

The Effect of Environmental Compliance on Financial Performance: A Survey of Listed
Manufacturing Firms in Tanzania

Naila Daniel Linus

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School of Graduate Studies

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Naila Daniel Linus



21st June, 2011

Approval

The Thesis of Nail a Daniel Linus was reviewed and approved by the following:

Dr. Freshia Mugo- Waweru

Senior Lecturer Strathmore

University

. Mr. David Wangombe

Dean, School of Management and Commerce

Prof. Ruth Kiraka

Dean, School of Graduate Studies

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ABSTRACT

There has been environmental pollution across the globe. Environmental activist have condemned manufacturing firms of environmental pollution. This has led to the establishment of various environmental regulations and standards. However the effect of compliance to environmental regulations on the financial performance is not clearly known. This study explores the effects of environmental compliance on the financial performance for listed manufacturing firms in Tanzania. Five listed manufacturing companies were surveyed to obtain data used for the purpose this study. Specifically, the study intended to establish: the extent of environmental compliance by listed manufacturing firms in Tanzania, the relationship between environmental compliance and financial performance and the effect of environmental compliance on the financial performance. Regression analysis was done to establish the relationship between environmental compliance and financial performance. Interviews were conducted to find out the extent of environmental compliance by the listed manufacturing firms. Findings are summarized and presented in term of tables and figures. The findings suggest that there is no significant relationship between environmental compliance and financial performance among listed manufacturing firms in Tanzania; the extent of environmental compliance by listed manufacturing firms in Tanzania is not clear. This study concludes that the argument that environmental compliance has no significant effect on the financial performance for listed manufacturing firms in Tanzania.

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DEFINITION OF TERMS

Environmental compliance

For the purpose of this study, environmental compliance means: compliance to environmental laws, regulations, standards and other requirements. It is measured by capital expenditure on pollution control technology and certification to ISO 1400 L Detailed discussion about these measurements is given in chapter two.

Financial performance

For the purpose of this study, financial performance is measured by the Return on Investment (ROI). Higher value for ROI implies better financial performance. A detailed discussion of financial performance is given in chapter two.

ABBREVIATIONS

EMA 2004- Environmental Management Act 2004

DSE - Dar es salaam Stock Exchange

CO₂- Carbon dioxide

UNEP - United Nations Environmental Program

ROI -Return on Investment

UN - United Nations

CSMA- Capital and Securities Market Authority

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DEDICATION

To my late parents Mr & Mrs Linus Laurent Mrawa who made me to be who I am today. I will cherish their memories forever.

To my wife (Leticia) and son (Linus Daniel Jr) who always support me in my academic career.

To my brother (Joseph) and sisters (Ester and Grace). I will always remember them.

CHAPTER ONE

1.0 INTRODUCTION

This chapter introduces the study. A brief discussion to the background of the problem is given. The empirical studies relating to the current study and a brief introduction of environmental regulations in Tanzania, is also given. The main problem of the study is introduced in statement of the problem. Finally this chapter states objectives, questions and significance of the study.

1.1 BACKGROUND TO THE PROBLEM

1.1.1 Environmental performance and financial performance.

Environmental pollution across the globe has been increasing. For example, carbon dioxide (CO₂) reached 2,900 million metric tons in 2004 and continues to rise as evidenced by increasing concentration of CO₂ in the atmosphere (UN 2007c). In Northern Africa emission more than doubled between 1990 and 2004 increasing from 1.9 to 3.2 metric tons of CO₂ per capita (Ibid 2007).

Environmental activists have been accusing business organizations of environmental pollution': This has led to the establishment of environmental regulations by various countries across the globe" Since financial performance is crucial to business organizations, it is important to know the effects of environmental compliance on financial performance. The effects of environmental compliance on financial performance can be understood by establishing a relationship between environmental compliance and financial performance.

Empirical studies reveal that, the relationship between environmental compliance and financial performance is not clear. Studies (Spicer, 1978; Waddock&Graves, 1997; Schnietz&Epstien, 2005; Wahba ,2008; Hart, 1997; Porter & Van der Linde, 1995; Reinhardt, 1999 and Dowel et al., 2000) suggests a positive relationship between environmental compliance and financial performance. Other studies (Chen & Metcalf 1980; Jaggi& Freedman, 1992 and Wagner et al; 2002) suggest a negative relationship between environmental compliance and financial performance. As opposed to positive and negative relationships, studies (Mahapatra, 1984; Me Williams & Siegel, 2000; Mill, 2006 and Murray

ICfEnvironmental activist and scientific proofs by Sylvia Noble Tesh

² For example Tanzania established Environmental Management Act 2004

et al., 2006) suggest that there is no significant relationship between environmental compliance and financial performance.

1.1.2 Environmental pollution in Tanzania.

Environmental pollution is also witnessed in Tanzania. Pollution from agriculture, Industry, mining and household is threatening Tanzania water resources (TJ1\TEP 2008). Business organization in form of industries plays a part in environmental pollution. Although the level of industrialization is low in United Republic of Tanzania, untreated industrial waste causes significant localized pollution [IJNEP 2008]. About 80 percent of industries including agrochemical industries, breweries and steel manufacturing industries are located in the coastal Dar-es-salaam [UNEP 2008]. It has been estimated that almost 70 percent of the industries directly or indirectly pollute the Indian Ocean [Mgana and Mahogo 2002].

1.1.3 Environmental regulations in Tanzania.

Environmental regulations in Tanzania are directed under the Environmental Management Act 2004 (EMA2004). Local government authorities are required to ensure that industries located within respective areas of jurisdiction provide adequate space and facilities for managing all solid waste generated from such industries before they are collected for disposal at designated places. The minister responsible for environment is entitled to make regulations prescribing the best methods for the treatment of hazardous and non-hazardous liquid waste from industries.³

Concerning gas pollution, EJ\1A2004 explains about the location of industries which emit gases. The local government authorities in taking to consideration wind direction and environmental impact assessment recommendations should ensure that industries producing gas emission are located far away from residential areas.⁴

Failure to comply with environmental regulations, the firms operating in Tanzania will incur costs in terms of fines and penalties. EMA2004 states that individuals who fail to comply with environmental regulations will be subjected to fines and penalties

³ Environmental Management Act 2004 section 116(1)

⁴ Environmental Management Act 2004 section 128

⁵ Environmental Management Act 2004, section 184, 184(4) 187(2)

National Environmental Management Council (NEMC)

EMA2004 states that there shall be an independent board known as National Environmental Management Council (NEMC)

The functions of NEMC are to:

1. Carry an environmental audit in relation to section 101 of EMA2004.
- ii. Carry out surveys which assist in the proper management and conservation of the environment.
- iii. Undertake and coordinate research, investigation and surveys in the field of environment and collect, and disseminate information about the findings of such research, investigation or survey.
- iv. Review and recommend for approval of Environmental Impact Assessment,
- v. Enforce and ensure compliance of the national environmental quality standards.
- vi. Initiate and evolve procedures and safeguards for the prevention of accidents which may cause environmental degradation and evolve remedial measures where accidents occur.
- vii. Undertake in co-ordination with relevant sector the ministry programs intends to enhance environmental education and public awareness about the need for sound environmental management as well as enlisting public support and encouraging the effort made by other entities in that regard.
- viii. Publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.

- ix. Render advice and technical support, where possible to entities engaged in natural resources and environmental management so as to enable them to carry out their responsibilities.
- x. Perform other functions as the minister may assign to it or as are incidental or conducive to the exercise by it of any or all the functions provided under EMA 2004.

1.2 STATEMENT OF THE PROBLEM

Empirical studies indicate that the relationship between environmental performance and financial performance represents a perplexing issue. There are studies which suggest a positive relationship, other studies suggest negative relationship. Contrary to positive and negative relationship are studies which suggest that there is no significant relationship. The review of literature suggests that majority of studies have been done in developed economies and little has been done in developing economies like Tanzania⁷.

With EMA2004, firms operating in Tanzania are subject to complying with environmental regulation. To comply with environmental regulations, firms incur costs⁸, Whether these costs improve or reduces environmental performance is not known.

The problem which motivates the conduct of this study is based on three reasons. First, empirical studies suggest that the effect of environmental performance on financial performance is not clear. Second, few studies on the relationship between environmental performance and financial performance has been done in developing countries. Third, establishment of EMA2004 add operating costs for firms operating in Tanzania; whether these costs improves or reduces financial performance is not known.

Therefore the study seeks to investigate how environmental compliance affects financial performance and whether costs resulting from environmental regulations improves or reduces financial performance of business organizations.

⁷In 2008, Wahba did a study in Egypt to investigate whether the financial market values corporate environmental responsibility.

⁸Section 81(1) of EMA2004 implies that firms falling under third schedule shall conduct an environmental impact assessment study at their own costs prior to application for environmental impact assessment certificate.

1.3 RESEARCH OBJECTIVES

The study focused on how environmental compliance affects financial performance through a comparative study of all manufacturing firms listed on the Dar -es Salaam Stock Exchange (DSE)⁹.

The specific objectives were:

1. To assess the extent of environmental compliance by manufacturing firms in Tanzania
- i. To examine the relationship between environmental compliance and financial performance for listed manufacturing firms in Tanzania.
- ii. To investigate the effect of environmental regulations on the manufacturing firms listed on the Dar es salaam Stock Exchange.

1.4 RESEARCH QUESTIONS

The study seeks answers to the following questions:

- i. What is the extent of environmental compliance by listed manufacturing firms in Tanzania?
- ii. What is the relationship between environmental compliance and financial performance?
- iii, What is the effect of environmental regulations on the listed manufacturing firms in Tanzania?

1.5 SIGNIFICANCE OF THE STUDY

The study is of importance to the following groups:

- i, Management of manufacturing companies listed on the Dar es Salaam Stock Exchange.

The study has revealed the relationship between environmental compliance and firm's financial performance. This will enable the firm's management to make right decisions when come to acquiring pollution control technology.

⁹ For the purpose of this study and basing on prior studies environmental performance will be measured by: capital expenditure incurred in pollution control technology, law suits concerning improper disposal of hazardous waste and reward or other recognition for superior environmental performance; and financial performance is measured by Tobin's q ratio. Detailed discussion on these measures is provided in chapter two and three.

Listed manufacturing firms are preferred in this study because: they are included in the 3rd schedule of EMA2004 for environmental impact assessment; and financial information for listed firms is publicly available.

H. Environmental activists

The findings and conclusions presented in this study will enable environmental activists in Tanzania to know how their campaigns affect financial performance of manufacturing firms listed on the Dar es Salaam Stock exchange.

Hi. Future researchers

The conclusions and recommendations presented in this study have revealed a knowledge gap.

This gap can be used by future researchers as areas for other studies.

CHAPTER TWO

2.0 LITERATURE REVIEW

This chapter gives a brief introduction of environmental pollution worldwide and in the Tanzanian context. Discussion of related studies, a theoretical framework and environmental regulations is also given in this chapter. Finally the discussion of the conceptual framework and linear regression model is given at the end of this chapter.

2.1 Environmental pollution

Environmental pollution means any direct or indirect alteration of the physical, thermal, chemical, biological or radioactive properties of any part of the environment by discharging, emitting, or depositing of waste so as to adversely affect any beneficial use, to cause a condition which is hazardous to public health, safety or welfare, to animals, birds, wildlife, fish or aquatic life, or to plants or to cause contravention of any condition, limitation or restriction which is the subject to a license under EMA2004.10

Global environmental pollution has been increasing. For instance, carbon dioxide (CO₂) emission reached 2,900 million metric tones of CO₂ in the atmosphere. In Northern Africa emission more than doubled between 1990 and 2004 increasing from 1.9 to 3.2 metric tones of CO₂ capital (UN 2007c).

Environmental pollution is also happening in Tanzania. Massive land degradation is causing the land to be inappropriate for agriculture. 25 percent of land in United Republic of Tanzania is considered to be severely degraded (FAO AGL, 2003). Water resources as well have been polluted. Although the level of industrialization is low in Tanzania, untreated industrial waste cause significant localized pollution (UNEP, 2008). This is because about 80 percent of the industries, including agrochemicals and chemical industries, breweries and steel manufacturing industries are located in the coastal Dar-es-salaam (UNEP, 2008). It has also been estimated that almost 70 percent of the industries directly or indirectly pollute the Indian Ocean (Mgana&Mahogo, 2002).

2.2 Studies on the relationship between environmental compliance and financial performance.

The relationship between environmental compliance and financial performance is important. Market analysts for example increasingly gather environmental compliance data as an indicator of future capital market return (Kiernan, 1998).

¹⁰ Environmental Management Act 2004, section 3

Studies on the relationship between environmental compliance and financial performance do not provide similar results. There are studies which suggest a positive relationship, others negative relationship and even some of them suggest that there is no significant relationship.

Concerning positive relationship, Hart (1997) argues that discretionary improvement in environmental compliance often provides financial benefits; this is because pollution reduction causes future cost savings by increasing efficiency, reducing compliance costs and minimizing future liabilities (Porters & Van der Linde, 1995 and Reinhardt, 1999). In the same line of argument, Dowel et al, (2000) argues that firms that adopt single stringent environmental standards worldwide have higher market valuations than firms that do not adopt such standards.

A positive relationship between environmental compliance and financial performance is further supported by empirical studies. Spicer (1978) documented a positive correlation between pollution control records and profitability. Schneitz and Epstien (2005) documented less negative reaction from the stock market after environmental crises.

A negative relationship between environmental compliance and financial performance is also supported by prior research. Jaggi and Freedman (1992) found a negative relationship between pollution performance index and financial performance index; they concluded that the market does not reward corporate environmental commitment. In similar view Chen and Metcalf (1980) found a negative relationship between firm environmental performance and financial performance.

As opposed to positive and negative relationship, some studies suggest that there is no significant relationship between environmental compliance and financial performance. Me Williams and Siegel (2001) argue that, corporate environmental responsibility and profitability are expected to be neutral. This argument is supported by Mahapatra (1984) who argues that pollution control expenditure and firms profitability are not correlated. Similar results were established by Murray et al (2006) who found that share returns and environmental performance have no direct relationship.

Overall, previous studies suggest that the relationship between environmental compliance and financial performance is not clear. Therefore, more studies should be done about the relationship between environmental compliance and financial performance especially in developing countries.

2.3 Theoretical framework

Previous studies have used three main theories to explain the relationship between environmental compliance and firm's financial performance. These are: Stakeholder theory, Agency theory and the theory of firm perspective.

2.3.1 Agency theory

According to agency theory, the expected costs of firm's social _ environmental responsibility is likely to outweigh the resulting benefits and hence firm social performance is expected to have a negative impact on firm profitability (Freedman 1970). Auperlle et al, (1985) explain this theory by arguing that, these firms that spend money on some pollution control instrument will incur costs that may affect their price and thus profitability whilst other competitors do not do this on the basis that it is the government's responsibility. The main argument in agency theory as related to environmental compliance is that corporate environmental responsibility can be explained as an agency problem between firm's management and shareholders.

Empirically this argument on agency theory has found support. Jaggi and Freedman (1992) established a negative relationship between firm environmental compliance and financial performance. In a similar view Chen and Metchalf (1980) found a negative correlation between firm environmental compliance and financial performance.

2.3.2 Theory of firm perspective

According to the theory of firm perspective, the optimal level of investment in social environmental responsibility for a firm can be evaluated in the same way as any other investment by considering demand and supply (William and Siegel, 2001). The main argument of William and Siegel is that, the relationship between environmental compliance and financial performance should be neutral. They explained their position by arguing that; firms which do not incur costs to prevent environmental effect of their operation will, offer their products and services at lower price while those firms which incur environmental costs will be able to offer their products and services at higher prices.

The theory of firm perspective has found some empirical supports. Murray et al, (2006) established that share returns' and environmental disclosure have no direct relationship.

Similarly, Mahapatra (1984) found that pollution control expenditure and firm profitability are not correlated.

2.3.3 Stakeholder theory

Stakeholder's theory suggests that every corporation has its unique stakeholders that influence and simultaneously are affected by its actions (Freeman, 1984). This theory also suggests that every corporation has predetermined contracts and commitments internally and externally with different parties which need to be fulfilled (Wood, 1991). In particular this theory suggests that environmental compliance should be reflected positively in firm's profitability. The stakeholder assumption can be explained by considering the inverse relationship between implicit and explicit costs of the firm. Waddock and Graves (1997) argued that when the organization decide to bring down its implicit costs by acting in environmentally irresponsible manner by reducing costs of pollution prevention and protection, it will experience higher explicit costs as competitive edge will be exhausted.

Previous empirical studies support stakeholder theory. Dowel et al, (2000) argues that firms that adopt single stringent environmental standards worldwide have higher market valuation than firms that do not adopt such standards. Similarly Hart (1997) argues that improvement in environmental compliance often provides financial benefits. More specifically, Schnietz and Epstien (2005) found a positive correlation between firm's environmental compliance and its financial performance.

2.4 ENVIRONMENTAL REGULATION IN TANZANIA

2.4.1 Preliminaries

Legal issues concerning environmental management ¹¹ Tanzania are provided in the Environmental management Act 2004 (EMA 2004).

Every person living in Tanzania has a right to a clean and safe environment¹. The right to clean, safe and health environment includes: the right of access by any citizen to the various public elements or segments of environment for recreational, health, spiritual, cultural and economic purposes.¹²

¹¹ Environmental Management Act 2004, section 4(1)

¹² Environmental Management Act 2004 section 4(2)

It is the duty of every person living in Tanzania to safeguard and enhance the environment and to inform the relevant authority of any activity and phenomenon that may affect the environment significantly.¹³

It is the duty of the minister in collaboration with other agencies, to promote cleaner production technologies and foster sustainable consumption of goods and services. The minister may describe guidelines relating to sustainable consumption and cleaner production".

For the purpose of minimizing environmental damage, the director of the environment shall periodically prepare proposals on package of economic instrument financial incentives and forward the same to the minister".

The minister may in consultation with the minister for finance make regulations and rules on economic instruments which prescribes how best to oblige individuals or firms when making decisions about production consumption and investment, to consider the environmental consequences. The EMA2004 defines an economic instrument as an instrument for environmental and natural resource management designed to influence behavior of economic agents in order to ensure sustainable use and perfection of biophysical resources and includes fiscal instruments, charge systems, property right, market creation, performance bonds and deposit refund systems. Liability systems, provision of information and financial instruments¹⁴ 6.

2.4.2 Environmental impact assessment

Environmental impact assessment means a systematic examination conducted to determine whether or not a programme, activity or a project will have any adverse impacts on the environment"? .

The costs associated with environmental impact assessment are supposed to be borne by individuals assessed. Any person being a proponent or a developer of a project for which

¹³ Environmental Management Act 2004 ,section 6

¹⁴ Environmental Management Act 2004, section 79

¹⁵ Environmental Management Act 2004 ,section 80(1)

¹⁶ Environmental Management Act 2004 .section 80C 4)

¹⁷ Environmental Management Act 2004, section 3

environmental impact assessment is required to be made by the law governing such project has to undertake or cause to be undertaken at his own cost, an environmental impact assessment study. In addition to that, the law requires environmental assessment study to be carried out prior to the commencement of the financing of a project".

After environmental impact assessment, the law entitles the proponent to be issued with environmental impact assessment certificate ¹⁹. However this is done when all requirements for the certificate are made. The environmental impact assessment certificate may be transferred from one holder to another in the event the project change ownership and not otherwise within thirty days of transfer.

2.4.3 Waste management from industries

Local government authorities are required to ensure that industries located within respective areas of jurisdiction provide adequate space and facilities for managing all solid waste generated from such industries before they are collected for disposal at designated places".

The minister responsible for the environment is entitled to make regulations prescribing the best methods for the treatment of hazardous and non-hazardous liquid waste from industries.

The law prescribes the location of industries which emits gases. It require local government authorities in taking to consideration wind direction and environmental impact assessment recommendations to ensure that industries producing gas emission are located far away from residential area".

2.4.4 Offences and Penalties

It is necessary for firms to consider how their operations affect the environment. Failure to comply with environmental regulations may cost the firm in term affine penalties. The act is clear about penalties and fines concerning violation of environmental regulations.

Penalties against a person vi?lating the regulations relating to environmental impact assessment report are verified in the EMA 2004. Such person commits an offence and is

¹⁸ Environmental Management Act 2004, section 81(1) and (2)

¹⁹ Environmental Management Act 2004, section 81(3)

²⁰ Environmental Management Act 2004, section 116(1)

²¹ Environmental Management Act 2004, section 128

liable on conviction to a fine of not less than five hundred thousands Tanzanian shillings but not exceeding ten million shillings or to imprisonment for a term of not less than two years but not exceeding seven years or both²².

Section 187(4) of the act prescribes penalties against a person which discharges dangerous materials and pollutants. It states that, such person commits an offence and is liable on conviction to a fine of not less than three million Tanzanian shillings but not exceeding fifty million Tanzanian shillings or to imprisonment for a term of not exceeding twelve years or both.

Cleaning of polluted environment is the responsibility of the person who has polluted environment. The law requires the person convicted to pay full costs of clearing up the polluted environment and removing the pollution or to clean up the polluted environment and remove the effects of pollution to satisfaction of the council".

2.5 CONCEPTUAL FRAMEWORK

The conceptual framework to be used for the purpose of this study has been developed basing on previous studies and Tanzania context. Figure 2.1 provides the summary of conceptual framework. The following functional model explains relationships among variables in the conceptual framework.

$$Fin\ per = (ISO, ENVIC, CINT, AG)$$

Where:

Fin per = financial performance measured by the Return on Investment (ROI)

ENVIC= Capital expenditure on pollution control technology. (Measure by the ratio of total capital cost incurred to acquire pollution control technology to the fixed assets).

ISO = Certification to ISO 14001 (Measured as; 1- a company is certified to ISO 14001 and 0- a company is not certified to ISO 14001)

CINT = Capital intensity (Measured by the ratio of fixed asset to total assets).

²² Environmental Management Act 2004, section 184.

²³ Environmental Management Act 2004, section 187(2)

AGE = Finn age (Measured by the natural logarithm of number of years the firm has been in to operation)

This study uses financial performance a dependent variable. Similar to Hart & Ahuja (1996) and Russo & Fouts (1997) Return on Investment (ROI) is used to measure financial performance. The calculation for ROI will be as follows:

$$ROI = \frac{\text{Profit}}{\text{Total asset}}$$

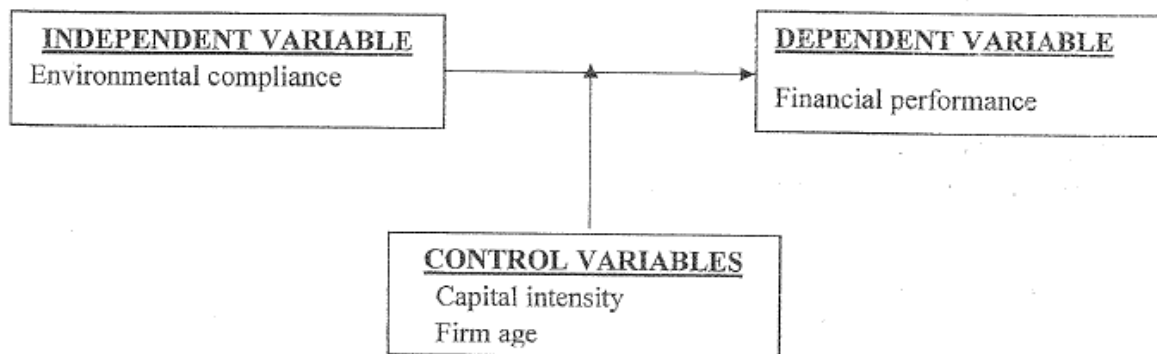
Greater ROI implies greater asset utilization in generating profit which indicates better financial performance. Lower ROI implies lower asset utilization in generating profit which indicates poor financial performance.

ROI is preferred as a measure of financial performance because it factors in the asset utilization efficiency. This will make it possible to measure the efficiency of assets invested to comply with environmental regulations.

Basing on previous studies and availability of information in Tanzanian context the study used two independent variables.

Similar to Spicer (1978) and Nehrt (1996), capital expenditure on pollution control technology was used as the first independent variable²⁴. This is preferred because information will be easily obtained as listed companies are required to make their financial information publicly available.

Figure 2.1 a conceptual model of the relationship between environmental performance and financial performance



²⁴ According to Spicer (1978) and Nehrt (1996), capital expenditure incurred in pollution control technology measures the extent to which capital is employed to comply with environmental standards.

As it will be explained in the next chapter, capital expenditure on pollution control technology will be measured as a percentage of total cost incurred to acquire and maintain pollution control technology.

The second independent variable is ISO 14001 certification. ISO refers to Geneva based International Standards Organization, best known as author of the ISO 9000 series of quality standards. The ISO 14000 series standardizes environmental management on dimension ranging from an organization system for managing environmental impact assessment to Labeling guidelines to lifecycle assessment (Tibor and Feldman; 1996). The ISO 14001 standard which refer to environmental management system was finalized in 1996 and there after globally. Certification to ISO 14001 requires an environmental management system. This implies that companies with ISO 14001 standard certification have environmental management system. Wahba (2008) used ISO 14001 certification to measure whether the market value corporate social environmental responsibility for Egyptian companies.

The literature suggests that there are other factors which affect the relationship between environmental performance and financial performance", In order to avoid model misspecification two variables were controlled.

To eliminate the effect of capital on financial performance, capital intensity was controlled. Capital intensity is calculated by the ratio of fixed assets to total assets."

Hanks et al (1993) emphasized the control for firm age. They argued that firm age reflects firm life cycle stage which affects profitability and managerial priorities. For the purpose of this study firm age was measured by the number of years the firm has been in to operation.

²⁵ See Wahba (2008) and King and Lenox (2001)

²⁶ See Wahba (2008), King & Lenox 2001, Russo & Fouts (1997) and Konar&Kohen (2001))

CHAPTER THREE

3.0 METHODOLOGY

3.1 INTRODUCTION

The purpose of this study is to find out the effect of environmental compliance on firm's financial performance. This chapter discusses the companies surveyed and variables which are applied to accomplish the study. In this chapter description of measures of environmental compliance and financial performance, and the relationship between environmental compliance and financial performance is discussed.

3.2 RESEARCH DESIGN

This study is a survey of listed manufacturing companies listed on the Dar es Salaam Stock Exchange (DSE)²⁷. Financial information for four years prior to and after the establishment of Environmental Management has been examined. Regression analysis for the data set obtained for periods prior to and after the establishment of the EMA2004 has been run. The act came in to operation in 2006.

In this study listed manufacturing firms have been selected for three main reasons. First, manufacturing firms are more involved in environmental pollution than other listed firms. Second, financial information for listed manufacturing firms can be easily obtained because listed firms are required by the law to make their financial statements publicly available. Third, manufacturing firms are included in the second schedule of EM A 2004²⁸.

3.3 DATA SET AND SAMPLE

Data is obtained from a survey of five manufacturing firms listed on the DSE. The list of the five firms which will be used in this study is provided in appendix two. The data set is for the period of eight years t4-toand 41- 10-4; where to is 2006 when EMA2004 came in to operation.

Also qualitative data has been obtained with the use of interview. An interview was conducted to the corporate managers of four listed manufacturing firms in Tanzania.

²⁷ Until 30th October 2010 only fifteen companies were listed in DSE. Six of the listed companies are manufacturing companies. One company was dropped due to the unavailability of information for most periods covered by the study

²⁸ Firms falling under second schedule of EMA2004 are required to conduct environmental impact assessment study prior to start of any project.

Interview was not conducted in one of the firms because the management was unwilling to cooperate.

3.4 DATA COLLECTION

Financial information for listed manufacturing firms has been obtained from Tanzania capital and Securities Market Authority (CSMA) database and firms' financial offices. Records of whether a company has been certified to ISO 14001 are obtained from financial statements disclosures. Qualitative information has been obtained with the use of an interview schedule.

3.5 VARIABLES

The variables used for the purpose of this study have been influenced by previous studies and availability of information in Tanzanian context. The dependent variable is financial performance measured by Return on investment. Independent variables are capital expenditure and pollution control technology and certification to ISO 14001. The control variables are capital intensity and firm's age. Measure and source of these variables is provided in appendix 1.

3.6 REGRESSION MODEL SPECIFICATION

The multiple regression equation has been used due to the following reasons: First, it allows the testing of more than one independent variable. Second, it fits well the conceptual framework which has been explored in chapter two. Third, majority of similar studies used multiple regression models to find out the relationship between environmental compliance and financial performance.

The p-values have been used to determine the significance of the relationship between Return on Investment and measures of environmental performance. F-test has been used to determine the strength and significant model used in the proposed study. Specifically the proposed study has used the following regression model.

$$Fin\ per = \gamma_1 + \beta_1 ISO + \beta_2 ENVIC + \beta_3 JCINT + \beta_4 tAGE + \varepsilon$$

Where:

Fin per = Financial performance

ENVIC = Capital expenditure on pollution control technology.

ISO = Certification to ISO 14001

CINT = Capital intensity

AGE Firm age

E = Error term

IT = Y intercept

B = coefficients of variables

CHAPTER FOUR

4.0 PRESENTATION OF RESEARCH FINDINGS

4.1 INTRODUCTION

In this chapter, the data analysis and a report on the results of the study is presented. This chapter is divided in to two main parts. The first part covers the data analysis in which sample presentation, descriptive statistics and Pearson's correlation is discussed. The second part covers empirical findings in which findings are discussed based on the objectives of the study. Finally the chapter ends with chapter summary.

4.2 DATA ANALYSIS

4.2.1 Sample representation

Of the six listed manufacturing companies in the DSE only five companies were surveyed. One company was dropped due to unavailability of information for most periods covered by the study. The data collected covered two periods of four years before and after the establishment of Environmental Management Act 2004 (EMA 2004) which came in to operation in the year 2006. The period before the act is comprised of year $t_4 - t_j$. The period after the act is comprised of year 41 - 44. Where t is the year 2006 when EMA 2004 came in to operation.

4.2.2 Descriptive statistics

In order to understand the general overview of the industry under study, descriptive statistics are calculated. Table 4.1 presents a summary of descriptive statistics for all the variables used in this particular study.

From the table below, it can be observed that, the mean value for ROI is 0.281. this suggests that the central tendency for ROI is 0.281. However the standard deviation indicates that values for ROI are either below or above 0.3298. The median indicates that half the values of ROI are equal or below 0.27, and another half of values are equal or above 0.27. The overall summary statistics for ROI implies that, the average ROI for listed manufacturing firms in Tanzania is 0.281.

For ENVIC, table 4.1 show that the observed mean is 0.001182. The standard deviation implies that values for ENVIC are either 0.002108 above or below their mean. The median implies that half the values are equal or less than zero and the other half of values are greater or equal to zero. These summary statistics for ENVIC implies that, the average ratio of capital expenditure on pollution control technology to fixed assets for listed manufacturing firms in Tanzania is 0.001] 82.

Table 4.1 Summary statistics for a combination of before and after EMA 2004

VARIABLE	N	Mean	St-Dev	Median
ROI	40	0.281000	0.329800	0.270000
ENVIC	40	0.001182	0.002108	0.000000
ISO	40	0.375000	0.490300	0.000000
CINT	40	0.565600	0.160300	0.584800
AGE	40	3.455000	0.655000	3.713000

Table 4.1 shows the summary statistics including: number of observations, means, standard deviations and medians. ROI, ENVIC, ISO, CINT and AGE represents Return on Investment, Capital expenditure on pollution control technology, Certification to ISO 14001, Capital Intensity and age of the firm respectively. N and St-dev stands for number of observations and Standard deviation respectively. ROI was measured by the following formula: Profit/ Total asset. Capital expenditure on pollution control technology was calculated using the following formula: total cost incurred to acquire pollution control technology/ total fixed assets. ISO was measured as to whether a firm had been certified to ISO 14001 or not. 1 implies the firm had been certified and 0 implies the firm had not been certified. CINT has been obtained by the ratio of total assets to fixed assets. Age had been measured by number of years the firm had been in to operation.

For ISO table 4.1 shows that, the observed mean is 0.375. The standard deviation suggests that values for ISO are either 0.4903 above the mean or 0.4903 below the mean. The median suggests that half values for ISO are below or equal to zero and the other half of values are above or equal to zero.

The mean for CINT is 0.5656. The standard deviation suggests that, values for CINT are 0.1603 below or above the mean. The median suggests that half the values for CINT are less or equal to 0.5848 and the values from the other half are equal or greater than 0.5848. These statistics for CINT implies that, on average listed manufacturing firms in Tanzania have a capital intensity of 0.5656.

The mean value for AGE is 3.455. This implies that, firms used in this study have an average of 3.455 as natural logarithm of their age. The standard deviation suggests that, natural logarithm of ages for firms used in this study are either below or above the mean by 0.655. The median suggests that, half the natural logarithms of age for firms used in this study are less or equal to 3.713 and the other half of values are greater or equal to 3.713.

4.2.3 Pearson correlations

In order to determine multicollinearity among variables, Pearson's correlation coefficients were calculated. Table 4.2 presents correlation coefficients among the variables,

Table 4.2: Pearson's correlation coefficient after EMA 2004

	ENVIC	AGE	CINT	ISO
ROI	0.176	0.827*	-0.045**	-0.200
ENVIC	1	0.245	-0.422	0.814*
AGE		1	0.108	0.371***
CINT			1	-0.487**

This table presents Pearson's correlation coefficients among variables. ROI, ENVIC, AGE, CINT and ISO represents Return on investment, capital expenditure on pollution control technology, age and Certification to ISO 14001 respectively. ROI was measured by the following formula: Profit/ Total asset. Capital expenditure on pollution control technology was calculated using the following formula: total cost incurred to acquire pollution control technology/ total fixed assets. ISO was measured as to whether a firm had been certified to ISO 14001 or not. 1 implies the firm had been certified and 0 implies the firm had not been certified. CINT has been obtained by the ratio of total assets to fixed assets. Age had been measured by natural logarithm of number of years the firm had been in to operation. The significance levels of the coefficient is obtained using the p-values with *, ** and *** for 1%, 5% and 10% levels respectively.

It can be observed from the table 4.2 that, there is high positive correlation coefficient between Return on investment (ROI) and age of the firm. This suggests that there is high positive linear relationship between ROI and age of the firm. In other words it can be argued that as the firm gets older its ROI improves. In most cases initial investment involves great amount of money. As a result of that, initial ROT will be low but as time goes it will improve -other factors remaining constant

Also table 4.2 shows that there is strong positive correlation between ISO 14001 certification and capital expenditure in pollution control technology. This suggests that, firms which are certified to ISO 14001 incur more expenditure on pollution control technology. The explanation for this observation is that in order for the firm to be certified to ISO 14001, it must comply with certain standards. One of these standards is pollution control technology.

There is a weak positive correlation coefficient between age and certification to ISO 14001. This suggests that, there is weak linear relationship between ages of the firm and certification to ISO 14001. In other words it can be stated that, the older the firm the higher the chance that a firm is certified to ISO 14001.

For CINT and ISO, results in table 4.2 shows that there is weak negative correlation among them. This suggests that firms with high capital intensity are less likely to be certified to ISO 14001. However the correlation coefficient between Return on Investment and capital

intensity is very weak though significant. This weakness of correlation coefficient makes it difficult to come in to any objective implication.

Results also suggest that there is positive correlation between ROI and ENVIC and negative correlation between ROI and ISO. However these correlations are not significant.

4.3 EMPIRICAL FINDINGS

4.3.1 The extent of environmental compliance for listed manufacturing firms in Tanzania.

In order to understand the extent of environmental compliance, an interview was conducted to corporate managers of four listed manufacturing firms in Tanzania. One firm was not included because the management was not ready to cooperate. The results from interview are presented as follows

4.3.1.1 Awareness of Environmental Management Act 2004.

Regarding to awareness of EMA 2004, respondents were asked if they know Environmental Management Act (EMA) 2004. 100% of respondents said that they know EMA 2004. This implies that managers of listed manufacturing firms in Tanzania are aware of environmental regulations as stipulated in EMA 2004.

4.3.1.2 The effect of environmental compliance on the financial performance

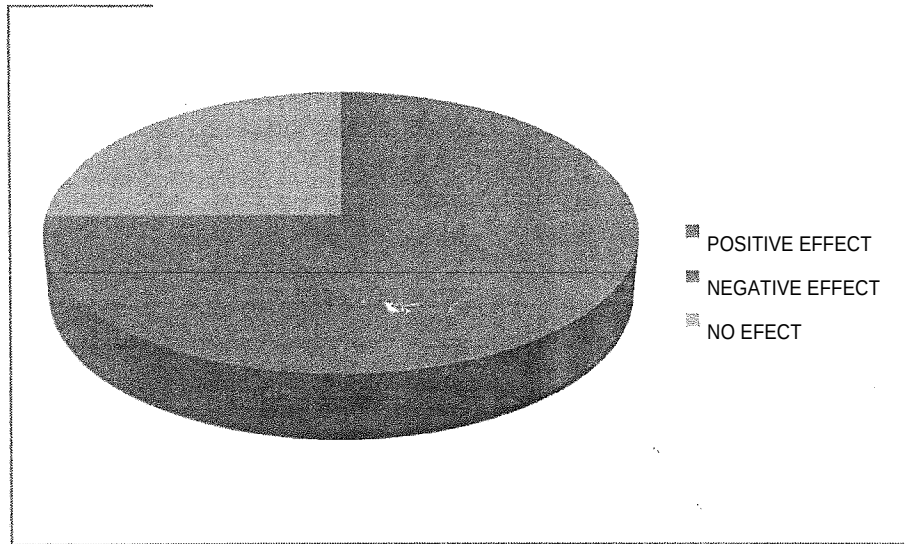
With regard to the effect of environmental compliance on financial performance respondents were asked to give their opinion on the effect of EMA 2004 on the financial performance. The results are summarised in figure 4.1 below.

From figure 4.1 it can be observed that, 75 percent of respondents are of the opinion that environmental compliance has a negative effect on financial performance of the firm; 25 percent of respondents view that environmental compliance has no effect to the financial performance of the firm while no respondent had a view of positive relationship. This implies that the majority of managers in listed manufacturing firms in Tanzania are of the opinion that environmental compliance has a negative effect on the financial performance of the firm. However these results contradict quantitative result which suggests that there is no significant effect of environmental compliance on financial performance. The contradiction can be

explained by the fact that managers sometimes seems to be cost cautious in any expenditure they make. With this regard therefore, it is likely that managers will be of the opinion that

environmental compliance has a negative effect on financial performance; since environmental compliance involves expenditure in acquiring pollution control technology,

Figure 4.1; The effect of environmental compliance on financial performance



4.3.3.3 Environmental Impact Assessment Certificate (EIAC)

Regarding to EIAC, respondents were required to state if the companies they were working with had been issued with EIAC. 100 percent respondents said that the companies they are working with had never been issued with EIAC. This implies that no environmental impact assessment had been done on those firms, or the environmental impact assessment had been done but no certificate had been issued.

4.3.3.4 Adequate places for waste disposal

Respondents were asked if the companies they are working for had adequate place for disposal of waste. This is one of the requirements of the EMA 2004. Respondents from all listed manufacturing companies interviewed had adequate places for waste disposal. This implies that the majority of listed manufacturing firms in Tanzania comply with the requirement to have adequate places for waste disposal.

4.3.3.5 Violation of EMA 2004

Respondents were required to answer if the companies they are working with had been taken to court for allegations regarding to violation of the EMA 2004 or not.

No listed manufacturing firm among the interviewed had been taken to court for allegations regarding to violation of the Environmental Management Act 2004. This implies that listed manufacturing firms in Tanzania are not violating environmental regulations, or environmental regulations in Tanzania are not effective enough to deal with the violators.

4.3.3.6 Certification to ISO 14001

Respondents were asked to answer if their companies had been certified to ISO 14001. The response from this particular question is presented in figure 4.2.

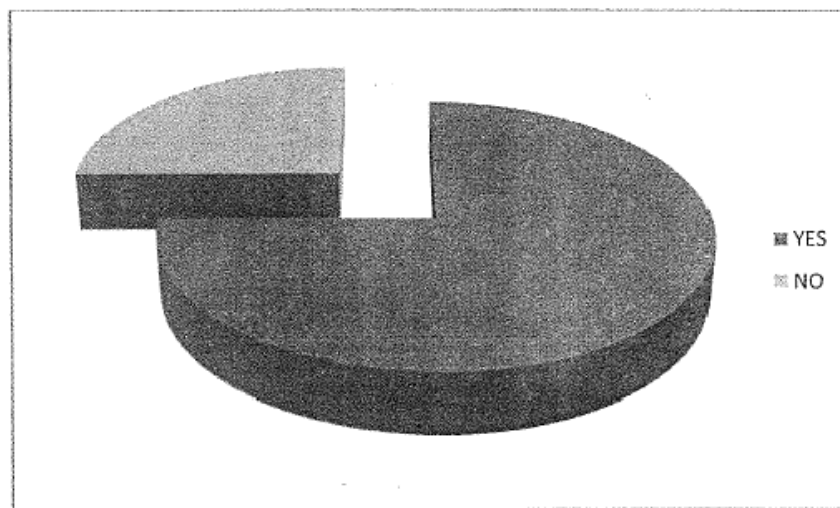


Figure 4.2, Certification to ISO 14001

From figure 4.2 it can be observed that 25 percent of respondent are not certified to ISO 14001. This implies that some of listed manufacturing firms in Tanzania do not see the importance of being certified to ISO 14001, or they are not aware of ISO 14001.

On the other hand 75 percent of respondents said that their companies had been certified to ISO 14001. This implies that majority of listed manufacturing firms in Tanzania view that it is important to be certified to ISO 14001.

From quantitative findings it can be observed that ISO 14001 has no significant relationship with environmental compliance measured by ROt. When linked to qualitative findings it can be observed that though ISO 14001 has no significant effect on ROI, still listed manufacturing companies in Tanzania are opting for ISO 14001 certification. This implies that there are other benefits for ISO 14001 certification apart from financial benefits, or managers of listed manufacturing firms in Tanzania are not aware of the benefits of ISO 14001 certification.

4.3.1 Relationship between environmental compliance and financial performance,

To find the relationship between environmental compliance and financial performance, regression analysis was performed. ROI was used as an independent variable to measure financial performance. ENVIC and ISO were used as dependent variables to measure environmental compliance. CINT and AGE were used as control variables.

The regression model specification was as follows:

$$Fin\ per = f(ENVIC, ISO, AGE, CINT)$$

Where:

..'

Fin per = financial performance measured by the Return on Investment (ROI)

ENVIC= Capital expenditure on pollution control technology. (Measured by the ratio of total capital costs incurred to acquire pollution control technology to the total assets).

ISO = Certification to ISO 14001 (Binary measure; 1- a company is certified to ISO 14001 and 0- a company is not certified to ISO 14001).

CINT = Capital intensity (Measured by the ratio of fixed assets to total assets).

AGE = Firm age (Measured by number of years the firm has been in to operation)

The regression output for the periods before and after 2006, when EMA 2004 came in to operation is given in table 4.3 below.

Table 4.3 Regression output

VARIABLE	BEFORE 2006	AFTER 2006
	Coefficients	Coefficients
Intercept	0.561	2.74
ENVIC	9.06	-46.1
AGE	0.261 **	-0.757*
CINT	-0.941 *	0.445
ISO	0.0198	0.304
R2 (adj)	92.30%	65.30%
Durb-watson	2.03663	2.65693
Pvvalue	0.00000	0.00000
Fvvalue	57.95	9.93

In this table; ENVIC, AGE, CINT and ISO represent capital expenditure on pollution control technology, age, capital intensity and certification to ISO 14001 respectively. ROI was measured by the following formula: Profit/ Total asset. Capital expenditure on pollution control technology was calculated using the following formula: total cost incurred to acquire pollution control technology/ total fixed assets. ISO was measured as to whether a firm had been certified to ISO 14001 or not. 1 implies the firm had been certified and 0 implies the firm had not been certified. CINT has been obtained by the ratio of total assets to fixed assets. Age has been measured by natural logarithm of the number of years the firm has been in to operation. R² - adjusted represents coefficient of determination. It measures the proportion of the variation in dependent variables that is explained by a set of independent variables. The significance of the coefficient is obtained using the p-values with * and ** for 1%, and 10% significance levels respectively.

Table 4.3 above show that the R² -adjusted for the period before 2006 is 92.3%; this suggests that 92.3% of the variation in the dependent variables before 2006 is explained by independent variables. It is also observed from the table that the R² - adjusted for the period after 2006 is 65.3%; this implies that, 65.3% of the variation in the dependent variable after 2006 is explained by independent variables.

The p-values for both models are 0.00. The Durbin-Watson ratio is 2.03663 and 2.65693 for the period of before and after 2006 respectively. This implies that both models for before and after 2006 are significant.

To understand the significance of coefficients p- values for each coefficient were calculated. Table 4.4 below presents coefficient for each variable with their respective p-values.

Table 4.4 Regression Analysis Output for observations after EMA 2004

PREDICTOR	Coef	SECoef	T -value	Pvvalue
Constant	2.7399	0.4375	6.2600	0.0000 .--
ENVIC	-46.110	58.6900	-0.7900	0.4440
ISO	0.3043	0.2126	1.4300	0.1730
CINT	0.4451	0.4527	0.9800	0.3410
AGE	0.7566	0.1260	-6.0000	0.0000*

This table represents regression analysis output for observations after the year 2006 when the Environmental Management Act 2004 came in to operation. ENVIC, ISO, CINT and AGE represents Capital expenditure on pollution control technology, certification to ISO 14001, capital intensity and age of the firm respectively. ROI was measured by the following formula: Profit/ Total asset. Capital expenditure on pollution control technology was calculated using the following formula: total cost incurred to acquire pollution control technology/ total fixed assets. ISO was measured as to whether a firm had been certified to ISO 14001 or not. 1 implies the firm had been certified and 0 implies the firm had not been certified. CINT has been obtained by the ratio of total assets to fixed assets. Age had been measured by number of years the firm had been in to operation.

Note: * denotes significance at 1% significance level.

It can be observed that, there is a positive relationship between ROI and ISO, ROI and CINT, and ROI and AGE. There is also a negative relationship between ROI and ENVIC. However with exception of AGE, the relationship between ROI and other independent variables is not significant.

The p-value of 0.444 suggests that, there is no significant relationship between capital expenditure on pollution control technology and financial performance. This implies that efforts done by listed manufacturing firms in Tanzania to comply with environmental standards are not reflected in financial performance. These results are consistent with studies by Mc Williams & Siegel (2007), Mahapatra (1984) and Murray et al. (2006) which suggests that there is no significant relationship between environmental compliance and financial performance.

The p-value for ISO variable is 0.173, which means the variable is not significant. This implies that certification to ISO 14001 does not affect financial performance for listed manufacturing firms in Tanzania. These results are consistent with studies (Mc Williams & Siegel; 2007, Mahapatra; 1984, Murray et al, 2006) which suggests that there is no significant relationship between environmental compliance and financial performance.

4.3.2 The effect of environmental compliance on financial performance

To understand the effects of environmental compliance on the financial performance, regression outputs for the period before and after 2006 are compared. Table 4.5 below presents summarized outputs for the period before and after 2006.

Table 4.5; Regression output for the periods of before and after EMA 2004

PREDICTOR	Coef		P-value	
	BEFORE EMA2004	AFTER EMA2004	BEFORE EMA2004	AFTER EMA2004
Constant	0.5614	2.7399	0.0000	0.0000
ENVIC	9.0610	-46.1100	0.2150	0.4440
ISO	0.0199	0.3043	0.6910	0.1730
CINT	-0.9409	0.4451	0.2000	0.3410
AGE	0.0261	0.7566	0.0920**	0.0000*

This table presents summarized comparison of regression outputs for the periods before and after EMA 2004. ENVIC, ISO, CINT and AGE represents Capital expenditure on pollution control technology, certification to ISO 14001, capital intensity and age of the firm respectively. ROI was measured by the following formula: Profit/ Total asset. Capital expenditure on pollution control technology was calculated using the following formula: total cost incurred to acquire pollution control technology/ total fixed assets. ISO was measured as to whether a firm had been certified to ISO 14001 or not. 1 implies the firm had been certified and 0 implies the firm had not been certified. CINT has been obtained by the ratio of total assets to fixed assets. Age had been measured by number of years the firm had been in to operation.

Note: * and ** denotes significance at 1% and 10% significance level respectively.

Data from both periods indicates that, there is no significant relationship between dependent variable (financial performance) and independent variables (ENVIC and ISO). This implies that environmental compliance has no significance effect to the financial performance of listed manufacturing firms in Tanzania.

However, with respect to control variables; there is significant relationship between ROI and AGE for both periods. This implies that, with or without EMA 2004, AGE still has effect on financial performance of listed manufacturing firms in Tanzania. The older the firm the better the financial performance.

4.4 CHAPTER SUMMARY

In this chapter the findings of the study have been presented and discussed. The key findings presented in this study indicates that; although there is relationship between dependent variable (ROI) and independent variables (ENVIC and ISO), the relationship is not

significant. This indicates that environmental compliance has no significant effect on the financial performance of listed manufacturing firms in Tanzania.

Qualitative findings indicates that majority of listed manufacturing firms in Tanzania are aware of environmental regulations stipulated by the Environmental Management Act 2004. However managers of listed manufacturing firms in Tanzania view that environmental compliance has a negative effect on the financial performance of their firms.

Also qualitative findings indicates that majority of listed manufacturing firms comply with some of the requirements of environmental regulations such as adequate disposal for waste and certification to ISO 14001. However no listed firm among those interviewed had been taken to court for violation of environmental regulations or issued with environmental impact assessment certificate.

CHAPTER FIVE

5.0 SUMMARY CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter focuses on the interpretation and the implication of the findings from the study based on the research objectives. First is the brief discussion of the relationship between environmental compliance and financial performance. Second is the brief discussion of the effect of environmental compliance on financial performance. Finally, a discussion of the extent of environmental compliance listed manufacturing firms in Tanzania is given.

5.2 Summary of the findings

This thesis presents a study of the effect of environmental compliance on the financial performance among the listed manufacturing firms in Tanzania. The conceptual framework was presented based on prior studies and the Tanzanian context. The key variables under investigation are measurers of environmental compliance (capital expenditure on pollution control technology and certification to ISO 14001) and financial performance measured by ROI.

The key findings from this study are (1) the extent of environmental compliance among listed manufacturing firms in Tanzania is not clear; (2) There is no significant relationship between environmental compliance and financial performance and (3) Environmental compliance has no significant effect on the financial performance for listed manufacturing firms in Tanzania. The P-values for environmental compliance costs and financial performance are greater than 0.1. However, the model was significant with P-values of less than 0.01.

5.3 Research findings and implications

In this study an examination of the effect of environmental compliance on the financial performance is carried out. This study finds that, environmental compliance has no significant effect on the financial performance of the listed manufacturing firms in Tanzania. These findings are consistent with the theory of firm perspective which suggests that, the environmental compliance has no effect on the financial performance. Specifically, managers of listed manufacturing firms in Tanzania can neither decrease nor increase their financial performance by complying with environmental regulations. This is similar to studies (Mahapatra; 1984" Me Williams and Siegel; 2000, Mull; 2006 and Murray et at 2006) which suggest that there is no significant relationship between environmental compliance and

financial performance. However the argument of no significance relationship is contrary to other studies. Studies (Spicer; 1978; Waddock & Graves; 1997, Schnietz & Epstein; 2005, Hart; 1997, Porter & Vander.Linda; 1995, Reinhardt 1999, Dowel et al; 2000 and King & Lenox 2001) suggest a positive relationship between environmental compliance and financial performance; while studies (Chan & Metcalf; 1980, Jaggi Feedman; 1992 and Wagner et al 2000 suggest a negative relationship between environmental compliance and financial performance.

This study is expected to be useful to managers of listed manufacturing firms. The result of the relationship between environmental compliance and financial performance can affect the practices of managers for listed manufacturing firms. For instance Tanzania listed manufacturing firms' managers will be cautious when they have to make decisions regarding to environmental compliance.

The study has also provided scholars with areas of research. It will be interesting to do a research on the effect of environmental compliance on financial performance in other developing countries like Tanzania and find out if similar results will be observed.

With reference to control variables the findings suggest two major issues. First, there is significant negative relationship between financial performance and age for listed manufacturing firms in Tanzania. This implies that the older the listed manufacturing firms in Tanzania the better their financial performance. Second, there is significant negative relationship between financial performance and capital intensely for listed manufacturing firms in Tanzania. This implies that those listed manufacturing firms which invest heavily on the fixed assets will have poor financial performance (measured by ROI) in short run.

Qualitative findings suggest that the extent of environmental compliance for listed manufacturing firms in Tanzania is not clear. Although majority of listed manufacturing firms in Tanzania are aware of environmental regulations, no firm had been sued for violating environmental standards or issued with environmental impact assessment certificate. This suggests that listed manufacturing firms follow environmental regulations or the environmental regulations are not effective enough.

5.4 Recommendations

Based on the findings and implications presented in this study the following recommendations can be made.

First, results suggest that environmental compliance has no significant effect on the financial performance for listed manufacturing firms in Tanzania; this implies that environmental compliance does not add financial value. Therefore it is advisable that, manager of listed manufacturing firms in Tanzania should be careful when making decisions regarding to environmental compliance costs.

Secondly, the EMA 2004 indicates that, failure to comply with environmental regulations may cost the firms in term of fines and penalties. It is therefore advised that, listed manufacturing firms in Tanzania should comply with environmental standards.

Thirdly, findings suggest that the extent of environmental compliance by listed manufacturing firms in Tanzania is not clear. Therefore it is advised that NEMC and environmental policy makers in Tanzania should find out 'why no company among listed manufacturing firms in Tanzania has been taken to court. Is it because listed manufacturing firms follow regulations or environmental regulations are not effective enough?

Fourthly, for further researches, the following should be done :(1) Further research of the relationship between environmental compliance and financial performance should be done in other developing countries like Tanzania. (2) Other studies should be done in Tanzania using other measures of financial performance and environmental compliance a part from measures used in this study. (3) Studies on the extent of environmental compliance and effectiveness of environmental regulations for developing countries should be done.

5.5 Limitations of the study

The limitations which arose in this study are as follows:-

First, the findings implications and recommendations presented in this study are limited to listed manufacturing firms in Tanzania. This could not be avoided because only financial information for listed firms in Tanzania are publicly available, and manufacturing firms are obliged to environmental regulations as they fall under 2nd schedule of environmental management act 2004.

Secondly, the information obtained using interview scheduled can be biased. This could not be avoided because information was obtained from employees of companies who could attempt to cover some information in order to protect their interest.

5.6 Chapter summary

In this chapter; discussion conclusions and recommendations have been presented. The study holds two arguments. First, there is no significant relationship between environmental compliance and financial performance for listed manufacturing firms in Tanzania. Secondly, the extent of environmental compliance among listed manufacturing firms in Tanzania. Therefore studies of similar nature should be done in other developing countries to find out if similar results will be observed.

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APENDIX 1

VARIABLES

Dependent variable	Formula	Rationale	Source
Return on Investment (ROI)	$\frac{\text{PROFIT}}{\text{TOTAL ASSET}}$	Represent asset utilization efficiency in generating profit.	Hart & Ahuja (1996) Russo & Fouts (1997)

Table 3.1 Dependent variables

Independent variable	Formula	Rationale	Source
Capital expenditure on pollution control technology. (ENVIC)	The ratio of capital expenditure in pollution control technology to the total fixed assets	It measure the extent of capital expenditure incurred on pollution control pollution.	Spicer (1978) Nehrt (1996)
ISO 14001 certification (ISO)	1- Company has certification to ISO 14001; and 0- Company has no certification to ISO 14001	It measures whether the company has environmental management system	

Table 3.2 Independent variables

Control variables	Formula	Rationale	Source
Capital intensity (CINT)	Ratio of fixed asset to total assets	Used to control for the possibility of capital intensity having an influence on the relationship being investigated.	King & Lenox (2001), Wahba (2008), Russo & Fouts (1997) and Konar & Cohen (2001).
Firm's age (AGE)	Number of years the firm has been in to operation	Used as control for the age of the company.	Hanks et al.,(1993)

Table 3.3 Control variable

APENDIX 2

LIST OF MANUFACTURING COMPANIES QUOTED ON THE DSE

S/N	Name of manufacturing firms	Listing year	Year of incorporation
1	Tol Gas Limited	1998	1950
2	Tanzania Breweries Ltd	1998	1960
3	Tanzania Tea Packers Ltd	1999	1994
4	Tanzania Cigarette Company	2000	1965
5	Tanzania Cement Company	2002	1973

APENDIX 3

INTERVIEW SCHEDULE

1. Do you know Environmental Management Act 2004?

Yes ☐

No ☐

2. If yes, what is the effect of environmental compliance on financial performance?

Negative ☐

Positive ☐

Neutral ☐

3. Is your company issued with Environmental Impact Assessment certificate?

Yes ☐

No ☐

4. Does your company have adequate space for disposal of waste?

Yes ☐

No ☐

5. Have you been fined or taken to court for matters regarding to violation of environmental regulations?

Yes ☐

No ☐

6. Are you certified to ISO 14001?

Yes ☐

No ☐

APPENDIX FOUR

VARIABLES' VALUES

COMPANY	YEAR	ROI	ISO	ENVIC	AGE	CINT
A	t-4	0.077985008	0	0	3.951244	0.766446526
	t-3	-0.06746888	0	0	3.970292	0.764098521
	t-2	0.074451067	0	0	3.988984	0.768335081
	t-1	0.072076967	0	0	4.007333	0.779530188
	t+1	0.061334765	0	0	4.043051	0.774044228
	t+2	0.003684713	0	0	4.060443	0.778789931
	t+3	0.001008363	0	0	4.077537	0.780851895
	t+4	0.000130396	0	0	4.094345	0.781479099
B	t-4	0.239083467	0	0	1.462398	0.366108403
	t-3	0.241145569	0	0	3.401197	0.373501388
	t-2	0.187180235	0	0	3.433987	0.560140243
	t-1	0.326287227	1	0.0094604	3.465736	0.52819279
	H1	0.342951929	1	0.005202116	3.52636]	0.600795042
	t+2	0.340576574	1	0.003236674	3.555348	0.656150095
	t+3	0.261913551	1	0.001947767	3.583519	0.731754985
	t+4	0.862799571	1	0.001796515	3.610918	0.733427844
C	t-4	0.022419516	0	0	2.079442	0.654689] 03
	t-3	0.0271 04568	0	0	2.197225	0.68770179
	t-2	0.110761293	0	0	2.302585	0.622368939
	t-1	0.019348364	0	0	2.397895	0.632914969
	t+1	0.409856364	0	0	2.564949	0.448615796
	H2	1.394923363	0	0	2.639057	0.718571002
	t+3	1.107612934	0	0	2.708050	0.622368939
	H4	1.130342138	0	0	2.772589	0.613134603
D	t-4	0.369047619	0	0	3.610918	0.333267104
	t-3	0.374545166	0	0	3.637586	0.322126003
	t-2	0.297451774	0	0	3.663562	0.373167081
	t-1	0.280367533	1	0.006368047	3.688879	0.379433906
	t+1	0.212953636	1	0.003314213	3.737670	0.529811331
	t+2	0.296329584	1	0.003356125	3.761200	0.474773484
	t+3	0.308589969	1	0.002066817	3.784190	0.320827019

E	t+4	0.419223319	1	0.0017664	3.806662	0.30342834~
	t-4	0.276067225	0	0	3.737670	0.39529682:
	t-3	0.288355815	0	0	3.761200	0.413522001
	t-2	0.283969131	0	0	3.784190	0.41458290E
	t-I	0.318090535	1	0	3.806662	0.419251455
	t+1	0.313338124	1	0.004037707	3.850148	0.463906176
	t+2	0.263858533	1	0.002391584	3.871201	0.52439584
	t+3	0.216464046	1	0.001451419	3.891820	0.568813656
	t+4	0.193186337	1	0.000870964	3.912023	0.64422034

APENDIX FIVE

REGRESSION OUTPUT

Summary statistics: mean values by company

COMPANY	ROI	ISO	ENVIC	AGE	CINT
A	-0.04470	0.00000	0.00000	4.02420	0.77420
B	0.35020	0.62500	0.00271	3.25500	0.56880
C	0.51100	0.00000	0.00000	2.45770	0.62500
D	0.3198	0.62500	0.00211	2.71130	0.37960
E	0.26920	0.62500	0.00109	2.82690	0.40850

Summary statistics: standard deviation by companies

COMPANY	ROI	ISO	ENVIC	AGE	CINT
A	0.03610	0.00000	0.00000	0.52400	0.00700
B	0.21450	0.51800	0.00328	0.72800	0.14310
C	0.60300	0.00000	0.00000	0.25210	0.08010
D	0.06490	0.51800	0.00224	0.07160	0.08140
E	0.04400	0.51800	0.00148	0.06380	0.09000

Summary statistics: median by companies

COMPANY	ROI	ISO	ENVIC	AGE	CINT
A	-0.06440	0.00000	0.00000	4.02520	0.77642
B	0.21450	0.51800	0.00328	0.728	0.14310
C	0.26000	0.00000	0.00000	2.48140	0.62760
D	0.30300	1.00000	0.00192	3.71330	0.35320
E	0.28000	1.00000	0.00044	3.82840	4416.00000

summary statistics: before and after EMA 2004

		<u>BEFOREEMA</u>			
VARIABLE	N	<u>2004</u>		<u>AFTER EMA 2004</u>	
		<u>Mean</u>	<u>st dev</u>	<u>Mean</u>	<u>st dev</u>
ROI	20.00000	0.11160	0.17090	0.40050	0.4051
ENVIC	20.00000	0.00079	0.00249	0.00157	0
ISO	20.00000	3.37700	0.76700	0.60000	0.0016
CINT	20.00000	0.52770	0.66700	0.60350	2
AGE	20.00000	0.15000	0.36630	0.59300	0.5030
					0
					0.1482
					0
					0.5030
					0

Pearson's correlation coefficients before EMA 2004

	ROI	ENVIC	AGE	CINT
ENVIC	0.280			
AGE	0.154	0.104		
CINT	-0.945	-0.119	-0.017	
ISO	0.370	0.777	0.18	-0.221

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Pearson's correlation coefficient after				EMA 2004
	ROI	ENVIC	ISO	CINT
ENVIC	-0.176			
ISO	-0.200	0.814		
CINT	-0.045	-0.422	-0.487	
AGE	-0.827	0.245	0.37	0.108

1

Regression analysis output for observation after EMA 2004-

PREDICTOR	Coef	SE Coef	T-value	Pvvalue	VF
Constant	2.7399	0.4375	6.2600	0.0000	
ENVIC	46.1100	58.6900	-0.7900	0.444	3.0000
ISO	0.3043	0.2126	1.430	0	3.8000
CINT	0.4451	0.4527	0	0.173	1.5000
AGE	0.7566	0.1260	0.9800	0	1.3000
			-6.000	0.341	
			0	0	

Regression analysis output observations before EMA 2004

PREDICTOR	Coef	SE Coef	T-value	P-value	VF
Constant	0.56142	0.05982	9.39000	0.00000	
ENVIC	9.06100	6.99300	1.30000	0.21500	2.60000
ISO	0.01985	0.04970	0.41000	0.69100	2.70000
CINT	0.9409	0.06718	14.01000	0.2000	1.10000
AGE	1	0.01448	1.80000	0	1.00000
	0.0260			0.0920	
	9			0	

Comparison EMA2004 Variable	regression equations before EMA2004 and	
	Before EMA 2004	After EMA2004
Intercept	0.56100	2.70000
ENVIC	9.06000	-46.10000
AGE	0.26100	-0.75700
CINT	-0.94100	0.44500
ISO	0.01980	0.30400
R-sq(Adj)	92.30%	66.30%
Durb-Wats	2.03663	2.65693
P-value	0.00000	0.00000
F-value	57.95000	9.93000

Significance of variables before and after EMA 2004

Varriable Before EMA 2004 After EMA 2004

	T-value	P-value	T-value	P-value
ENVIC	1.300	0.215	-0.790	0.444
AGE	1.800	0.092	0.000	0.000
CINT	-14.010	0.000	0.341	0.341
ISO	0.410	0.691	1.430	0.173

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