

## Environmental Accounting Reporting: Case of Emerging Economy

\*Mahdi Salehi

Faculty of Economics and Administrative Sciences, Ferdowsi University of Mashhad, Iran.

\*Mahdi\_salehi54@yahoo.com

### Abstract

*The purpose of this research is studying on pharmaceutical and petrochemical companies' managers in the Tehran Stock Exchange in the field of environmental information disclosure. Data is collected via questionnaire. It is used the formal validity for validity assessment of questionnaires and Cronbach's alpha reliability test for measuring the sustainability / reliability with the rate of 77%. It is used the descriptive and inferential statistics for analyzing the data, so that two statistical communities means comparison test showed that managers of these two industries are willing to disclose information about costs and benefits of their own organization but they are facing with serious obstacles in this way. Disclosure of environmental information is resulted in added value of business unit and improved environmental conditions. Considering the environmental accounting in other countries, especially in advanced industrial countries has a history of several decades. However, research on environmental issues has little background in Iran despite of the subject importance. The basis of environmental research is the assessment of the managers' views about these issues. This study has been focused on this important issue as the first one of its kind.*

**Keywords:** *environmental accounting, environmental costs, industry, petrochemical, cement companies.*

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### Introduction

Environmental pollution comes from various sources. Now, with the advancement of human civilization, development of technology and the ever increasing population, the world is facing with problems as the air and land pollution on the earth threatening the residents' life, so that the environment protection is regarded as a serious matter by the statesmen in every country. Today, the environmental situation is such that people in a city or state are not safe of pollution effects in the other cities or countries.

Snow falling in Norway comprises of some pollutants originated from England and Germany or the acid rain in Canada is resulted from pollutants originated from the United States. Athena is sometimes forced to close the factories due to severe air pollution and limit Vehicles traffic. Other world cities like Mexico City, Rome and Tehran are also grappling with the problem of air pollution. Pollution of seas, rivers, lakes and forests is also a serious issue.

### Environmental pollution and the Ozone layer

One of the issues making concern the scientists in recent years is the *ozone layer depletion* and hole creation in this layer in Antarctica. Ozone layer is located in 16 to 48 kilometers from the earth's surface and protects the earth against the sun UV radiation. The radiation level reaching at the ground increases to 20 percent when the amount of the ozone layer decreases to 10%. UV radiation can cause skin cancer in humans and damage plants. *Chlorofluorocarbons* molecules (CFCs) are effective in destroying the ozone layer. These compounds are widely used in cooling devices and sprays.

These molecules find their way into the stratosphere due to the stability. Then, the C-Cl bond is broken by solar radiation effect. The resulted chlorine atom attacks to an ozone molecule and a CLO molecule is appeared. This molecule is in turn combined with oxygen and O<sub>2</sub> molecule and Cl atom are released that is participating in ozone destruction cycle again, so it is determined to reduce the use of Chlorofluorocarbons gradually and to replace other founded materials as substitutes for them. Founding such compounds is the work of chemists indisputably.

### Air pollution and Photochemical smog

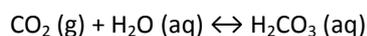
Many urban areas are faced with air pollution phenomenon, in which the relatively high levels of ozone at ground surface as the negative component of the air at low heights are produced due to the light-induced reaction of pollutants. This phenomenon is known as chemical light smog and is sometimes referred as "the ozone layer in the wrong place" because of the similarity with the problem of stratosphere ozone depletion.

Smog formation process is in fact consisted of hundreds of different reaction including dozens of chemicals and occurs simultaneously. In fact, the urban air has been simulated to the "huge chemical reactors."

The chemical smog phenomenon was observed in the 1940s in Los Angeles at the first time. Since then, this data is generally attributed on the city. But the smog problem has had a relative decrease by air pollution control in Los Angeles in recent decades. The most of countries and the World Health Organization (WHO) have determined a limit for the maximum allowable concentration of ozone in the air quantitatively (about 100 ppb of concentration mean in one hour). Ozone only reaches at a few percent of this amount in the clean air. The original reactors in a chemical light smog phenomenon are Nitric acid, and not burned hydrocarbons releasing from Internal Combustion Engines as the air pollutants. Another important component is sunlight in smog creation.

### **Acid rain**

Acid rain is one of the most serious environmental problems that many areas of the world are facing with today. This idiom includes different types of phenomena such as acidic fog and snow that all are associated with significant amounts of acid falling from the sky. Acid rain has a variety of ecologically harmful results. Acid in the air may also influence on the human health. The phenomenon of acid rain was discovered in the late years of 1800s in Great Britain, but it was forgotten until the 1960s after that. Acid rain is predicted to Rainfall with acidity more significant than normal rainfall (i.e. not polluted) caused by air dissolved carbon dioxide and the formation of carbonic acid with a mild acidity.



Proton is released from minor dissociation of  $\text{H}_2\text{CO}_3$  and reduces system PH. Hence, the PH of the not polluted normal rain from specific source is about 5.6. The only rain with considerably more acidity than this is considered as the acid rain with PH less than 5. Two major acids in acid rain are  $\text{HNO}_3$  and  $\text{H}_2\text{SO}_4$ . In general, where acid rain falls in the way of wind is farther than the source of primary type of pollutants,  $\text{SO}_2$  and nitrogen oxides. Acid rain is created when the rain carrying the air masse with first type pollutants. Thus, acid rain is a pollution problem without geographical boundaries because of the long-range transport of air pollutants.

### **Toxic organic chemicals**

The term of synthetic chemicals from media is used to describe objects that are not commonly found in nature, but they have been synthesized by chemists from simpler objects. The most of synthetic chemicals with commercial use are organic compounds and oil as the primary source of carbon in these reactions is used for most of them. Carbon with Chlorine forms many of the compounds as pesticides with wide application that are toxic to some plants and insects. Other chlorinated organic compounds are widely used in electronics and plastics industry.

Breaking the carbon-chlorine bond is difficult typically and the presence of chlorine also decreases reactivity of the other bonds in organic molecules. This property means with entering the chlorinated organic compounds into the environment, their degradation will be slow and are more tended to gather and so they have turned into a great environmental problem. Toxic organic substances used mainly include: the types of pesticides, traditional insecticides, chlorinated organic insecticides, DDT, *toxafens*, carbonate, organic Phosphates' insecticides and Herbicides.

### **Water pollution**

Water, its treatment and prevention of its pollution and wasting is considered as one of the most important issues. Water pollution is a major environmental problem and we are faced with increasing development of it due to the technology and industries progress.

### **Heavy metals and soil chemistry**

Many heavy metals are toxic to humans and four mercury (Hg), lead (Pb), cadmium (Cd) and Arsenic (As) metals have the greatest risk for each environmental space due to widespread use, toxicity and their widespread distribution. However, none of them is spread in environment to the extent as a wide risk. Each of them can be anyway found at toxic levels in some localities in recent years. These metals can be mainly

transferred from one place to another through the air and this transferring is usually done on the hovering particle-like material as adsorbed or absorbed kinds.

### **Energy production and its environmental impacts**

Many environmental issues are the indirect result of energy production and consumption, especially coal and petroleum. The world's total coal reserves are much more than the whole oil, natural gas and uranium. Thus, not only the consumption of coal for industrial energy production will continue, but also it will probably go on a lot in developing countries like China and India, where there is large reserves of these materials. It is produced a large amounts of SO<sub>2</sub> and CO<sub>2</sub> as pollutants from coal burning. Discussion of nuclear energy and the other energy resources are also in their place.

### **Concept of environment and environmental accounting**

#### **Environment definition:**

Environmental term is widely used and less known. Latin term of environment means the objects surrounding us, but environment as mentioned in the ecological books is a set of social, biological and physical phenomena around us. Our environment is composed of three parts. Underlying part is called *pedosphere*, the middle part is called Biosphere and the upper part is called Atmosphere. The part of *pedosphere* covered with water and ice is called hydrosphere.

#### **Definition of environmental accounting:**

Environmental accounting is a set of activities that enhance the ability of accounting systems in order to identify, record and report the effects of environmental degradation and pollution.

Environmental accounting is a branch of accounting collecting environment costs information and it is used to calculate the total cost of product and services with the purpose of providing some information for performance evaluation, decision making, control and reporting to the managers.

Japanese Ministry of Environment defined the environmental accounting in February 2005 as follows (Sumiani, et al., 2007):

Environmental accounting is focused on sustainable development, effective communication with the community and compliance with the environmental protection behaviors. Costs of environmental protection activities, these activities profits, provision of the best measurement means (either monetary or physically), previous information relation with each other, including information presented by such accountings to the companies.

Environmental protection activities include prevention, reduction or eliminate of the environmental effects of human activities.

### **Accounting and background of environment**

Kisenyi & Gray (1998) state that the lack of understanding of social and environmental accountability within emerging economies. Belal and Momin (2009) argue that environmental reporting has the potential to promote equality, social justice, transparency and accountability. Studying attitudes will enable a better understanding of the relationship (if any) among social and environmental factors, such as culture, ethics, education, law and law enforcement, and attitudes towards environmental management and whether those attitudes vary across industries. Industrial companies in the mid of 70s were faced with the environmental liabilities reporting. First, companies were reluctant to disclose the enforced losses to environment in their Financial Statements, but the companies were forced to observe it over the time and with increasing the level of losses (*Clormir and Magnan 2007*). Accounting Standards Board published the environmental pollution costs in the publication No. 8-90 titled with capitalization in 1990 and concluded that the environmental liabilities costs must be determined during a certain design to reduce pollution (Cornelia et al., 2010). Cummings (2006) and Shafer (2006) found that managers lend their support to the new environmental paradigm. Cummings (2006) indicated significant differences towards environmental attitudes among Australian, Chinese and Indonesian respondents. Australian respondents were more cautious of supporting a candid view on environmental issues but Chinese respondents favoured a more centralised approach to decision making regarding the environment. It was also found that the age factor was a possible influence on respondent beliefs.

Kuasirikun (2005) who evaluated perceptions of current accounting as well as attitudes to social and environmental accounting among Thai managers and management accountants. The author argued that changing perceptions will have to involve a change in the nature of the Thai accounting profession and suggested ways in which the future development of SEA practice might be given further momentum in the Thai context. Liangrong and Song (2008) investigated how Chinese executives and managers perceive and interpret SEA, to what extent firms' characteristics influence managers' attitudes towards SEA and whether their values in favour of SEA are positively correlated to firms' economic performance.

### Disclosure of environmental costs, liabilities and commitments

#### Environmental costs in the financial statements:

- A. The environmental costs recognized as expenses, assets or liabilities.
- B. Environmental liabilities or losses not recognized in financial statements.
- C. Commitments.

#### Environmental costs

##### Current costs:

Classification in the profit and loss account:

1. Can certain environmental costs be considered as an extraordinary item?

Extraordinary items are arisen from events and transactions including three features as follows:

- A. They will not happen in past few years.
- B. They are not resulted from normal business unit activities.
- C. They are not related to the managers or owners' decisions.
- D. Damaging events to the environment may be considered as extraordinary items, such as the explosion of a nuclear reactor.

2. Do environmental costs operational or non-operational expenses?

Most of them are operational but also non-operational in cases such as cleaning up an abandoned place.

Research conceptual model

This model shows that willingness to disclose environmental information as well as environmental costs information is closely related to the existing barriers in the way of information disclosure and two variables relies on managers and boards' opinions of corporations completely.

Research hypotheses

Thus, the following hypotheses are proposed with regard to the conceptual model.

1. Petrochemical companies are more willing to disclose information about the environmental benefits of units under their management than *pharmaceutical* companies.
2. Petrochemical companies are more willing to disclose information about the environmental costs of units under their management than *pharmaceutical* companies.
3. Petrochemical companies are faced with additional obstacles in disclosure of their environmental information than *pharmaceutical* companies.

Research methodology

In order to gathering usable data, a Five Likert scale is designed and developed *with* reliability calculated by Cronbach's alpha method and the alpha coefficient value is equal to 77% indicating the reliability. The validity has been approved by use of content validity (elites and experts' opinions). Statistical society includes 18 *pharmaceutical* companies' managers and 30 petrochemical companies' managers of listed companies listed in the Tehran Stock Exchange during 2011. Table 1 shows the details of the statistical society.

Table 1. Demographic of the participants

Variable	Index	frequency	Percent
Gender	male	42	87.50
	Female	6	12.50
Educational level	<i>B.S</i>	42	87.5
	<i>M.S</i>	4	8.33
	<i>PhD</i>	2	4.17

Age	21 to 30 years	10	21.00
	31 to 40 years	18	37.50
	41 to 50 years	15	31.25
	More than 50 years	5	10.25
Experience	Less than 5 years	6	12.50
	5 to 10 years	12	25.00
	10 to 15 years	12	25.00
	15 to 20 years	10	21.00
	More than 20 years	8	16.50
Educational Background	Accounting	44	91.70
	Economics	0	0.00
	Management	4	8.30
Position	Financial Manager	12	25.00
	Chief Accountant	24	50.00
	Financial Expert	24	50.00

The highest percentages of respondents were male with regard to the table. The most of respondents were bachelor's degree and about 8.33 percent were MS. Under 30 and over 50 years old respondents number have been very low and 69 percent of them were between 30 and 50 years. Favorable percent, 91.70 percent, of respondents were accounting degree according to the research topic. 12.50 percent of respondents had less than 5 years record and the rest of them had over 5 years record.

#### Comparison of two statistical Societies mean for both *pharmaceutical* and *petrochemical* industry

$$H_0: \mu_s = \mu_p$$

$$H_1: \mu_s \neq \mu_p$$

Table 2 shows the mean comparison test for research hypotheses in *pharmaceutical* and *petrochemical* industry.

Table 2. Mean comparison of the two society

Inferential statistics					
Environmental variable	Mean value equal to 3				
	T	D.f	Sig.	95% confidence interval for the difference	
				Lower limit	Upper limit
Unwillingness to disclose information about the environmental benefits	1.57	50	0.12	-0.56959	0.55020
Unwillingness to disclose information about the environmental costs	0.977	50	0.33	-0.19752	0.57187
There are obstacles in the disclosure of environmental information	0.590	50	0.55	-0.23349	0.42770

The obtained T-test value for the three factors (cases) is not significant at the 95% level according to the above table; because the significant resulted numbers during the analysis of test data in all three factors are greater than 0.05. According to the  $H_0$  hypothesis of each factor (case), T-test significant amount has not been achieved. It can be said that the average difference between the two communities namely *pharmaceutical* and *petrochemical* industry in the field of research hypotheses does not show significant differences due to the upper *limit* is positive and the lower *limit* is negative. Then,  $H_0$  is confirmed and the opposite hypothesis,  $H_1$ , is rejected in the relevant hypotheses.

### Conclusions and recommendations

Comparison of two statistical Societies mean shows that *pharmaceutical* and petrochemical companies have the same willingness to disclose information about their environmental benefits. Although, companies are equal in tending to disclose information about its environmental costs, they are faced with the same obstacles in the way of environmental information disclosure. Some suggestions are offered with regard to the above results as follows:

Not developing the environmental accounting is primarily due to the lack of companies' requirement in this area. Hence, revision and amendment of some laws and codification of new legislation is necessary.

There is not any specific instruction about how environmental costs are reflecting. Then, it is necessary to provide an instruction in this regard.

It is essential in academic accounting education to note to accounting progresses teaching and modern society needs, including the environmental accounting. So, it is recommended to prepare courses in accordance with the above issues.

The main basis of standards of ISO 14000 series is the commitment and strong belief to the senior managers to protect the environment and responsibility for the next generation and it is only provided through education of managers in order to be familiar with the pollution caused by industries and its destructive effects on the environment and to find the ways to reduce this pollutions. Proper accounting system is a tool that is able to facilitate disclosure. We offer environmental accounting reference codification. Manager should be aware of disclosure benefits, including the value-added business unit. Although these benefits are not measured in Rials (Iranian currency), they are positively affecting on the business units' stock price among the interest groups.

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