these distinctive measurements of sustainability. The level of the EPI index varying from 0 - 100 factors, the higher the much better on the high quality of environmental efficiency in the nation, Table 1 reveals Libya's worldwide ranking according to the EPI index.

EPI indicator of Libya is around 50% and the Rank of Libya is allocated in the middle countries with little drop of the 2018 rank compared to 2010. The results show that Libya practices have no change within the last decade.

Table 1. EPI Indicator of Libya Since 2010

EPI Indicator	Countries Count	Rank	Year
49.79	180	123	2018
63.29	180	119	2016
42.72	178	120	2014
61	132	123	2012
50.1	163	117	2010

Source: Prepared by author from data collected from ([http://archive .epi .yale.edu](http://archive.epi.yale.edu))

Hypotheses Development

The research study framework of this research study check out the effect of business accountancy steps on environmental costing disclosure (ECD). Some scholastic scholars have actually disputed on the problem of sustainability coverage, yet they have not dig deeply in the setting of disclosure, neither do they have broad arrangement on what are the finest variables that will certainly advertise the environmental

costing disclosure, which are Organization Awareness (OA), Accounting Practices (AP), Accounting Standards (AS), Law and Policies (LP), and Public Auditing (PA).

The suggested model in this research is a customized model based upon Stakeholder theory, theory of legitimacy, and some associated researches. The recommended model in this research is displayed in Figure 1.

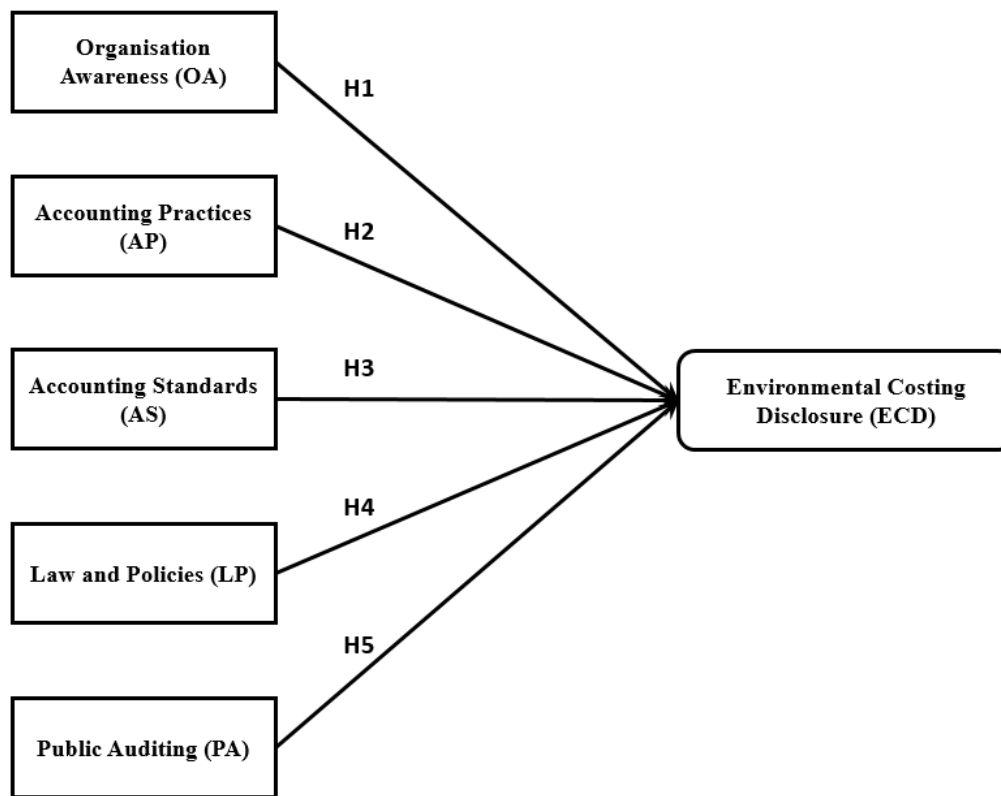


Figure 1. Conceptual Model and Hypotheses

Organizational awareness is a degree of understanding of different facets of the company consisting of business, framework, and society of the company. It likewise includes an understanding of the political, social, environmental, and financial concerns impacting the company (Eriksen, 2018; Gaynor, Kelton, Mercer, & Yohn, 2016). In accounting, organizational awareness requires accountants to recognize the organization's responsibility, policies, and environmental structure. In addition, organize with other workers to work effectively (Powell & DiMaggio, 2012). Ekara Helfaya and Moussa (2017) proved the relation between awareness & orientation and environmental sustainability disclosure (Ekara Helfaya & Moussa, 2017). In addition, Johnson (2015) proved the relation between managers awareness and CSR practices (Johnson, 2015). And finally, Ahmad (2014) found a positive relationship between environmental awareness issues and the disclosure of environmental accounting information (Ahmad, 2014). Therefore, the following argument is hypothesized.

- **Hypothesis 1:** Organisation Awareness has a positive direct influence on Environmental Costing Disclosure

Accounting practice is the system of controls and treatments made use of by the accountancy division to tape and develop organisation deals. Preferably, bookkeeping technique need to be extremely constant, as there are a great deal of organisation deals that should be managed in specifically similarly in order to accomplish trusted financial declarations

(Crain, Hopwood, Gendler, Young, & Pacini, 2019). Auditors rely on consistent accounting practice when examining the company's financial statements. Regarding the recording and disclosure of costs of environmental performance in financial reports, an appropriate accounting system and procedures are necessary to ensure comprehensive and accurate environmental information is obtained (Bennett & James, 2017). Masud et al., (2017) proved the relation between environmental accounting and environmental reporting (Masud, Bae, & Kim, 2017). In addition, Ribeiro et al., (2016) proved the relation between accounting framework and environmental management practices (Ribeiro, Aibar-Guzmán, Aibar-Guzman, & da Silva Monteiro, 2016). And finally, Egbunike et al., (2018) proved the relation between social accounting practice and social disclosure; between environmental accounting practice and environmental disclosure; and economic accounting practice and economic disclosure (EGBUNIKE, EMUDAINOHWO, GUNARDI, KURNIASARI, & PRIHANTO, 2018). Therefore, the following argument is hypothesized.

- **Hypothesis 2:** Accounting Practices has a positive influence on Environmental Costing Disclosure

An accounting standard is an usual collection of concepts, criteria, and treatments that specify the basis of financial accounting plans and techniques. Accounting standards enhance the openness of financial coverage in all nations (Flower & Ebbers, 2018). In the USA, the Typically

Accepted Bookkeeping Concepts create the collection of accounting standards extensively approved for preparing financial declarations. Global business adhere to the International Financial Coverage Criteria, which are established by the International Accounting Standards Board and act as the standard for non-U.S. GAAP business reporting financial declarations (Choi & Meek, 2008; Flower & Ebberts, 2018). Egbunike et al., (2018) proved the relation between social accounting practice and social disclosure; between environmental accounting practice and environmental disclosure; and economic accounting practice and economic disclosure (EGBUNIKE et al., 2018). In addition, Basse et al. (2013) declared that the absence of standards for environmental reporting and disclosure greatly affects the standardization of reports and disclosure of environmental information in financial statements, annual reports and accounts (Basse, Effiok, & Eton, 2013). Therefore, the following argument is hypothesized.

- **Hypothesis 3:** Accounting Standards has a positive influence on Environmental Costing Disclosure.

Both law and policies are linked to the legal system at the national level. Law has completed the legislation process and become valid for implementation. The policy defines the objectives of a ministry or government agency as well as the methods and principles to achieve those goals. Policies are not laws, but can lead to the development of laws (Kerwin & Furlong, 2018). Many countries have been interested in enacting environmental laws that require companies to comply with environmental protection requirements. And policies on environmental performance, which have played an important role in improving environmental performance over the past decades (Haque & Ntim, 2018). Many studies argued that there is a positive relation between social and

Methodology

This study is following the scientific approach, therefore quantitative approach and deductive approach are applied. And the study uses different statistical techniques that applied via two statistical packages, SmartPLS for advanced PLS-SEM analysis, and SPSS for essential analysis. SmartPLS is used in many studies in social science research such as (Salem and Alanadoly 2020).

The population for this research is all the Libyan employees of financial accounting related jobs in oil and gas industry in Libya; therefore, quota sampling is the sampling technique suitable for this research. The samples were collected from seven organisations: National Oil Corporation, Brega Oil Marketing, Ras Lanuf Oil and Gas, Azzawiya Oil Refining, Sirte Oil, Arabian Gulf Oil, and Zuetina Oil. The estimated population is 1101 people and the actual sample size is 293 subjects based on Morgan's sampling table. For collecting the data, different methods are used including online digital survey and direct collection by distributing the survey in a variety of oil and gas companies within the Libyan county. Questionnaire is the main instrument for collecting data, the questions addressing employees' opinion about their companies' environmental costing disclosure. The

environmental disclosure and legal requirements. In specific, D'Amico et al., (2016) proved the relation between legislation and environmental disclosure (D'Amico, Coluccia, Fontana, & Solimene, 2016). In addition Ahmad (2014) found a positive relationship between existence of legal legislation and the disclosure of environmental accounting information (Ahmad, 2014). Therefore, the following argument is hypothesized.

- **Hypothesis 4:** Law and Policies has a positive influence on Environmental Costing Disclosure.

The term audit typically describes a financial declaration audit. A financial audit is an unbiased exam and analysis of the financial declarations of a company to see to it that the financial documents are an exact and reasonable depiction of the deals they declare to stand for (Gaynor et al., 2016). The audit can be carried out inside by staff members of the company or on the surface by an outdoors Cpa (Certified Public Accountant) company. A public audit entails bookkeeping a public entity's financial declarations and various other info (such as non-financial efficiency info) that the entity is called for to have actually investigated. There are various needs for various sorts of public entities. Audits additionally check out conformity with legal responsibilities, where those commitments have a product (huge sufficient to issue) impact on the financial declarations (Chambers & Rand, 2011; Knechel & Salterio, 2016). D'Amico et al., (2016) proved the relation between audit and environmental disclosure (D'Amico et al., 2016). Therefore, the following argument is hypothesized.

- **Hypothesis 5:** Public Auditing has a positive influence on Environmental Costing Disclosure.

questionnaire is built based on different sources from previous studies. And the questionnaire sources are as the following:

- Environmental Costing Disclosure (ECD) (Pava & Krausz, 1996; Schaltegger & Burritt, 2010; Shroff, 2017)
- Organisation Awareness (OA) (Bonilla Priego, Najera, & Font, 2011; Kotler & Lee, 2008; Lee, 2011)
- Accounting Practices (AP) (Saeidi, 2014; Thilakasiri, Kurukulasooriya, De Silva, & Dies, 2014)
- Accounting Standards (AS) (Al-Tuwaijri, Christensen, & Hughes Li, 2004; Bewley & Li, 2000; Reid, Carcello, Li, Neal, & Francis, 2018)
- Law and Policies (LP) (Dinkins, Wilkinson, Peloso, & Meriwether, 2010; McEldowney, 2017)
- Public Auditing (PA) (Alhelou, Taweel, Issam, Al Shobaki, & Abu-Naser, 2018; Reid et al., 2018).

Findings

Descriptive Statistics

For all variables in the valid dataset, the scores are varied between 2.17 (43.4%) and 2.52 (50.4%) and the results show

that respondents perceptions are allocated at dissatisfied level for the proposed variables of environmental costing disclosure. The results show that the respondents are not satisfy with their organizations' performance and disclosure

of environment costing and even not satisfy at all with the accounting and auditing practices. The results are shown Table 2.

Table 2. Descriptive Statistics of Research Variables

	Mean	Percent	SD
Environmental Costing Disclosure (ECD)	2.31	46.2	.704
Organisation Awareness (OA)	2.23	44.6	.69
Accounting Practices (AP)	2.41	48.2	.816
Accounting Standards (AS)	2.17	43.4	.662
Law and Policies (LP)	2.52	50.4	.738
Public Auditing (PA)	2.46	49.2	.793

Reliability and Validity

Table 3 reveals the outcomes of all the six variables, which reveal an appropriate degree of reliability. For Cronbach's Alpha reliability, the valued are varied from 0.81 to 0.90, which reveals appropriate degree of internal consistency.

Average Variance Extracted (AVE) score over 0.5 is the appropriate limit (Hair et al., 2014; Salem and Salem 2019). The results reveal that all scores are in the variety in between 0.58 and 0.71, which is an appropriate degree over the limit of 0.5.

Table 3. Internal Consistency Assessments of Research Variables

	Composite Reliability	Cronbach's Alpha	AVE
Accounting Practices (AP)	0.92	0.90	0.71
Accounting Standards (AS)	0.91	0.87	0.66
Environmental Costing Disclosure (ECD)	0.89	0.84	0.61
Law and Policies (LP)	0.87	0.81	0.58
Organisation Awareness (OA)	0.87	0.82	0.58
Public Auditing (PA)	0.88	0.84	0.60

Table 4 showed the Fornell & Larcker requirement matrix. The matrix is a polished matrix of the unexposed variables correlations. The examination achieves success if the worth in the diagonal is greater than any type of various other worth within the gone across column and raw (Hair Jr et al., 2016).

Accounting Practices (AP) has the worth of 0.84, which is greater than all the various other ratings within the common column and raw. All various other variables have the exact same standard and hence the seven research study variables have a sufficient degree of discriminant validity.

Table 4. Fornell & Larcker Criterion Matrix Assessment of Research Variables

	AP	AS	ECD	LP	OA	PA
AP	0.84					
AS	0.12	0.81				
ECD	0.34	0.46	0.78			
LP	0.15	0.23	0.28	0.76		
OA	0.22	0.08	0.33	0.08	0.76	
PA	0.36	0.02	0.23	0.04	0.14	0.77

Relations and Effectiveness of the Proposed Model

Results of Environmental Costing Disclosure (ECD), illustrate a satisfactory predictive power and a medium predictive relevance. R square value is 0.385 (a power of 38.5%) and the related Q square is 0.232 (a relevance of 23.2%). The prediction constructs (Accounting Practices (AP), Law and Policies (LP), Organisation Awareness (OA),

and Public Auditing (PA) can explain more 38% of the Environmental Costing Disclosure variance.

Table 5 shows the path coefficient assessment with the values of T Statistics and Beta values for the outcome variable Environmental Costing Disclosure (ECD). The five antecedents have significant relations, in which the p value scores are above 0.05 and the t statistics scores are above 1.65. The precedence for the relations based on the path coefficient value is AS (0.38), OA (0.23), AP (0.18), LP (0.15), and PA (0.12).

Table 5. Path Coefficient Assessment of Environmental Costing Disclosure (ECD)

	Path Coefficient	Standard Deviation	T Statistics	P Value (one tailed)	Status
AP -> ECD	0.18	0.05	3.32	0.0005	Significant
AS -> ECD	0.38	0.06	6.68	0.0000	Significant
LP -> ECD	0.15	0.04	3.43	0.0003	Significant
OA -> ECD	0.23	0.05	4.42	0.0000	Significant
PA -> ECD	0.12	0.05	2.24	0.0129	Significant

Conclusion

The proposed model have six variables, Accounting Practices (AP), Accounting Standards (AS), Law and Policies (LP), Organisation Awareness (OA), Public Auditing (PA), and Environmental Costing Disclosure (ECD). The perception of the respondents for the majority of the variables is dissatisfied. The core variable Environmental Costing Disclosure (ECD) has the percentage of 46.2%, which is allocated as dissatisfaction perception. For the five antecedents, Organisation Awareness (OA) has the lowest dissatisfaction level with rate 44.6% and the other four antecedents are below the margin of 50%. The results shows that the professional accountants in the oil and gas industry in

Libya are not satisfied with environmental costing disclosure or the performance and these perception is also mapped with the weakness in practices, laws, auditing, and awareness in the organisation. Environmental Costing Disclosure (ECD) illustrate a satisfactory predictive power of 38.5% and the precedence for the relations based on the path coefficient value is Accounting Standards (AS) (0.38), Organisation Awareness (OA) (0.23), Accounting Practices (AP) (0.18), Law and Policies (LP) (0.15), and Public Auditing (PA) (0.12). The measures of the predictive power is showing an acceptable results and therefore the proposed structural model is a successful tool for improving environmental cost disclosure and performance of the oil and gas industry in Libya.

Recommendation for Future Studies

This research study suggested a created model with brand-new constructs and relationships. While the model was examined efficiently, however even more study is required to examine the model in various settings. Among the restraints is the minimal technique of execution, which lowers the generalization, as a result duplicating the very same evaluation in oil and gas sectors in various other nations is suggested to obtain a far better understanding and

generalization. An additional restriction is the individuals' kinds and option, accounting professionals in oil and gas sector, which decrease the generalization, consequently reproducing the exact same evaluation in various other markets such as power is advised to obtain a far better understanding and generalization. Findings show that the proposed model can explain 38.5% of Environmental Costing Disclosure. However, the complement percentage (more than 60%) reveals that some various other variables perhaps creating this exposed variance. Additional researches need to concentrate in discovering, and taking a look at added factors, various other than organisational bookkeeping procedures.

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