The Analysis of Information Content towards Greenhouse Gas Emissions Disclosure in Indonesia Companies

A THESIS

A Thesis Submitted in Fulfilment
of the Requirements For the Award of the
Undergraduate Degree Faculty of Economics and Business
University of Diponegoro

Submitted by:

HARLINDA SISKA PRADINI
C2C009088

FACULTY OF ECONOMICS AND BUSINESS
UNIVERSITY OF DIPONEGORO
SEMARANG
2013

THESIS APPROVAL

Author Name   :   Harlinda Siska Pradini

Student Number   :   C2C009088

Faculty/ Department   :   Economics and Business/Accounting

Thesis Title   :   **The Analysis of Information Content towards Greenhouse Gas Emissions Disclosure in Indonesia Companies**

Thesis Supervisor   :   Dr. Endang Kiswara, S.E, M.Si, Akt.

Semarang, 1 February 2013

Supervisor

(Dr. Endang Kiswara S.E, M.Si, Akt.)
NIP. 19690214 199412 2001

SUBMISSION

Author Name   : Harlinda Siska Pradini

Student Number   : C2C009088

Faculty/ Department   : Economics and Business/Accounting

Thesis Title   : **The Analysis of Information Content towards Greenhouse Gas Emissions Disclosure in Indonesia Companies**

Has been retained and declared in front of the Board of Reviewers on February 20, 2013 for fulfilling the requirement to be accepted.

Reviews Board   :

1. Dr. Endang Kiswara S.E,M.Si,Akt   (   )

2. Agung Juliarto, S.E,M.Si,Ph.D,Akt   (   )

3. Surya Raharja, S.E, M.Si,Akt   (   )

Certificate of Originality

I, Harlinda Siska Pradini, hereby certify that this assignment is true and accurate to be my own work specially written for the fulfilment of Under Graduate Program of Accounting and has not initially been presented in any other occasion. I bear full responsibility for my thesis.

Harlinda Siska Pradini

February 1, 2013

DEDICATION

I would like to dedicate this thesis to my beloved parents. My mother and my father have been teaching me a lot of valuable things since the early of my lifetime. I am sincere that without their affection, wisdom, advice, knowledge and guidance, I would not able to stand as my own circumstances as right now. I truly feel proud of them. I am precisely unable to count for their extraordinary things which they have been given to me. I am grateful to Allah and thankful to my parents.

For the most wonderful woman that I ever seen, the brightest star who always enlighten my life when it is dark and the source of love and passion in my glorious life. She never let me down with her prayers and support. She also gives me the strength to deal with such kind of obstacles in the rhythm of my life.

(My beloved Mother)

For the most amazing hero in all measurements and they stand up for supporting me. He always taught me about the meaning of life very patiently. He is a man who plays the greatest part in my life.

(My beloved Farther)

For my best partners in family, they always stay with me for the most of the time. They are the real meaning of faithfulness. I am quite sure that life is nothing without them. They precisely encourage me to try to become the best sister.

(My beloved Brothers)

For my friends and classmates who are studying at Undergraduate degree in Accounting at University of Diponegoro. Thanks for togetherness, kindness and brotherhood.

I realize that this thesis is still far from perfect, therefore, critics, suggestion, advice in order to improve my thesis are always welcome. I hope that this research can bring benefit for everybody who reads and for me in particular.

If You want something You've never had, You must be willing to do something You've never done. (THOMAS JEFFRSON)

ACKNOWLEDGEMENT

ABSTRACT

This study aimed to obtain empirical evidence about the influence of ISO 14001 certified Environmental Management System, the existence of environment function, report environment information in accordance with the Global Reporting Initiative version 3.1, the rank of PROPER, firm size, companies' leverage, companies' profitability and type of industry to the extent of greenhouse gas emissions disclosure in Indonesia companies. To measure the extent of greenhouse gas emissions disclosure used index that was developed based on Standard Organization (ISO) 14064-1 about specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.

The population of this study was all companies listed in Indonesia Stock Exchange (ISX) in 2010 and 2011. Sample consists of companies in agriculture, mining and manufacture sectors that disclosed their greenhouse gas emissions. The total sample were 30 companies, with period of observation is two years so the total of company's report which be checked only 34 reports because there was 19 reports that were outliers. Data analysis was performed with the classical assumption and hypothesis testing used regression analysis. Statistic program in this study used SPSS 20, only normality test used E-views.

The results of this study indicated that the factor of report environment information in accordance with the Global Reporting Initiative version 3.1, the rank of PROPER and firm size significantly influence to the extent of greenhouse gas emissions disclosure. Meanwhile, ISO 14001 certified Environmental Management System, existence of environment function, companies' leverage, companies' profitability and type of industry had no significant effect to the extent of greenhouse gas emissions disclosure. Implication of this research showed that practice of greenhouse gas emissions disclosure was still minimize to fulfil ISO 14064-1 guideline.

Keywords: content analysis, greenhouse gas emissions, disclosure

ABSTRAK

Penelitian ini bertujuan untuk memperoleh bukti empiris tentang pengaruh sistem manajemen lingkungan bersertifikasi ISO 14001, keberadaan fungsi lingkungan, kesesuian laporan informasi lingkungan berdasarkan Global Reporting Initiative versi 3.1, peringkat PROPER, ukuran perusahaan, leverage perusahaan, profitabilitas perusahaan dan jenis industri terhadap luas pengungkapan emisi gas rumah kaca pada perusahaan di Indonesia. Pengukuran luas pengungkapan emisi gas rumah kaca menggunakan indeks yang dikembangkan dari ISO 14064-1 tentang Spesifikasi dengan Panduan pada Level Organisasi untuk Kuantifikasi dan Pelaporan dari Emisi dan Penghilangan Gas Rumah Kaca.

Populasi dari penelitian ini adalah semua perusahaan yang terdaftar di Bursa Efek Indonesia tahun 2010 dan 2011. Sampel penelitian terdiri dari perusahaan-perusahaan di sektor pertanian, pertambangan dan manufaktur yang mengungkapkan emisi gas rumah kaca. Total sampel penelitian adalah 30 perusahaan dengan periode pengamatan selama dua tahun sehingga total laporan perusahaan yang dianalisis hanya 34 laporan karena ada 19 laporan yang outlier. Analisis data dilakukan dengan uji asumsi klasik dan pengujian hipotesis dengan analisis regresi. Program statistik dalam penelitian menggunakan SPSS 20, kecuali untuk uji normalitas menggunakan E-views.

Hasil dari penelitian ini menunjukkan bahwa kesesuaian laporan informasi lingkungan dengan GRI versi 3.1, peringkat PROPER dan ukuran perusahaan berpengaruh signifikan terhadap luas pengungkapan emisi gas rumah kaca. Sementara itu, sistem manajemen lingkungan bersertifikasi ISO 14001, keberadaan fungsi lingkungan, leverage perusahaan, profitabilitas perusahaan dan jenis industri tidak berpengaruh signifikan terhadap luas pengungkapan emisi gas rumah kaca. Implikasi dari penelitian ini menunjukkan bahwa praktik pengungkapan emisi gas rumah kaca masih minim untuk memenuhi pedoman ISO 14064-1.

Kata kunci: analisis kandungan, emisi gas rumah kaca, pengungkapan

TABLE OF CONTENTS

Page

CHAPTER III RESEARCH METHOD

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIX

CHAPTER I

INTRODUCTION

1.1 Background

Indonesia is one of the countries that deal with high risk in the global warming. Intergovernmental Panel on Climate Change (IPCC) predicted that it will happen in Indonesia in 2030 as an impact of the global warming which sea level will rise about 8-29 cm, loss about 2000 islands, the difference level of the ebb and flow of water on the watershed becomes more extremely, and lack of clean water in coastal area. The further impacts are extreme flood and dry season.

Global warming is caused by the increasing of greenhouse gas emissions in atmospheres which is exceeded from normal standard. Greenhouse gas emissions consist of Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Hydro Fluorocarbons (HFCs), Per Fluorocarbons (PFCs), and Sulphur Hexafluoride (SF_6) (Presidential Decree or *Peraturan Presiden 71/2011*). To overcome the global warming, Indonesia needs national strategy and national policy for reducing greenhouse gas emissions.

Indonesia has ratified Kyoto Protocol on the 3rd of December in 2004 through *Undang-Undang 17/2004* by ratifying Kyoto Protocol in the United Nations Framework Convention on Climate Change (KLH, 2009). Moreover, Indonesia would commit for reducing its greenhouse gas emissions in 2020, about 26% when it used for national resource or about 41% when it gets international support (*Bappenas*, 2010). The policy that was made by Indonesia to support the

1

target of emissions reduction was *Peraturan Presiden 61/2011*, it was about national action plan to reduce greenhouse gas emissions and *Peraturan Presiden 71/2011* about the national inventories of greenhouse gas emissions.

National action plan to reduce greenhouse gas emissions explains that industry is one of the greenhouse gas emitters. Greenhouse gas emissions are produced by industry which is coming from energy and land uses, production process, and industrial waste. Therefore, industries are expected to reduce their greenhouse gas emissions as Corporate Social Responsibility (CSR) realization.

Based on *Peraturan Presiden* number *61/2011*, *71/2011, 47/2012* and *Undang-Undang 40/2007* explained that industrial sectors can reduce the greenhouse gas emissions and they also have the obligation to carry out Corporate Social Responsibility (CSR), that are mining, agriculture and manufacture. Therefore in this study, researcher will focus on the analysing factors that affect the extent of greenhouse gas emissions disclosure in mining, agriculture and manufacture sectors. The data was collected from 2010-2011 based on national action plan to reduce greenhouse gas emission recently passed in 2011, and consequently, observing the latest trend of greenhouse gas emissions disclosure was only used companies' data in 2010 and 2011. This period selection was also supported by other reason that ISO 14064 was recently adopted by *Badan Standarisasi Nasional* (BSN) in early December 2009.

Greenhouse gas emissions disclosure is a kind of voluntary disclosure; therefore not all companies disclose it information in their report. Companies which disclose their greenhouse gas emissions have several reasons such as to

maintain legitimacy, to protect their reputation, to get the good image and to participate in sustainability programs voluntarily. Chu et al (2013), Rankin et al (2011), Lorenzo et al (2009), and Freedman and Jaggi (2005) tried to analyse the factors that influence to the extent and the credibility of voluntary greenhouse gas emissions disclosure. These researches used different indicators to measure the extent and the credibility of voluntary greenhouse gas emissions disclosure. Chu et al (2013) used The Greenhouse Gas Reporting Index based on questionnaire from the Carbon Disclosure Project (CDP), Rankin et al (2011) used International Standard Organization (ISO) 14064-1, while Lorenzo et al (2009) used indicators proposed by the Global Reporting Initiative (GRI) referring to emissions (EN16, EN17, EN18, EN19, EN20) and the climate change reports are designed by KPMG and GRI (2007), and Freedman and Jaggi (2005) used Equal Weight Disclosure Index and Unequal Weight Disclosure Index.

In Indonesia, the researches that specifically examined the disclosure of greenhouse gas emissions are still limited. All this time, researches on the extent of environment disclosure are focused on Corporate Social Responsibility (CSR) disclosure which is measured by Global Reporting Initiative index (Erdanu, 2010 and Waryanto, 2010).

This study aims to test factors that affect the extent of greenhouse gas emissions disclosure, in terms of ISO 14001 certified Environmental Management System (EMS), the existence of environment function, the report of environment information in accordance with Global Reporting Initiative (GRI) version 3.1, the rank of PROPER, firm size, companies' leverage, and companies' profitability.

This study referred to the research of Rankin et al (2011). Based on this research, the information content in greenhouse gas emissions disclosure was measured by ISO 14064-1. In addition, the theory in this study was also consistent with theory in research of Rankin et al (2011) that is Institutional Governance Systems Theory. Meanwhile, the additional independent variables are described by legitimacy theory. Therefore, researchers took the title:

"The Analysis of Information Content towards Greenhouse Gas Emissions Disclosure in Indonesia Companies"

1.2 Problem Formulation

Based on the background, it can be concluded that companies in agriculture, mining and industrial (manufacturing) sectors have the obligation to carry out Corporate Social Responsibility (CSR), and they also have the important role to reduce greenhouse gas emissions. One of the transparency and accountability form for these responsibilities is disclosure of greenhouse gas emissions. However, not all companies perform their greenhouse gas emissions disclosure because of voluntary (voluntary disclosure classification).

Researches which specifically analyse factors that influence the extent of greenhouse gas emissions disclosure are still limited in Indonesia. In contrast, the research of greenhouse gas emissions disclosure was only became part of the Corporate Social Responsibility (CSR) disclosure based on Global Reporting Initiative (GRI). Indeed, GRI guideline has the assessment aspects that do not only limit to the greenhouse gas emissions disclosure, but also environment performance, economic performance, and social performance. Therefore, this

research analysis factors that affect the extent of greenhouse gas emissions disclosure based on ISO 14064-1. According to the above problems, this research intends to find the answers in the following research questions:

1. Does ISO 14001 certified Environmental Management System (EMS) affects the extent of greenhouse gas emissions disclosure based on ISO 14064-1?

2. Does the existence of environment function affects the extent of greenhouse gas emissions disclosure based on ISO 14064-1?

3. Does the report of environment information in accordance with Global Reporting Initiative version 3.1 affects the extent of greenhouse gas emissions disclosure based on ISO 14064-1?

4. Does the rank of PROPER affects the extent of greenhouse gas emissions disclosure based on ISO 14064-1?

5. Does the firm size affects the extent of greenhouse gas emissions disclosure based on ISO 14064-1?

6. Does companies' leverage affects the extent of greenhouse gas emissions disclosure based on ISO 14064-1?

7. Does companies' profitability affects the extent of greenhouse gas emissions disclosure based on ISO 14064-1?

8. Do all of independent variables simultaneously affect the extent of greenhouse gas emissions disclosure based on ISO 14064-1?

1.3 Objectives of the Study

According to research problems, this research has objectives as follows:

1. To analyse the effect of ISO 14001 certified Environmental Management System (EMS) to the extent of greenhouse gas emissions disclosure based on ISO 14064-1.

2. To analyse the effect of existence of environment function to extent of greenhouse gas emissions disclosure based on ISO 14064-1.

3. To analyse the effect of report of environment information in accordance with Global Reporting Initiative version 3.1 to extent of greenhouse gas emissions disclosure based on ISO 14064-1.

4. To analyse the effect of rank of PROPER to extent of greenhouse gas emissions disclosure based on ISO 14064-1.

5. To analyse the effect of firm size to the extent of greenhouse gas emissions disclosure based on ISO 14064-1.

6. To analyse the effect of companies' leverage to the extent of greenhouse gas emissions disclosure based on ISO 14064-1.

7. To analyse the effect of companies' profitability to the extent of greenhouse gas emissions disclosure based on ISO 14064-1.

8. To analyse the simultaneously effect of independent variables to the extent of greenhouse gas emissions disclosure based on ISO 14064-1.

1.4 Contributions of the Study

The contribution of this study is based on background, problem formulation and research objectives. This research has several contributions, such as:

1. For researchers, the result of this study is expected to give contribution on environment accounting development, particularly on the disclosure of greenhouse gas emissions.

2. For management of the companies, the result of this study is expected to give motivation and ideas about the importance of greenhouse gas emissions disclosure and the important of company's policy preparation for reducing greenhouse gas emissions proactively.

3. For government, the result of this study is expected to be the basis for determining the reduction policy of greenhouse gas emissions that should be obeyed by the company to succeed the target of emissions reduction.

4. For society, the result of this study is provides motivation aspect in order to control the corporate environment behaviour especially to reduce their greenhouse gas emissions progressively.

1.5 Structure of The Study

In order to provide a clear view of the study which is conducted, there are systematic information composing that contain about the material and the things which discussed in each chapter. The study is divided into 5 sections, arranged as follows:

CHAPTER I   : INTRODUCTION

This chapter consists of background, problem formulation, research objectives and purposes, and the structure of this research.

CHAPTER II : LITERATURE REVIEW

This chapter consists of theories that formed from the basic of this study such as institutional governance system theory, legitimacy theory, and other concepts that relevance with this research. In addition to explain the theory and the relevant concepts, this chapter also explains the previous researches and the hypothesis development.

CHAPTER III : RESEARCH METHODS

This chapter describes about research design, type and source of data, data collect method, research object and data analysis. This research is quantitative approach with regression analysis using SPSS 20.

CHAPTER IV : RESULT AND ANALYSIS

This chapter explains about the research object, data analysis that consists of descriptive statistic, the goodness fit of the model, hypothesis test result and interpretation of results.

CHAPTER V : CONCLUSION

This chapter consists of conclusion that can be drawn from the analysis result, research implications, the limitations of the study and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Underlying Theories and The Prior Researches

2.1.1 Greenhouse Gas Emissions

Peraturan Presiden (precidential decree) number *71/2011* explained that the definition of Greenhouse Gas (GHG) is gases which contains the atmosphere, whether natural or anthropogenic, absorbing and retransmit the infrared radiation. Whereas, the definition of greenhouse gas emissions is release from greenhouse gases into the atmosphere in certain areas within particular period. Greenhouse gas emissions consists of Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Hydro Fluorocarbons (HFCs), Per Fluorocarbons (PFCs), and Sulphur Hexafluoride (SF_6).

A lot of chemical compounds are found in the earth's atmosphere, which is known as greenhouse gas emissions that allow sunlight fill into the atmosphere freely. When sunlight has struck the earth's surface, some of it was reflected back in space as infrared radiation (heat). Furthermore, greenhouse gases will absorb this infrared radiation and trapped in the heat of atmosphere. Greenhouse gases in the atmosphere has ability to absorb solar radiation that reflected by the earth, so it causes the earth get warmer. This event is called a greenhouse effect because it the same as the phenomenon which occurs in a greenhouse. Greenhouse phenomenon occurs when the heat came and trapped inside and unable to

penetrate in outside, so it can warm up the whole of greenhouses (National Energy Information Centre, 2004).

The increasing of greenhouse gas emissions in atmosphere above of normal standard causes the global warming and other changing in the climate system. Intergovernmental Panel on Climate Change (IPCC) found that over the last 100 years (1906-2005), the average of earth's temperature was rose about 0.74˚ C. Moreover warming on land was greater than the sea. The average of warming's rate over the last 50 years was higher than that was occurred in the last 100 years.

2.1.2   Institutional Governance System Theory

Institutional Governance System Theory is configuration between private, the state, and institutional arrangement to create the mechanism and impact on social economic condition in a country's production system. Strategic management and political economy are the perspective of institutional governance system theory (Griffiths and Zammuto, 2005).

Strategic management perspective focuses on the company where company's performance can be influenced by the structure of industry and firm characteristics. Company's competitive advantage comes from resources, capabilities and corporate strategies. In contrast, political economy perspective focuses on government and national institution which is believed that government and national institution have the vital role to develop the competitive advantage of companies and industry. Political economy perspective emphasizes that the active

role of government has support and encourage the national competitive advantage (Griffiths and Zammuto, 2005).

Strategic management literature shows that broad of industry structure, market force and the integration of value chain contribute to the industry and company competitiveness. On the other hand, political economy literature shows that state involvement in industry through the coordination of economic activity is key variable for achieving economic competitiveness. Value chain integration and state involvement are used as framework to explain the distinction of national industrial competitiveness on institutional governance system theory. Figure 2.1 explains the difference in characteristics of institutional governance system (Griffiths and Zammuto, 2005).

Figure 2.1
Four Institutional Governance System
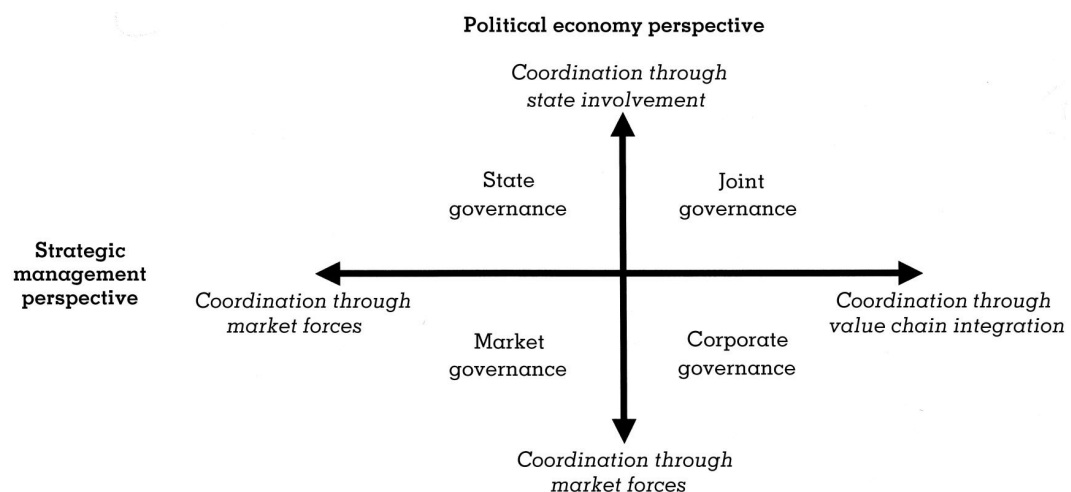
Source: Griffiths and Zammuto (2005)

Figure 2.1 explains the difference between state governance, joint governance, market governance and corporate governance. The detail explanation of the Figure 2.1 can be seen in Table 2.1

Table 2.1
Comparison of the Four Institutional Governance Systems

Institutional Profiles	Market Governance	Corporate Governance	State Governance	Joint Governance
Characteristics				
Value chain	Fragmented	Integrated	Fragmented	Integrated
State Involvement	Low	Low	High	High
Coordination of economic activities and decision making	Market Forces	Corporations through managerial hierarchies	State	State/corporate collaboration
Competitive orientation (cost/ value added)	Low/low	Low/Moderate	High/high	Moderate/high
Institutional capabilities				
State involvement in industry governance	Low-minimal, tariffs/trade agreements	Low-intervenes to address competitive imbalances	High-corporatist-style structures to bring key economic players together, negotiated outcomes	High-corporatist-style structures to bring key economic players together, transformational capabilities
Corporate involvement in industry governance	Low	High	Low	High
Rate of innovation (rate/focus)	Slow- firm specific	Fast- firm specific	Slow- industry enhancing	Fast- development of future-oriented industry capabilities

Institutional Profiles	Market Governance	Corporate Governance	State Governance	Joint Governance
Conditions of best fit				
Economic conditions	Economic stability or growth that encourages industry expansion	Rapid industry growth	Long-term growth, fosters national identity during tough economic times	Works well under conditions of economic growth and stability and under conditions of economic turbulence
Speed of adjustment to industry changes	Slow- if adjustments are made at all	Fast	Slow	Fast
Stakeholder adjustment	Weakest members of the value chain bear the costs of industry adaptation	Weakest members of the value chain bear the costs of industry adaptation	Costs of adaptation are distributed across industry participants, focus on "sharing the pie"	Costs of adaptation are distributed across industry participants, focus on "growing the pie"

Source: Griffiths and Zammuto (2005)

Based on the comparison of four institutional governance systems, this study used market governance to explain the practice of greenhouse gas emissions disclosure in Indonesia. The characteristics of market governance in accordance with the efforts to reduce greenhouse gas emissions in Indonesia companies. Market governance on approaches to climate change issues has the following characteristic (Griffiths et al, 2007):

1. A reliance of minimum compliance standards. Corporations are encouraged to achieve these compliance standards and therefore, these viewed

sustainability initiatives as a cost. Climate change issues and reduction of greenhouse gases is ignored.

2. If corporations pursue individual corporate climate change activities, these are a consequence of managerial choice. In other words, the main part capabilities around climate change and greenhouse gas mitigation are left to the development prerogative of individual managers and corporations.

3. Corporations and industries may engage with climate change activities as a consequence of volunteering to take part in industry or government sponsored sustainability programs.

4. The main focus of corporate and industry may attempt to influence political debate and it focus on costs of adjustment- such as the loss of economic growth and employment as a consequence of addressing greenhouse mitigation issues.

2.1.3 Legitimacy Theory

Legitimacy theory is the most widely used to explain environmental disclosure. Assumption of legitimacy theory is social contract (expressed or implied) between an organisation and society, which is arises from idea about reciprocal responsibilities. Organizations agree to operate within certain bounds imposed by society in order to enjoy continued access to product and resource markets (Campbell et al, 2002).

Legitimating is concerned with building, maintaining and repairing the contract or relationship between company and society. Failure to keep it can cause the legitimacy gap (Campbell et al, 2002). To solve the legitimacy threat,

company must expand its disclosure and reporting. Function of disclosure and reporting are legitimacy devices that realign the stakeholder perceptions and expectations about actual changes in corporate behaviour, highlighting accomplishments in critical areas, justifying intentions, acts and omissions. Since stakeholders start favour to the company, consequently the disclosure and reporting will contribute to make stakeholders aware about fairness of company's procedures (Vurro and Perrini, 2011).

Lindblom (1994) identified four organizational strategies to close the legitimacy gap consists of changing the organization or changing the public, manipulation and misrepresentation of the organization. Changing the organization refers to providing an impression to the public that organization has changed its behaviour, while change the public symbolize changing the perception of the public without followed by changing of organization's behaviour. Manipulation refers to diverting the attention of the public. Finally, misrepresentation refers to misinterpretation of fact for getting legitimacy.

2.1.4   International Standards Organization (ISO) 14064

International Organization for Standardization (IOS) issued a series of standards on the greenhouse gases, called ISO 14064-1: 2006 (Greenhouse gases: Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals),   ISO 14064-2: 2006 (Greenhouse gases- Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancement, ISO 14064-3: 2006 (Greenhouse gases- Part 3:

Specification with guidance for the validation and verification of greenhouse gas assertions). The standards of ISO 14064 had been adopted by *Badan Standarisasi Nasional* in early December 2009 (BSN, 2009). ISO 14064 (ISO, 2006) has the below objectives:

1. Enhancement of environmental integrity by promoting consistency, transparency and credibility in greenhouse gases quantification, monitoring, reporting and verification;

2. Enabling organizations and manager to identify greenhouse gases related to liabilities, assets and risks;

3. Facilitating the trade of greenhouse gas allowances or credits; and

4. Supporting design, development and the implementation of comparable and consistent greenhouse gases schemes or programs.

2.1.5   International Standards Organization (ISO) 14001

ISO developed standards that help organizations to take proactive approach for managing environmental issues: the ISO 14000 family of environmental management standards which can be implemented in any type of organizations either in public or private sectors- from companies administrations to public utilities (ISO, 2009). ISO 14001: 2004 sets out the criteria for an environmental management system and it can be certified. It does not state requirements for environmental performance, but maps out a framework that a company or organization can follow to set up an effective environmental management system. The benefit of using ISO 14001: 2004 is includes reducing cost of waste management, savings in consumption of energy and materials,

lowering distribution costs and improving corporate image among regulators, customers, and the public.

ISO 14001: 2004 specifies for requirements an environmental management system that enabling an organization to develop and to implement a policy and objectives which take into account the legal requirements and others in which the organization subscribes and the significant information of environmental aspects. These are applying for the environmental aspects that the organization identifying is those which can control and those which can influence. It does not state to the specific environmental performance criteria itself. The International Standard is applicable to any organizations that wish to:

1. Establish, implement, maintain and improve an environmental management system,

2. Assure the conformation with stated environmental policy itself,

3. Demonstrate the confirmation with this international standard by:

   a. Making a self- determination and self- declaration, or

   b. Seeking confirmation of its conformance by parties who have an interest in the organization, such as customers, or

   c. Seeking confirmation of its self-declaration by an external party to the organization, or

   d. Seeking certification or registration of its environmental management system by an external organization.

2.1.6 Management System

There are two different on legal systems in the board of company, namely Anglo-Saxon and Continental European (FCGI, 2002). Anglo– Saxon model has one-tier system. In one-tier system, the companies have one board of directors, which are generally the combination of senior managers or executives (executive directors) and independent director who works on the principle of part time (non-executive directors). Countries that implement this system are United States and United Kingdom.

Continental European has two-tier systems. In two-tear systems, companies have two separate bodies, namely the board of supervisors (board of commissioners) and board of management (board of directors). The board of directors assign to manage and represent the company under the direction and supervision of board of commissioners. The other task board of directors provide information to board of commissioners and answer the matters that are submitted by board of commissioners. Meanwhile, the board of commissioners have duty to appoint and to dismiss the board of directors and responsible to supervise management's tasks. Countries that implement this system are Denmark, Germany, Japan, Dutch and Indonesia.

2.1.7 Global Reporting Initiative (GRI) Version 3.1

GRI has pioneered and developed a Comprehensive Sustainability Reporting Framework that is widely used in the world. The framework that enables in all organizations to measure and report their economic, environmental, social and governance performance are the four key areas of sustainability. The

uptake of GRI's guidance was boosted in 2006 when launched the current generation of Guidelines, G3. Over 3,000 experts from across businesses, civil society and labour unions were participated in G3's development.

In March 2011, GRI published the G3.1 Guidelines, an update and the complete result of G3 that expanded guidance on reporting gender, community and human rights, related to the performance. The G3.1 Guidelines were made up by two parts. Part 1 featured guidance on how to report. Part 2 featured guidance on what should be reported in the form of disclosures on management approach and performance indicators.

2.1.8 PROPER

PROPER is monitoring activities and incentive or disincentive programs to the person responsibility for business or activity. PROPER encourages the company's adherence to the environmental regulations and achieve the environmental excellence through the integration of sustainable development principles in the process of production and service (KLH, 2011). The performance assessment of PROPER can be found on *Peraturan Menteri Negara Lingkungan Hidup 5/2011*. Generally, the performance of PROPER is in the follows:

1. Gold is given to the personal responsibility for business or activities that consistently show environmental excellence in the process of production or service, the implementation of ethical business and the responsibility for the community.

2. Green is given to the personal responsibility for business or activities that has environmental management more than that is required in regulation (beyond compliance) through the implementation of environmental management system, using the resources efficiently with 4 R (Reduce, Reuse, Recycle and Recovery), and it also performs better social responsibility (CSR or Community Development).

3. Blue is given to the personal responsibility for business or activities that have environmental management efforts in accordance with the rules or regulations.

4. Red is given to the personal responsibility for business or activities that have environmental management efforts which are not accordance with the rules or regulations.

5. Black is given to the personal responsibility for business or activities that have deliberate action or negligence so it causes the pollution, environmental damage and the violation of the laws or the violation of administrative sanctions.

2.1.9 Firm Size

Large companies get more public attention than small companies. Consequently, they will disclose the detailed information (Al-Shammari, 2005). Watts and Zimmerman (Al-Shammari, 2005) argue that large companies expand their disclosure to protect reputation and avoid government intervention. Greenhouse gas emissions disclosure in large companies is more likely to be done because they have more resources and they get more extensive effect.

Environmental accounting literature argues that firm size plays an important role in a firm's pollution-abatement performance and pollution-emissions disclosures (Freedman and Jaggi, 2005). This argument based on premise that large companies can be more easily afford the expenditure needed to abate pollution. Moreover Branco and Rodrigues (2008) argued that large companies get more public attention than small companies because they are more openly get monitoring from stakeholder and more vulnerable to adverse reactions. Freedman and Jaggi (2005) argued that the fear for incurring a high political cost provided the motivation of large companies to make detailed disclosures, so that their pollution performance would not be underestimated or ignored by policy makers and regulators.

Measuring the firm size is used to the total of assets. In this research, firm size was measured by total of assets (trillion) at each sample company.

2.1.10 Leverage

A basic measure of the safety of creditors' claims is the leverage, which states total liabilities as a percentage of total assets. A company's debt ratio or leverage is computed by dividing total liabilities by total assets. Leverage is not a measure of short-term liquidity. Rather, it is a measure of creditors' long term risk. The smaller the portion of total assets financed by creditors, the smaller the risk that the business may become unable to pay its debts. From the creditors' point of view, the lower the debt ratio, the safer their position.

A high debt ratio indicates an extensive use of leverage, that is, a large proportion of financing provided by creditors. A lower debt ratio, on the other

hand, indicates that the business is making little use of leverage (Williams et al, 2010). Increasing of leverage ratio has positive impact to the company's financial risk (Horne and Wachowicz, 2009).

2.1.11 Profitability

Profitability ratio consists of net profit margin, Return on Assets (ROA), Return on Investment (ROI) and Return on Equity (ROE). In this study, ROI is used to measured profitability. In several literatures, ROI is often equated with ROA (Horne and Wachowicz, 2009). In other literatures, Riyanto (2008) explains the difference between ROA and ROI. ROA is ability of capital that invested in overall assets to make profit for investors (shareholders and bondholders), while ROI is the ability of capital that be invested in overall assets to make net profit. Positive ROI indicates total asset that is used in operating activities capable to create the company's profit.

Company with better operating performance is more likely to make detailed environmental disclosure, because they are able to spend more on environmental abatement than others (Freedman and Jaggi, 2005). Therefore, companies which have better economic performance can be expected to perform good job environment (Porter and Van der Linde, 1995).

2.2 Prior Researches

In Indonesia, researches about Corporate Social Responsibility disclosure are more than research about greenhouse gas emissions disclosure. The reference (replication) of prior researches that used in this research is consists of:

Table 2.2
List of Prior Researches

Researcher	Variable	Statistical Analysis	Samples	Findings
Freedman and Jaggi (2005)	Disclosure of pollution that associated with climate change based on Equal Weight Disclosure Index (Y1) Disclosure of pollution that associated with climate change based on Unequal Weight Disclosure Index (Y2), Ratification of Kyoto Protocol (X1), firm size (X2), debt- equity ratio (X3), ROA (X4)	Regression	The study is based on disclosures made in the annual reports, environmental reports, and websites of 120 of the largest (in terms of revenues) public firms from the chemical, oil and gas, energy, and motor vehicles and casualty insurance industries. 120 firm from 20 countries.	The results show that firms from countries that ratified the Protocol have higher disclosure indexes as compared to firms in other countries. Additionally, larger firms disclose more detailed pollution information.
Lorenzo et al (2009)	Greenhouse gas emissions disclosure based on index that was developed by the GRI and climate change reports designed by KPMG and GRI (Y), firm size (X1), leverage (X2), ROE (X3), ROA (X4), Market to Book Ratio (X5) , Ratification of the Protocol Kyoto (X6)	Linier Regression	Data used in this study are companies from different countries worldwide (the USA, Australia, Canada and the European Union), and sought to represent both countries that have not ratified, approved, adhered to or accepted the Kyoto Protocol, and countries that have. The sample used corresponds to 101 firms from different countries and industries.	The results obtained show a direct relationship between corporate size, its market capitalization and the disclosure of information in addition to proposed Global Reporting Initiative (GRI) indicators on greenhouse gas emissions. Conversely, an inverse relationship between ROE and disclosure is detected.

Researcher	Variable(s)	Statistical Analysis	Samples	Findings
Rankin et al (2011)	Greenhouse gas emissions disclosure (Y1), The extent and credibility of voluntary greenhouse gas emission disclosure based on ISO 14064-1 (Y2) Environmental Management System (EMS) (X1a) ISO 14001 certified EMS (H1b) Introduction of environment committees (X2) Corporate governance quality (X3) Report sustainability information in accordance with the Global Reporting Initiative/ GRI (X4) Respond to the Carbon Disclosure Project (CDP) (X5) Participation in European Union Emissions Trading Scheme (EU-ETS) (X6)	Logistic Regression and multiple regression	Data used in this study are 187 firms which 80 companies (42.8 per cent) report GHG emissions in their 2007 company reports. Data is taken from S&P ASX 300 Australian Companies. Industry categories are energy and mining, industrials, consumer and service	Firms that voluntarily disclose GHGs have EMSs (uncertified and certified), higher corporate governance quality and publicly report to the CDP, tend to be large and in the energy and mining and industrial sectors. The credibility and extent of disclosures are related to the existence of a certificate EMS, public reporting to the CDP, and use of the GRI. Firms that disclose more credible information are more likely to be large and in the energy and mining, industrial and services sectors.

Researcher	Variable	Statistical Analysis	Samples	Findings
Chu et al (2013)	Greenhouse gas emissions disclosure based on The Greenhouse Gas Reporting Index (Y), Industry sectors (X1), Firm Size (X2), Profitability (X3), Overseas listing (X4), State Ownership (X5).	Multiple Regression Analysis	The top 100 A-share companies listed on Shanghai Stock Exchange	It was found thatmost Chinese companies reported neutral and good news. The results also indicate larger companies operating in an industry which has higher level of carbon dioxide emissions tend to have higher levels of greenhouse gas disclosures, consistent with the expectation of legitimacy theory. However, profitability and overseas listing were not significantly related to greenhouse gas reporting. This is consistent with the findings of previous literature. Finally, contrary to expectations, state-owned companies report less greenhouse gas information than private companies.

This study modified the research of Rankin et al (2011). This study aims to analyse the extent of greenhouse gas emissions disclosure in Indonesia companies. There are three independent variables that were adopted from research of Rankin et al (2011), namely ISO 14001 certified Environmental Management System, the existence of environment function and the report of sustainable information in accordance with Global Reporting Initiative. In this study, GRI was not measured by dummy variable, but environmental performance index based on GRI version 3.1. Besides, the existence of environment function was not measured by presence or absence of environment committee either in board of

directors or board of commissioners but it will be extended according to condition in Indonesia. Furthermore, additional independent variable that adjusted with research context in Indonesia was PROPER.

Study of Rankin et al (2011) used firm size, companies' profitability and companies' leverage as control variables, but this study using the control variables as independent variables. It referred to study of Chu et al (2013) Lorenzo et al (2009) and Freedman and Jaggi (2005) that used firm size, profitability and leverage ratio as independent variables.

2.3 Theoretical Framework

In this study, researcher takes seven independent variables, these are consist of ISO 14001 certified Environmental Management System (EMS), the existence of environment function, the report of environment information in accordance with Global Reporting Initiative (GRI), the rank of PROPER, firm size, companies' leverage, and companies' profitability, and one control variable from type of industry.

Based on hypothesis development, theoretical framework is arranged to describe the relation between independent variables and dependent variable. Model of theoretical framework is developed to analyse factors that affected the extent of greenhouse gas emissions disclosure based on ISO 14064-1. Theoretical framework is arranged to ease the hypothesis understanding which is constructed in this research.

Figure 2.2
Theoretical Framework
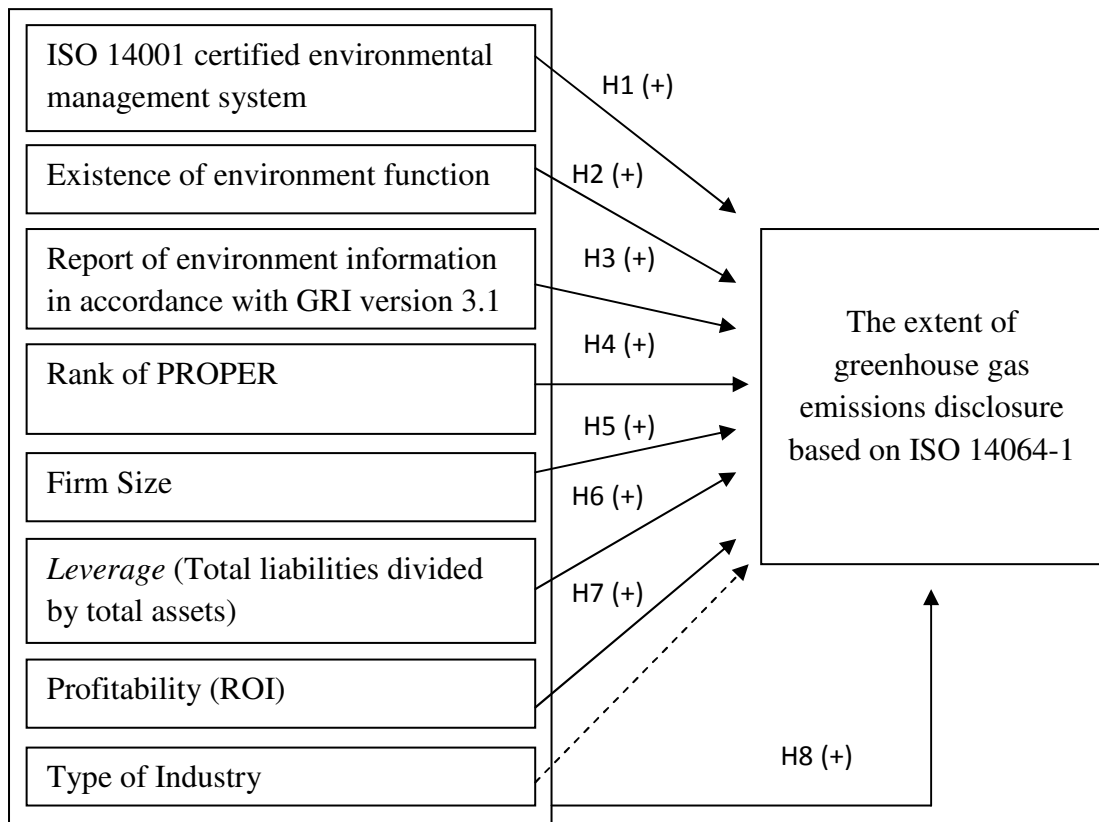
Source: Developed for this study, 2012

2.4 Hypothesis Development

2.4.1 ISO 14001 Certified Environmental Management System

Institutional governance system theory explains that market governance declares if corporations individually execute on climate change activities as the consequence of managerial choice (company's prerogative). The lack of public policy guidelines causes the several companies in Indonesia in implementing the guidelines of non-government organizations such as ISO for demonstrating their proactive approach on climate change issue. One of the organizational

management aspects based on ISO guidelines is implementation of environmental management system. The implementation of environmental management system shows the company's commitment to monitor, manage, measure and report their environmental performance, including greenhouse gas emissions disclosure. Environment management system is a tool that designed to manage greenhouse gas emissions in organization for overcoming the climate change.

ISO published ISO 14001: 2004 (Mello, 2006) for facilitating, organizing, monitoring, verifying and reporting the implementation of environmental management system in organization. Herremans et al (2009) used environmental management system as proxy to determine whether strategy of the company has conformity with GRI's visions or has internal control system to support the truth of financial statement. The existence of environmental management system indicates that environmental management accounting system serves managerial process and external reporting as response to internal issues to increasing social environment attention, including attention from investors.

The implementation of ISO 14001 certified environmental management system shows that quality of company's management system is capable to provide environmentally friendly products or green products to consumers (Adams, 2002). ISO 14001 requires company to establish and maintain communication both internally and externally. External communication can be made through several media, such as annual report, sustainability report, and corporate website. Research of Rankin et al (2011) showed that the presence of ISO 14001 certified environmental management system had significant impact to the extent and

credibility of greenhouse gas emissions disclosure. Based on the description, this study proposes hypothesis as follows:

H1: ISO 14001 certified environmental management system has a positive effect to the extent of greenhouse gas emissions disclosure based on ISO 14064-1.

2.4.2 The Existence of Environment Function

According to institutional governance system theory, market governance gives permission to companies for determining their policy on climate change. The initiatives for overcoming climate change can be demonstrated by the response of internal governance such as the existence of environment committee in company.

The existence of environment committee shows the company's greenhouse gas emissions management attention to improving their environmental reputation (Neu, et al, 1998), especially to the stakeholders. The existence of environment committee proves that company's governance realize in the long term organization strategy into the future which capable to minimize the carbon footprint proactively. Therefore, the main purpose of environment committee motivates companies to adopt policy, to measure, to practice and to report the greenhouse gas emissions.

Environment committee is more likely to recognise the importance of greenhouse gas emissions disclosure for reducing their risk, especially the risks that caused by the increasing of regulation and operational activity which have impact on the global warming (Rankin et al, 2011). Moreover, the existence of environmental committee is more likely discloses their emissions to the public

and provides more credible information (Ash forth and Gibbs, 1990). The study of Rankin et al (2011) showed that the existence of environment committee did not find significant effect to the extent and the credibility of greenhouse gas emissions disclosure.

The research context in Indonesia shows that the existence of environment committee on the structure of organization either the board of directors or board of commissioners is rarely found. Therefore, this study tries to expand the scope of environment committee to the environment function. The existence of environment function is not only limited in formal organization's structure (management hierarchy) but also to the person responsibility in environment programs (such as corporate social responsibility). The environment function with higher position would increase their authority. The environment function with higher authority enable the companies to be formulated into their greenhouse gas emissions policies, included reporting to the public. Based on the description, this study proposes hypothesis as follows:

H2: The existence of environment function has a positive effect to extent of greenhouse gas emissions disclosure based on ISO 14064-1.

2.4.3 The Report of Environment Information in accordance with Global Reporting Initiative (GRI) version 3.1

In institutional governance system theory, market governance states if individual corporations are pursue on climate change activities as consequence of managerial choice (company's prerogative). The lack of public policy guidelines stimulate the several companies in Indonesia to implement the guidelines of non-

government organizations such as GRI which is demonstrating their proactive approach on climate change issued to the stakeholders.

GRI reporting framework has globally been accepted for improving the quality of sustainability report in order to increase transparency, comparability, clarity and other principles. Rankin et al (2011) explained that companies are using GRI guidelines to generate sustainability information in private regulation and it can be used to disclose their greenhouse gas emission in annual report. The adoption of GRI guidelines demonstrated the company's commitment for overcoming the climate change. The study of Rankin et al (2011) found that sustainability information had the significant effect to the extent and credibility of greenhouse gas emissions disclosure. Based on the description, this study proposes hypothesis as follows:

H3: The Report of environment information in accordance with Global Reporting Initiative (GRI) version 3.1 has a positive effect to extent of greenhouse gas emissions disclosure based on ISO 14064-1

2.4.4   Rank of PROPER

There are two different of disclosure reflection between good environmental performers and poor environmental performers (Hughes et al, 2001). The most disclosures about positive environmental activities that are disclosed by the best environmental performers reflect legitimacy form. However, many statements about positive environmental activities that are disclosed by poor environmental performers reflect legitimization. Disclosures which are made to legitimize a company's activities do not provide yet social information that is truly useful to the stakeholder (Hughes et al, 2001).

Social responsibility perspective emphasizes the importance of relation between environmental performance and environmental disclosure for developing positive relation and credible validation (Al-Tuwaijri, 2004). Verrocchio (1983) assume that good environmental performance reduces the firm's exposure to future environmental costs, then disclosure of this information should be perceived as good news by investors. Therefore, firms with good environmental performance should disclose more environmental information both in quantity and in quality than firms with poorer environmental performance.

Companies with superior environmental performance have more incentives to inform their proactive environmental strategy by voluntarily disclosing to investors and other stakeholders. They seek to disclose their performance type that is not directly observed by investors and other stakeholders, through direct voluntary disclosures that cannot be easily imitated by poor environmental performers. Consequently, they potentially increase investor's valuation towards company's positive performance (Clarkson et al, 2006).

Al-Tuwaijri (2004) found a significantly positive relation between good environmental performance and more extensive quantifiable disclosure of environmental information. Its result is similar to study of Suratno et al (2006) and Rakhiemah and Agustia (2009), whom also found that environmental performance (Rank of PROPER) had significantly positive effect to the environmental disclosure. Based on the description, this study propose hypothesis as follows:

H4: The rank of PROPER has a positive effect to extent of greenhouse gas emissions disclosure based on ISO 14064-1

2.4.5   Firm Size

Firm size is often used in previous studies to explain the publication of environment information (Lorenzo et al, 2009). Large companies get more public attention, so they disclose more environmental information to prevent and to resolve the conflicts (Lorenzo et al, 2009). Liu and Anbumozhi (2009) argued that large company get more public monitoring and they also have superiority resource in environmental management efforts.

Corporate social reporting (CSR) is a strategy adopted by companies to achieve legitimacy and survive in society. Legitimacy theory suggests that visible companies which face higher public pressure need to be involved in socially responsible activities and tend to report more information to the public to maintain legitimacy and protect their reputation (Chu et al, 2013).

By analysing 120 large companies both countries which ratified the Kyoto Protocol and countries which not ratified the Kyoto Protocol. Freedman and Jaggi (2005) found that greenhouse gas emissions disclosure is positively related to the firm size. Their results are similar to study of Rankin et al (2011), Lorenzo et al (2009) and Chu et al (2013), whom also found that firm size was significant effect to the extent of greenhouse gas emissions disclosure. Based on the description, this study proposes hypothesis as follows:

H5: The Firm Size has a positive effect to extent of greenhouse gas emissions disclosure based on ISO 14064-1

2.4.6   Companies' Leverage

Companies with the higher debt have the greater interest conflict, because the possibilities of wealth transfer from company's debt to the shareholders. To

increase the amount of information disclosure, companies can construct their legitimacy and minimise their potential conflicts of interest between owners and creditors. Legitimacy theory suggests that companies with higher risk tend to report more information to grow company's good image and legitimacy.

According to Freedman and Jaggi (2005), the absence of detailed pollution disclosure causes investors and creditors are not capable to evaluate the default risks of company. Therefore, the investors and creditors can't avoid investment in company. Freedman and Jaggi (2005) did not find significant effect between leverage and greenhouse gas emissions disclosure. Same as Freedman and Jaggi (2005), Lorenzo et al (2009) also did not find significant effect between leverage and disclosure of greenhouse gas emissions. In contrast, the research of Rankin et al (2011) found that leverage is positively associated with the extent and credibility of greenhouse gas emissions disclosure. Based on the description, this study proposes hypothesis as follows:

H6: Companies' Leverage has a positive effect to the extent of greenhouse gas emissions disclosure based on ISO 14064-1

2.4.7 Companies' Profitability

In market governance system, environment activities are still considered as the cost of company, so economic performance becomes one of the relevant factors to determine whether the environment activity is company's priority or not company's priority (Lorenzo et al, 2009). Firms with higher economic performance have greater ability to reduce their emissions. The research of Khanna et al (2004) found positive effect between profitability and the extent of

environment disclosure. On the other hand, Neu et al (1998) explains that firms with unfavourable profitability take the advantage of environmental disclosure for legitimacy purpose.

The research of Freedman and Jaggi (2005) and Chu (2013) did not find significant effect between profitability and greenhouse gas emissions disclosure. Meanwhile, the research of Lorenzo et al (2009) found that ROA had no significant effect to the disclosure of greenhouse gas emissions, but ROE had significantly negative effect to the disclosure of greenhouse gas emissions. The study of Lorenzo et al (2009) was using ROA and ROE to measure profitability because ROA was used to reflect the technical characteristics and associated with the efficiency of company, while ROE provided that the financial perspective was according to stakeholders' demands.

In this study, ROA and ROE are not used as the proxy of profitability, but Return on Investment (ROI) is used to measure profitability. In this study, ROI is more appropriate to explain the extent of greenhouse gas emissions disclosure because the cost of disclosure is indirect investment that will be expected increasing the company's net profit. Based on the description, this study proposes hypothesis as follows:

H7: Companies' Profitability has a positive effect to the extent of greenhouse gas emissions disclosure based on ISO 14064-1

2.4.8   Simultaneous Test to the Independent Variables

In institutional governance system theory, market governance explains that ISO 14001 certified Environmental Management System (EMS), the existence of environment function, the report of environment information in accordance with

Global Reporting Initiative (GRI) version 3.1, and company's profitability have positive effect to the extent of greenhouse gas emissions disclosure based on ISO 14064-1. Besides, legitimacy theory explains that rank of PROPER, firm size and companies' leverage have positive effect to the extent of greenhouse gas emissions disclosure. Combination of the theories explain that ISO 14001 certified Environmental Management System (EMS), the existence of environment function, the report of environment information in accordance with Global Reporting Initiative (GRI) version 3.1, the rank of PROPER, firm size, companies' leverage, and companies' profitability have positive effect to the extent of greenhouse gas emissions disclosure.

This study is not only examines the effect of independent variables to dependent variable partially, but also simultaneously. Simultaneous test is used for comparing statistical models that have been fitted into a data set in order to identify the best model that suitable with the population from which the simplicity of data. Based on the description, this study proposes hypothesis as follows:

H8: Independent variables have simultaneous effect to the extent of greenhouse gas emissions disclosure based on ISO 14064-1

CHAPTER III

RESEARCH METHODS

3.1 Research Variables and Operational Definition

The summary of research variables, dimensions, indicators and measurement scales in this study are presented in below table,

Table 3.1
Variables, Dimensions, Indicators and Measurement Scale

Variables (Y/X)	Dimension	Indicator	Measurement Scale
The extent of greenhouse gas emissions disclosure (Y)	ISO 14064-1	20 indicators of greenhouse gas emissions disclosure (Rankin et al and ISO 14064-1)	Ratio Scale
Environmental management system (X1)	ISO 14001	4 Quality rating of environmental management system (Based on 4 Grades)	Interval Scale
The existence of environment function (X2)	Environment function in Company	4 Position of environment function in organization, whether inside or outside of management hierarchy (Based on 4 Grades)	Interval Scale
Environment Information (X3)	GRI version 3.1	30 indicators was developed from the environment performance aspect based on GRI	Ratio Scale
Environment Performance (X4)	PROPER	5 Rank of PROPER (2010 and 2011)	Interval Scale
Firm size (X5)	Firm size	Total assets (in Trillion)	Ratio Scale
Financial performance (X6)	Leverage	Total liabilities divided by total assets	Ratio Scale
Financial Performance (X7)	ROI	Earnings after tax divided by total assets	Ratio Scale

Source: developed for this study, 2012

3.1.1 Dependent Variable

The dependent variable is the variable of primary interest to the researcher (Sekaran, 2006). Dependent variable in this study was to the extent of greenhouse gas emissions disclosure based on ISO 14064-1 (EMD).

The extent of greenhouse gas emissions disclosure was measured by index based on ISO 14064-1. The developing of index is consistent with study of Rankin et al (2011). The score of index was given to the information that contained in annual report or sustainability report as the measurement of greenhouse gas emissions disclosure. Measurement was determined by the score of company's information disclosure that compared with the score of disclosures which was developed from ISO 14064-1. Index the extent of greenhouse gases is as follows:

Table 3.2
Greenhouse Gases Disclosure Index Based on ISO 14064-1 Requirements

Sect.	GHG reporting index	Max score	Score
7.3.1 Description of GHG inventory			
B	Person responsible	1	
C	Reporting period covered	1	
D	Document organisational boundaries	1	
E	Direct GHG emissions (tonnes of CO2e)	1	
F	Description of how CO2 emissions from the combustion of biomass are treated in GHG inventory	5	
G	If quantified, GHG removals, quantified (tonnes CO2e)	1	
H	Explanation for exclusion of any GHG sources or sinks from quantification	5	
I	Energy indirect GHG emissions associated with generation of imported electricity, heat or steam (tonnes CO2e)	1	

Sect.	GHG reporting index	Max score	Score
j and k	Historical base year selected and base-year GHG inventory	1	
l and m	Reference to or description of quantification methodologies	1	
N	Reference to or documentation of GHG emission or removal factors used	1	
O	Description of impact of uncertainties on accuracy of GHG emissions & removals data	1	
P	Statement that prepared in accordance with ISO 14064	1	
Q	Statement describing GHG inventory, report or assertion has been verified	1	
Subtotal		22	
7.3.2 Other issues to be considered			
A	Description of policies, strategies and programs	5	
F	GHG emissions or removals disaggregated by facility	1	
H	Uncertainty assessment description and results (incl. measures to manage or reduce uncertainties)	1	
I	Description of and presentation of additional indicators (e.g. efficiency or GHG emission intensity)	1	
J	Assessment of performance against internal and/or external benchmarks	1	
K	Description of GHG info management and monitoring procedures	5	
Subtotal		14	
Total		36	

Source : Rankin et al (2011)

Based on Table 3.1, companies that have more information will increase their score of greenhouse gas emissions index. The index calculation of greenhouse gas emissions disclosure was done with the following steps:

1. Gave score for each item of disclosure by dichotomy

2. Score of each company was summed to get the total score

3. The formed index calculation of greenhouse gas emissions disclosure as follow:

$$= \frac{\text{Total score was obtained}}{\text{Total score was expected can be obtained by the company}}$$

3.1.2 Independent Variables

An independent variable is influences the dependent variable in either positive or negative way (Sekaran, 2006). In this study, there are seven independent variables. In previous chapter is explained each of independent variable. The independent variables in this study are consists of:

3.1.2.1 ISO 14001 certified Environmental Management System (EMS)

Measurement was determined by the quality of environmental management system. The rank of environmental management system and the value of each rank were classified into 4 categories,

Table 3.3
Environmental Management System

Explanation	Ranking	The value of Rank
Getting a certification or registration of ISO 14001 certified EMS from external parties or another organization	1	4
Self-determination or self-declaration of ISO 14001 certified EMS	2	3
Company has environmental management system without certification of ISO 14001	3	2
Company has not environmental management system	4	1

Source: developed for this study, 2012

3.1.2.2 The Existence of Environment Function (ENV_FU)

Measurement was performed by assessing on how the position of environment functions in a company. The indicator is the existence of environment function, either inside position in management hierarchy or outside the management hierarchy (person responsible of environment activity). The detailed explanation about the existence of environment function is in below table:

Table 3.4
The Existence of Environment Function

Explanation	Ranking	The value of Rank
The person responsibility of environment issues at top management	1	4
The person responsibility of environment issues at middle management	2	3
The person responsibility of environment issues at low management	3	2
The person responsibility of CSR (outside the management hierarchy)	4	1

Source: developed for this study, 2012

3.1.2.3 The Report of Environment Information in accordance with Global Reporting Initiative Version 3.1 (GRI)

This measurement was determined by the score of environment information that was disclosed by company, and be compared with score of environment performance based on GRI version 3.1. GRI version 3.1 was used in this study as follows:

Table 3.5
Environment Performance Indicator Based on GRI Version 3.1

Item of GRI version 3.1	Environment Performance Indicators	Be Disclosed	
		Yes	No
	Aspect: Materials		
EN1	Materials used by weight or volume.		
EN2	The percentage of materials used is recycled by the input of materials.		
	Aspect: Energy		
EN3	Direct energy consumption by primary energy sources.		
EN4	Indirect energy consumption by primary source.		
EN5	Energy saved due to conservation and efficiency improvements.		
EN6	Initiatives to provide energy-efficient or renewable energy-based products and services, and reductions in energy requirements as a result of these initiatives.		
EN7	Initiatives to reduce indirect energy consumption and reductions achieved.		
	Aspect: Water		
EN8	Total water withdrawal by source.		
EN9	Water sources significantly affected by withdrawal of water.		
EN10	Percentage and total volume of water recycled and reused.		
	Aspect: Biodiversity		
EN11	Location and size of land owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.		

Item of GRI version 3.1	Environment Performance Indicators	Be Disclosed	
		Yes	No
EN12	Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas.		
EN13	Habitats protected or restored		
EN14	Strategies, current actions, and future plans for managing impacts on biodiversity.		
EN15	Number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk.		
	Aspect: Emissions, Effluents, and Waste		
EN16	Total direct and indirect greenhouse gas emissions by weight.		
EN17	Other relevant indirect greenhouse gas emissions by weight.		
EN18	Initiatives to reduce greenhouse gas emissions and reductions achieved.		
EN19	Emissions of ozone-depleting substances by weight.		
EN20	NOx, SOx, and other significant air emissions by type and weight.		
EN21	Total water discharge by quality and destination.		
EN22	Total weight of waste by type and disposal method.		
EN23	Total number and volume of significant spills.		
EN24	Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III, and VIII, and percentage of transported waste shipped internationally.		

Item of GRI version 3.1	Environment Performance Indicators	Be Disclosed	
		Yes	No
EN25	Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff.		
	Aspect: Products and Services		
EN26	Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation.		
EN27	Percentage of products sold and their packaging materials that are reclaimed by category.		
	Aspect: Compliance		
EN28	Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with environmental laws and regulations.		
	Aspect: Transport		
EN29	Significant environmental impacts of transporting products and other goods and materials used for the organization's operations, and transporting the member of workforce.		
	Aspect: Overall		
EN30	Total environmental protection expenditures and investments by type.		
TOTAL			

Source: Global Reporting Initiative, 2011

Score calculation of environment information reporting in accordance with

GRI version 3.1 had following steps:

1. Gave score for each item of disclosure by dichotomy. The companies were given score 1 if they disclosed the item of information and score 0 if they did not disclose the item of information.

2. Score that was obtained by each company was summed for getting the total score.

3. Score calculation the report of environment information in accordance with GRI version 3.1 had the following formula:

$$= \frac{\text{Total score obtained}}{\text{Total scores were expected can be obtained by the company}}$$

3.1.2.4 Rank of PROPER

In the PROPER rating system, performance appraisal result is demonstrated with colour according to the rate of performance. There are 5 ratings with 5 colours categories: gold, green, blue, red, and black. Gold indicates the highest ranking, whereas black indicates the lowest ranking.

In this study, the measurement was performed by giving the score according to the colour of company's rating in PROPER. Some of PROPER participants have branches, units or divisions so these must be done by the average score calculation. Value based on colour of PROPER ranking is in the following table:

Table 3.6
Rank of Colour in PROPER

Explanation	Ranking	The Value of Ranking
Gold	1	5
Green	2	4
Blue	3	3
Red	4	2
Black	5	1

Source: Adopted from PROPER, 2012

Companies will get score 0 if they have no publication of PROPER. The absence of PROPER has several possible reasons, such as companies are not become the target participant of PROPER, currently undergoing the law enforcement, currently running the mandatory audit and force majeure (KLH, 2011).

3.1.2.5 Companies' Firm Size (SIZE)

Firm size indicates the total assets of company at the year ended. Firm size was obtained from data of total assets in Trillion rupiah. Formulation of firm size is as follows:

Firm size = Total assets in Trillion Rupiah.

3.1.2.6 Companies' Leverage (LEV)

Leverage measured how much assets were financed by debt. Leverage was calculated by (Horne and Wachowicz, 2009):

$$LEV = \frac{total\ liabilities}{total\ assets}$$

3.1.2.7 Profitability (ROI)

ROI measured profitability of the company. ROI was calculated by (Riyanto, 2008):

$$ROI = \frac{\text{Earning After Tax}}{\text{Total Assets}}$$

3.1.3   Control Variable

Control variable in this study is a type of industry. Some industries are more likely to get public attention, especially in industries with operating activity which produced the higher greenhouse gas emissions (Rankin et al, 2011). Controlling of greenhouse gas emissions directly effect on energy and extractive industries, other industries that rely on fossil fuels, including coal, oil, motor vehicle, power stations and airlines (Rankin et al, 2011). Industrial emitters of greenhouse gases have the greater business risk because companies potential to face the demands of stakeholders in environmental issues. In this study, type of industry was classified into 5 types that are agriculture, mining, basic industry and chemicals, miscellaneous industries, and consumer goods industries.

3.2 Population and Sample Determination

3.2.1   Population

Population refers to the entire group of people, events, or something of interest that the researcher wishes to investigate (Sekaran, 2006). Population can be understood as a group of individuals or objects observation that at least has one common characteristic. Population in this study is companies that listed on the Indonesia Stock Exchange in 2011 and 2010.

3.2.2 Sample

A Sample is a subgroup or subset of the population. By studying the example, the researcher would be able to draw conclusions that it would be generalized to the population of interest (Sekaran, 2006). In this study, sample selection was conducted by random sampling method using the following criteria:

1. The companies can reduce greenhouse gas emissions and they also have obligation to carry out corporate social responsibility. The companies consisted of mining agriculture and manufacture. The companies' selection based on *Peraturan Presiden 61/2011*, *Peraturan Presiden 71/2011*, *Undang-Undang 40/2007* and *Peraturan Pemerintah 47/2012*.

2. Companies published the annual report or the sustainability report in 2010 and 2011.

3. The company would be selected if they disclose greenhouse gas emissions either explicitly or implicitly (company minimally disclosed one of the gases that produce greenhouse emissions or one of policy that related to greenhouse gas emissions).

Based on sample selection criteria, there was 30 eligible companies, these are consist of 23 companies which disclosed their greenhouse gas emissions in 2010 and 2011, one company disclosed its greenhouse gas emissions in 2010, and 6 companies disclosed their greenhouse gas emissions in 2011.

3.3 Types and Sources of the Data

This study used secondary data. It was obtained from another party in publication form. Several examples of secondary data are proof, recording and

reporting the history that were arranged in archive either published or unpublished. This research used secondary data both annual report and sustainability report of mining, agriculture and manufacturing companies which listed on Indonesia Stock Exchange in 2010 and 2011. Another secondary data in this study is PROPER that it was published by the ministry of environment.

3.4 Data Collection Method

Data collection method was the documentation both annual report and sustainability report. Annual report and sustainability report from mining, agriculture, and manufacturing companies were taken from IDX publication (idx.go.id) and its website from 2010 to 2011. Moreover, data of PROPER was taken from the ministry of environment publication.

3.5 Analysis Method

3.5.1 Descriptive Analysis

Descriptive statistical analysis is used to provide a description of the research variables statistically. Descriptive statistic in this study used average (mean), median, maximum, minimum and standard deviation of each variable. The variables consist of the extent of greenhouse gas emissions disclosure based on ISO 14064-1, ISO 14001 certified Environmental Management System, the existence of environment function, the report of environment information in accordance with Global Reporting Initiative (GRI) version 3.1, rank of PROPER, firm size, companies' leverage, companies' profitability.

3.5.2 Multiple Regression Analysis

Hypothesis testing was conducted by multiple regression analysis using SPSS 2.0. Multiple regression analysis is a statistical technique that can be used to analyse the relationship between a single dependent variable and several independent variables. The objective of multiple regression analysis is to using the independent variables whose values are known to predict the single dependent value which was selected by researcher (Hair et al, 2006). The regression equated was used in this study as the following form:

$$EMD = \alpha + \beta_1 \, EMS + \beta_2 \, ENV\_FU + \beta_3 \, GRI + \beta_4 \, PROPER + \beta_5 \, SIZE + \beta_6 \, LEV + \beta_7 \, ROI + \beta_8 \, IND + e$$

Explanation:

EMD	=	The extent of greenhouse gas emissions disclosure based on ISO 14064-1
α	=	Constants
EMS	=	ISO 14001 certified Environmental Management System
ENV_FU	=	The existence of environment function
GRI	=	The Report of environment information in accordance with Global Reporting Initiative (GRI) version 3.1
PROPER	=	The Rank of PROPER
SIZE	=	Firm Size
LEV	=	Companies' Leverage
ROI	=	Companies' Profitability

IND   = Type of Industry

e   = Standard error

Regression analysis is used to measure the strength of correlation between two or more variables and it shows the direction of relation between dependent variable and independent variable. The dependent variable is assumed random or stochastic, which has probabilistic distribution. The independent variables are assumed fixed value (in repetitive sampling) (Ghozali, 2011).

3.5.3 Classical Assumptions Test

Using of secondary data required to the classical assumptions test. Classical assumptions test that underlying the regression model is used to get the accurate model. Classical assumption test in this study is consists of:

3.5.3.1 Normality

Normality aims to test whether disturber or residual variable in regression model has normal distribution. There are two methods to detect residual which has normally distributed, namely graph analysis and statistical test (Ghozali, 2011).

The easiest method to view normality of the residual is looks at the histogram graph. Histogram graph compares between observational data and distribution which are approximate to the normal distribution. In principle, normality can be analysed by looking at the spread of data (dots) on diagonal axis of the graph or looking at the histogram of its residual. Basis for decision-making is in bellows:

1. If data spread around diagonal line and it follows direction of diagonal line or histogram graph, it shows the pattern of normal distribution then the regression model has to go through normality test.

2. If data spread away from diagonal and it does not follow direction of diagonal line or histogram graph, it shows the pattern of abnormal distribution then the regression model do not has to go through normality test.

The statistical test that can be used to determine the normality of data is Jarque-Bera. This study used Jarque-Bera in E-views program because it specifically analyses metric data (for parametric test). In contrast, using of SPSS normality test just provides non parametric test with Kolmogorov-Smirnov (K-S). Jarque-Bera statistical test carried out by looking at the value of skewness and kurtosis. The formula is used as follows:

$$JB = n[\frac{S^2}{6} + \frac{(K-3)^2}{24}]$$

JB test result is compared with Chi Square value at the 5% significance level. Data are considered normal if value of JB < Chi Square. In E-views program, JB test of normality can be seen through Jarque-Bera probability value which compares with significance value at 5%. Data normally distributed when value of Jarque-Bera probability higher than significance value at 5% (Gujarati and Porter, 2009).

3.5.3.2 Multicollinearity

Multicollinearity aims to analyse whether in regression model is found perfect correlation among the independent variables (Ghozali, 2011). A good regression model should not correlate among the independent variables. In order to detect the Multicollinearity, it can be seen from value of tolerance and variance inflation factor (VIF). Both of these measurements indicate each independent variable is explained by the other independent variable. In simple term, each independent variable becomes the dependent variable and it is regresses to other independent variables. The value of tolerance measures variability of independent variable that is selected and it is not explained by the other independent variable (Ghozali, 2011).

Low value of tolerance equal with high value of VIF (VIF = 1/Tolerance). Cut-off value that is generally used to indicate the Multicollinearity is tolerance values ≤ 0.10 or equal with VIF value ≥ 10.

3.5.3.3 Autocorrelation

Autocorrelation aims to analyse whether in linier regression model there is the correlation between the same intrusive mistakes in the t period with the mistake in the t-1 period (previous) or not. Autocorrelation occurs because observation is sequentially over time and links each other. The problem arises because residual is not independent from one observation to other observation (Ghozali, 2011). Good regression model is free from autocorrelation. In order to detect the presence or absence of autocorrelation, this study uses Durbin Watson.

Basic of decision making to determine the occurrence of autocorrelation is Durbin Watson (DW) Tables (Ghozali, 2011):

If $0 < d < dl$: no positive autocorrelation

If $dl \leq d \leq du$: no positive autocorrelation

If $4\text{-}dl < d < 4$: no negative autocorrelation

If $4\text{-}du \leq d \leq 4\text{-}dl$: no negative autocorrelation

If $du < d < 4\text{-}du$: no autocorrelation, either positive or negative

Based on DW Test, value of DW is $dl \leq d \leq du$, which means H0 had not positive autocorrelation. Decision toward the requirements is no decision. Due to autocorrelation test by DW Test not produced yet the decision so next testing with Run Test is needed to detect presence or absence the autocorrelation.

Run test is part of non-parametric statistics that it used to test whether in regression model there is occurred the high correlation among residuals. If there isn't correlation among residuals, then it is means as random residual. Run test is used to see whether residual data is random or systematic.

Basis for decision making in statistical analysis with Run Test is as follows (Ghozali, 2011):

1. If the Asymp. Sig value (2-tailed) is less than 0.05, thus H_0 is rejected. Rejection of H_0 shows that residual data is non-random (systematic).

2. If the Asymp. Sig value (2-tailed) is more than 0.05, thus H_0 is accepted. Acceptance of H_0 shows that residual data is random.

3.5.3.4 Heteroscedasticity

Heteroscedasticity test aims to analyse whether regression model occurs variance inequality from residual one observation to other observation. If residual variance from one observation to other observation is fixed, then it called Homokedastisitas and if different, it called Heteroscedasticity. Good regression model is Homokedastisitas. Statistical test that can be used to determine Heteroscedasticity is Park test.

Park Test is conducted to regress the logarithm of residuals squared (LnU^2i) as dependent variable, while the independent variables is fixed. If the beta parameters coefficient from regression equation is statistically significant, the consequent estimating of empirical model is occured Heteroscedasticity, but if beta parameter coefficient is not statistically significant, the result of Homokedastisitas assumption can't be rejected (Ghozali, 2011).

3.5.4 Test of Fit Model (Adjusted R Square)

To check fit the model or the independent variables in explaining variations of the dependent variable, it could be known from the value of the determination coefficient that is produced. Determination coefficient is 0-1. Low value of R^2 indicates lack of ability from independent variable to explain the dependent variable. Value that approximately one indicates that independent variables provide almost all of the information that is needed to predict the dependent variable (Ghozali, 2011).

3.5.5 Test of ANOVA (F-Test)

F-Test examines the relationship between independent variables and dependent variables simultaneously. F-Test tells the researcher if the set of independent variables is accounting or explaining statistically significant amount of variance in the dependent variable. Testing is done by significance level at 0.05 ($\alpha = 5\%$). Acceptance or rejection of hypothesis is done by following criteria:

1. If significance value of f is < 0.05, then H_0 is rejected or Ha is accepted, that means the regression coefficient is significant. Acceptance of Ha shows that independent variables together against the dependent variable.

2. If the significant value of f is > 0.05, then H_0 is accepted or Ha is rejected, that means the regression coefficient is not significant. Rejection of Ha does not show that independent variables together against the dependent variable.

3.5.6 Partial Test (t test)

T-test is used to determine the significance of each independent variable to dependent variable. Testing is done by significance level at 0.05 ($\alpha = 5\%$). Acceptance or rejection of hypothesis uses following criteria:

1. If significance value of t is < 0.05, then H_0 is rejected. Rejection of H_0 shows that independent variable has significant effect to dependent variable.

2. If significant value of t > 0.05, then H_0 is accepted. Acceptance of H_0 shows that independent variable has not significant effect to dependent variable.