

# Determinants of Companies' Environmental Information Disclosure in China

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### Abstract

Based on social-political theories, this study identifies the factors which would affect the level of environmental information report provided by Chinese companies. To evaluate the quality of corporate environmental information disclosure, the study develops a content analysis index based on Measures on Open Environmental Information, which was issued by the State Environmental Protection Administration in 2007, with a scoring method on the basis of Global Reporting Initiative sustainability reporting guidelines.

The sample comprised 154 Chinese companies listed on the Shanghai Stock Exchange or the Shenzhen Stock Exchange in 2014. By applying the multiple regression analysis, this study finds that firm value and the adoption of certified environmental management system are positively significantly associated with the quality of environmental information reporting. Also, a good knowledge of environmental regulations and reporting guidelines, a well-built corporate environmental culture and values, and an existence of external assurance for environmental reporting, might help companies to improve the quality of their environmental information disclosure.

This study may be useful for the companies which are concerned with environmental issues and their public image, and the regulators in China who take action in ensuring the high quality of corporate environmental information as well as in the overall protection of the environment.

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**Keywords** environmental information disclosure, Chinese listed companies, social-political theories, content analysis index, firm value, environmental management system

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# **1 INTRODUCTION**

## **1.1 ENVIRONMENTAL INFORMATION DISCLOSURE**

Definitions of environmental information disclosure vary. In general, also known as environmental information reporting, it is described as “the process of communicating externally the environmental effects of organizations' economic actions through the corporate annual report or through a separate, stand-alone, publicly available environmental report. It tends to encompass reporting relating to environmental policies, impacts, processes and audits, environmental-related expenditures, the environmental benefits of products, and details regarding sustainable operations” (O'Dwyer, 2001). Environmental information disclosure renders companies' environmental information transparent to both the public and the government. Additionally, the disclosure plays an important role to the society by leading companies to put effort on sustainable development and it might benefit the companies themselves by giving a positive public image.

In addition to improving their environmental compliance and performance, companies are also expected to disclose information publicly: What are the major impacts of their activities on the surrounding environment? How are they addressing those impacts and what are the results of their effort? Are they making progress or lagging behind (Alsaeed, 2006)? In a perfect world all companies would have a high quality of environmental disclosure. However not all companies want to spend effort on reporting preparation. In order to help the government make good guidelines and regulations, or guide the companies on how to improve the quality of their environmental disclosure, we should try to find the determinants behind good reporting. In other words, what exactly drives companies to do reporting of different quality. We also want to know what those drivers from different quality levels or different business background reveal us.

## **1.2 INSTITUTIONAL BACKGROUND**

### ***1.2.1 Macro situation***

China has been witnessing fast economic growth for more than three decades since the launch of the ‘Open Door Policy’ in 1978. Now, at the same time as embracing its economic prosperity, China is undergoing a period of economic restructuring and industrial transformation and upgrading. Furthermore, it is not enough to only develop the economy and sustain the pure “golden” profits – awareness of social responsibility should be continually promoted (Noronha, et al., 2013).

There are many researchers studying the various issues related to environmental information. In China, a number of scholars have already started to work on this field decades ago (Wang, et al., 2004; Li, et al., 2008; Li & Xiao, 2002; Zhu, 1999) However, it seems that only in recent years the public’s increased concern about environmental problems such as pollution haze began to put pressure on corporations and government. This, in some way, made the environmental change more urgent than ever. Environmental information reporting not only requires moral motivations, but also institutional guidance and support from the concerted effort of both the government and the related social organizations (Noronha, et al., 2013).

At the 18th National Congress of the Communist Party of China (Hu, 2012), President Hu reported that the People’s Republic of China should make great efforts to promote ecological progress, and that building a system of regulations, assessments and rewards is one of main tasks ahead. The system should be planned so that it gives incentives for companies to put effort on sustainable development. Moreover, it should address the public’s fears and issues.

Resource consumption, environmental damage and ecological benefits should be covered by the system of standards for evaluating economic and social development and related goals. Evaluation methods, along with reward and punishment mechanisms, should be adopted for the purpose of promoting ecological progress. Having good environmental information reporting is of vital importance, in more than one way. when building a system as described in the previous paragraph. For instance, environmental disclosures from organizations make good references for the government when modifying and refining the relevant standards and regulations. This would improve the existing system according to participants’ practical performance.

Chinese environmental information has already been included for many years in the main points that citizen can inquire about according to the Open Government Information regulations (The Central People's Government of the People's Republic of China, 2007). This fully manifests the government's view that environmental information is a big concern of the whole society and needs to be taken seriously.

### ***1.2.2 Corporate environmental reporting***

Corporate environmental responsibility has become the core subject of corporate social responsibility in China. Even though the cause of deterioration of the ecological environment involves many aspects, the main source of pollution are enterprises. Therefore, regularly published environmental information reporting from enterprises build a bridge to a cleaner future. Not only does it allow the public to be aware of the impact that companies have put on environment, but also to be understanding and supportive of companies' efforts for green activities. An important message here is that environmental and social information disclosures may effectively increase the resident's readiness of public participation (Liu, et al., 2010).

Listed companies have always been the main focus in environmental studies (Li & Xiao, 2002; Liu & Anbumozhi, 2009; Patten, 2002; Grigoris, et al., 2014; van de Burgwal & Vieira, 2014). Public companies have a significant power in building the social ecological system. They, and especially the organizations which have a big impact on environment, should take responsibility in leading the whole society, to be aware of the importance of environmental protection, and to improve the social environment. Whether listed companies are responsible and capable of handling environmental issues is not only part of their operating behaviors, but is also of great concern to other beneficiaries and should be supervised by the public. Reporting environmental information regularly is an effective method for companies to improve their communication and the understanding with their beneficiaries and the public (Chen & Liu, 2014).

China Securities Regulatory Commission (CSRC) has issued many regulations to help develop an environmental information disclosure mechanism in the securities market. The mechanism is mainly built so that all investors and the public can easily reach public companies' environmental information, such as risk to the environment, policies about protecting the environment, their

performance on the matter and the cost of all that. For instance, Guidelines on Environmental Information Disclosure by Companies Listed on the Shanghai Stock Exchange, which was issued by Shanghai Stock Exchange in 2008, requires public companies to disclose environmental information and CSR strategy either as part of their CSR report or as a separate report.

So far the whole process has gone step by step each time: environmental information has become part of documents that a company needs to hand in when it applies for going public or asset reorganization; the corporate social responsibility report has become an important channel for listed companies to disclose their own environmental information; the annual report has become a main way for listed companies to make ongoing disclose about their environmental performance; the National Environment Protection Agency (NEPA) has issued some guidelines and standards to direct companies on environmental reporting.

More recently, CSRC has been working on enhancing companies' self-consciousness and initiative. During the CSRC press conference, their spokesman Zhang said that in the revised Standards Concerning the Contents and Formats of Information Disclosure by Companies Offering Securities to the Public No.2, CSRC encouraged companies to take initiative to disclose their social responsibility performance, including what measures the companies take to prevent and control pollution and strengthen ecological protection. For details, see (Wen, 2015). Figure 1 demonstrates the main subjects which should be covered in Environmental reporting.

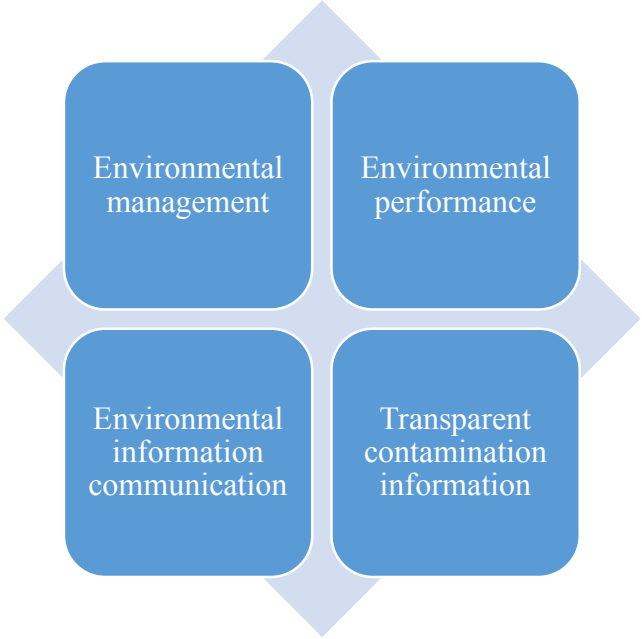
Liu, the Secretary-General of China Forum of Environmental Journalists, gave a speech on the occasion of the publication of their 2014 evaluation report on environmental responsibility information disclosure of Chinese listed companies. In it he pointed out that the access to environmental information, and the participation and supervision of environmental protection, are the rights of the citizens, corporations and other concerned organizations (Cui, 2016).

However, currently only companies from certain industrial sectors which discharge relatively more pollutants (mostly from primary or extractive industry, such as thermal power, steel, cement, coal, metal, chemical, building materials, and mining etc.) are facing mandatory environmental information reporting requirement by NEPA (Huanfa101, 2003; Huanban105, 2007; NEPA, 2010).



Most of companies which belong to secondary or tertiary industries are allowed to disclose their environmental information on a voluntary basis. Moreover, these official rules regarding environmental reporting give only rough guidance. For example, The Guide to Environmental Information Disclosure for Listed Firms in Shanghai Stock Exchange says that firms should disclose total energy used and contamination discharged. However it does not provide detailed guidance on governance structure, stakeholder involvement, and environmental spending, leading to great variation in transparency, breadth, and explicitness of environmental information disclosures (Du, et al., 2013).

**Figure 1: Main Contents of Environmental Information Disclosure**



Original source: (Wen, 2015)

In addition to the previous paragraph’s issues, evaluation indicators and reward and punishment mechanisms for corporate environmental disclosures and corporate finance reporting are often separate, and evaluation methods are too simple or too vague – which give potential reasons for some companies to sacrifice the environment and go after economic profit. Also, it’s not uncommon that evaluation indicators lack cover over all the different possible environmental

issues and many of them are difficult to apply to all industries (Chen & Liu, 2014). In general, compared with the standards generated in developed countries, the coverage of environmental and social issues may not be as comprehensive or as detailed. Nevertheless, the non-financial reporting requirement in China does have its uniqueness. For instance, the SCVPS (social contribution value per share), a new concept which is developed by Shanghai Stock Exchange (SSE), is used to measure the listed companies' 'value creation' on CSR (Noronha, et al., 2013).

The director of KPMG in China, Sean Gilbert once commented in 2014 that China has made big progress by having much more companies reporting environmental information now in comparison to a very limited disclosure a few years ago. Unfortunately the quality of reporting varies rather dramatically, from thoughtful documents to ones that only speak of broad ambitions and values, with little detail about actual actions or outcomes.

Similarly, according to (Wen, 2015), Ma, the chief economist who works in China's central bank, mentioned in an interview that public companies' environmental information reporting has already become common practice internationally, while in China, as of July of 2015, only around 20 percent of public companies disclosed environmental information. This was due to the lack of mandatory instructions and regulations, along with all sorts of difficulties with enforcement. It means that most companies have not given enough attention to environmental reporting or made their environmental information to available the public. He suggested that all members of the society, including government, organizations, customers and also investors should make their own contribution to building a national green financial system. Public companies ought to increase the level of their environmental information reporting, and disclose in details the possible risks and challenges regarding environment protection. This would help public companies prevent and control pollution and promote conservation culture (Wen, 2015).

Professor Li, one of the Chinese CPPCC (National Committee of the Chinese People's Political Consultative Conference) members, believes that it is very important for a company to be aware of its responsibility in its environmental and social activities. She argued that it would have an effect on the company's core competitive ability and its reputation and influence (Shi, 2016). By increasing the transparency of its business operation, the company shows its respect for the

stakeholders' interests, the code of ethics, the rule of law, the international norms and human rights. It gives the company benefits in market competition by optimizing the structure of its organization and building it a good reputation among investors and customers.

### **1.3 OBJECTIVES, CONTRIBUTION AND STRUCTURE**

This study aims to find the possible determinants of companies' environmental information disclosure in China and further to come up with some suggestions regarding how to improve the disclosure quality.

According to my knowledge, previous studies have developed several theories based on empirical evidence to explain companies' behavior in term of environmental information reporting. A large number of studies mainly focus on supplementing the existing theories with new regional evidence and applying the theories to explain the sample's behavior. However, there were not that many studies focusing on environmental information reporting's content and quality analysis and improvement. More specifically, when it comes to internal resources and control systems, individual values and knowledge background, we are still missing some empirical evidence. Additionally, I did not find many studies offering constructive suggestions which especially suit Chinese situation to improve low quality reporting. Furthermore, some previous studies (Boubaker, et al., 2015; Zeng, et al., 2012) mainly focused on the issues related to voluntary disclosures. While I believe that not only voluntary disclosures are meaningful to the improvement of level of corporate disclosures and overall environment protection, mandatory disclosures can also make big differences. Because some mandatory reporting may be indeed "forced" out by the relevant requirements, but others can be well prepared and go much over the minimum limit. This study thus did not differentiate environmental information disclosures based on whether they were required by the regulations or not.

With a careful examination of the environmental information discourses released by Chinese listed companies, the study contributes to the literature related to corporate non-financial disclosure by providing some empirical evidence from China. The study reveals that the quality of environmental reporting can be significantly affected by the firm's value and the existence of environmental management control system. And currently, Chinese companies lack the well-built

environmental culture and values, which can be great help for companies to take their environmental responsibility. In addition, a good knowledge of environmental regulations and reporting guidelines, along with the adoption of external assurance, may help companies to disclose better environmental information to meet the public's needs. This study may be useful for the regulators in China who take action in ensuring the high quality of public corporate environmental information as well as in the overall protection of the environment.

The rest of the study will proceed as follows. In the following section I review the previous studies, introduce theoretic background, provide relevant evidence and then develop the hypotheses. In section "Research Design", I describe the data, the measurement of the dependent variable and then present the econometric model. Section "Empirical results and discussions" includes data analysis and major findings. The final section "Conclusions" summarizes the study with a discussion on main findings and implications for future research.

## **2 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT**

### **2.1 BENEFIT AND TRENDS**

Global Reporting Initiative (GRI), is an international independent standards organization that develops a globally accepted reporting framework. It guides businesses, governments and other organizations to understand and improve their impacts on issues that related to environmental, social and economic performance and reporting. GRI believes that reporting can lead to enhancement of corporate reputation (GRI, 2010).

In (KPMG, 2013), KPMG's Global Chairman Yvo de Boer brought up with some benefits one company may obtain by doing reports with regard to its social and environmental practices and performance. Through reporting, one company can have a good knowledge of its actual situation in related aspects, and therefore understand both its exposure to the risks of these nonfinancial changes and its opportunities to make profit from the new environment. In addition, data analysis on certain issues may be an effective method for a company to create long term value and resilience

to environmental and social change. Furthermore, corporate responsibility reporting plays an important role in convincing investors about one company's ability of continuing operating.

Another study confirmed more benefits of environmental reporting, such as influencing or delaying legislation; reducing criticisms or possible boycotts by customers; attracting talented individuals to the company; making better decisions and cost savings and building trust and good publicity (Adams., 2002). "In essence, corporate environmental reporting is both a communication tool and a management tool." It delivers one company's external and internal attitude to its environmental performance to the audience who is in need of such information, and it also serves the company with its learning and growth (Alsaeed, 2006).

Jose and Lee did a content analysis of the environmental reports of 200 companies and found that corporate disclosing practices are largely driven by non-legal factors, instead of laws and regulations (Jose & Lee, 2007). In their study, most of companies associated their environmental considerations with corporate sustainability and stakeholder responsiveness, and competitive advantage enhancement rather than compliance reasons. The companies' long-term development and growth account for their main concern when they undertake environmental programs and prepare relative reports. For example, fundraising or access to resources can be the competitive elements to which companies attached great importance. Companies tend to use good reporting behaviors to enhance their reputation, so that it resonates favorably with stakeholders. Similarly, KPMG surveyed the world's largest 250 companies, and found that the majority of companies use their social and environmental reports to identify changes which have impact on the business and shareholders (KPMG, 2013). Besides that, some of the companies would explore and make strategies to manage the risks and opportunities (such as innovation of new products and services). Around one third of the companies make environmental disclosures to help increase their market share and cut expenses.

## **2.2 THEORETICAL PERSPECTIVES**

### ***2.2.1 Strict economic theories and social-political theories***

Several kinds of theoretical approaches have been used to explain corporate environmental disclosure. They can be mainly organized into two branches: strict economic explanations and social political based views (Araya, 2006). Strict economic theories, such as agency theory and cost-benefit framework, represent positive accounting thinking (PAT) – the primary accountability of companies is to maximize their wealth through utilizing the resources and engaging in activities (Watts & Zimmerman, 1986; Watts & Zimmerman, 1990). This kind of theories emphasizes the costs and benefits of information asymmetries (publics and management) reduction through voluntary reporting. Moreover, companies would measure whether reporting benefits outweigh costs since extra disclosures require more time, human and financial support. Also, environmental disclosures can be taken as one type of proprietary information, which occurs as a result of the information being used against the firm by competitors, regulators, or other outside pressure groups. This may affect companies' share prices, debt contracts or reputation (Cormier & Gordon, 2001; Peters & Romi, 2014).

While social-political theories, including legitimacy theory, institutional theory, stakeholder theory and sociological organizational theories, make no assumption of rational, wealth-maximizing organizations operating in the environment of efficient capital markets (Deegan, 2002), and focus on the structural conflicts within society. Deegan argues that environmental reporting can be taken as a method for companies to achieve corporate legitimacy. That is, to meet the expectations from society in terms of environmental behavior. According to social-political theories, corporate social and environmental disclosures are prepared to not only show companies' obedience to the present criterions and regulations, but also their special and important value. Therefore, companies have motivation to make efforts to enhance their image rather than merely being forced to follow social standards (Maltby, 2004). In his book (Deegan, 2013), Deegan further described that how accounting reports and disclosures are perceived as a method of maintaining the favored position of those who control scarce resources (capital), and as a method of undermining the position of those without scarce capital.

Among all of those theories, legitimacy theory and stakeholder theory give the most complete theoretical perspectives in the literature regarding environmental information disclosure. They can

be explained by socio-political rationale, that is, they converge around the notion that public pressure, besides laws and regulators influences corporate behavior (Araya, 2006).

### **2.2.2 *Legitimacy theory***

DiMaggio and Powell pointed out that organizations have to deal with both formal and informal pressure as they to some degree depend on organizations and society which usually have some expectations from them (DiMaggio & Powell, 1983). They also mentioned that environmental legitimacy brings several advantages. For example, legitimate companies have better transaction chances with partners and better access to resources. Later on, in (Lindblom, 1994), the author came up with the definition of legitimacy that has been widely used by scholars when explaining environment accounting disclosure: “Legitimacy is a condition or status which exists when an entity’s value system is congruent with the value system of the larger social system of which the entity is a part. When a disparity, actual or potential, exists between the two value systems, there is a threat to the entity’s legitimacy”. Furthermore, she brought up four strategies organizations might adopt to gain or maintain their legitimacy: the first one is to educate society concerning changes of organizations’ activities; the second one is to keep organizations’ actions unchanged but change the perception of society on those actions; the third one is to divert society’s attention away from the controversial issues to some other issues which are more favorable to organizations; the last one is to modify the definition of legitimacy and change society’s expectations of organizations’ current practices and outputs.

According to Cho and Patten, the legitimacy theory shows that environmental reporting is a function of the intensity and connectedness of societal and political pressure which is put on companies regarding the environmental performance, and the companies try to provide more environmental information as response to the pressure (Cho & Patten, 2007). As part of a broader social system, organizations strive to operate in accordance with the norms of their respective societies, so they see to make their activities perceived as legitimate by outside parties (Deegan, 2002).

If companies fail to operate in a manner that satisfy the society, they will be penalized. For example, there might be less demand from consumers or limited services from public organizations (Deegan, 2002). As Behram argued, organizations lacking legitimacy are deemed as less respectable and

trustable, and thus are less likely to be offered the resources for survival while organizations obtain and keep legitimacy are viewed as trustworthy and therefore have easier access to external support (Behram, 2015). In reality, the dependency on resources may 'force' a company to make targeted disclosures and to collaborate with external parties to reach legitimacy (Deegan, 2002). So corporations must adapt their activities to meet expectations of society. When a legitimacy gap emerges, companies can use environmental and social disclosures to bridge the gap. Hopwood pointed out that corporations may not use environmental disclosures as an accountability mechanism for further transparency, instead those disclosures are more like a legitimation device (Hopwood, 2009).

Suchman came up with three types of legitimacy that an organization might pursue by using environmental disclosures: pragmatic legitimacy, based on audience self-interest; cognitive legitimacy, based on broadly shared taken-for-granted assumptions and another is moral legitimacy, based on normative approval (Suchman, 1995). To enhance pragmatic legitimacy, an organization would most likely underline in the disclosure the social benefits of being committed to environmental management such as reduced pollution, fewer greenhouse gas emissions, effective waste recycling and resource conservation etc. With regard to cognitive legitimacy, an organization may find it difficult to make major influence and manipulation directly in most cases, since it has something to do with subconscious and rooted perceptions (Oliver, 1991). As for achieving moral legitimacy, the environmental disclosures provided by an organization may contain its activities' consequences and outputs, techniques, procedures, and structural characteristics which are all morally acceptable (Behram, 2015).

In study (Palazzo & Scherer, 2006), the authors argued that in modern society, the moral access to corporate legitimacy should be counted as the most appropriate and effective approach as the business environment has changed. They connected organizational legitimacy to a deliberative approach of political theory and explained why the communicatively constructed (to build a communicated network of public communication) corporate legitimacy fits current situation of business and society.

In recent years, Kuo and Chen studied the Japanese companies' disclosing practices and found that companies which are from environmentally-sensitive industries can significantly enhance their



environmental legitimacy by disclosing CSR information and companies with higher prior environmental legitimacy tend to be more active in environmental reporting preparation and also obtain better environmental legitimacy in the next period (Kuo & Chen, 2013). In (Cho, et al., 2015), the researchers studied whether the exposure to legitimacy factors could still explain CSR reporting nowadays, as it did in earlier work. And their analysis showed that the relationship among legitimacy factors to differences in CSR disclosure remains.

### **2.2.3 Stakeholder theory**

According to (Gray, et al., 1995), stakeholder theory, as well as legitimacy theory are both derived from social-political theory. Both of them predict that organizations respond to demands of diverse groups with corresponding efforts aiming to legitimize their activities (Qu & Leung, 2006). Thus they are highly interrelated to each other and cannot be perceived as two competing approaches. Society consists of various stakeholder groups.

Freeman defined stakeholders as “any group or individual who can affect or is affected by the achievement of an organization’s objectives’ (Freeman, 1984). The traditional stakeholders that are identified for business activities include the owners, customers, public groups and suppliers. However, we need to consider more external influences when doing an environmental information reporting analysis. Therefore regulators, environmentalists or some other special interest groups which care about environmental issues are important aspects as well (Freeman, 1984). Even though those groups hold unequal power to influence the activities of an organization, all of them are concerned with the environmental performance of the company (Roberts, 1992). In order to create value and make profit, a company need to maintain a favorable relationship with its stakeholders and avoid the conflict which would do harm to the profitability. It has to take the demands and expectations of stakeholders into consideration while doing business, and modify its activities to minimize conflicting interests. The more important the stakeholder is to the company, the more effort should be put by the company on managing the relationship with that stakeholder (Gray, et al., 1996).

Environmental information reporting can be used as a means for a company to meet the needs of its stakeholders and also as a communication tool between the company and stakeholders, shaping the stakeholders’ views and expectations of the company’s environmental responsibility (Gray, et

al., 2010; Huang & Kung, 2010). For instance, a study published in 2008 found that consumers tend to purchase from companies which are known to be responsible toward the environment (Sass, 2008). This demonstrates that as one important group of stakeholders, consumers are using their choices to affect companies' consideration of their environmental behavior, and the environmental information disclosure might be a both effective and efficient method for companies to "promote" themselves. Moreover, environmental reporting can be a common approach employed by the company to gain the stakeholder's support and approval, or to distract their opposition and disapproval (Gray, et al., 1996).

To help find a way of developing and maintaining companies' relationship with their stakeholders, Ullmann comes up with a three-dimensional model to explain the connections among companies' social disclosures and social and economic performance (Ullman, 1985). Stakeholder power is discussed as the first dimension of the model, explaining that companies would respond to stakeholders' demands, for example, by presenting social disclosures according to stakeholder's degree of control over resources required by the companies. The second dimension - companies' strategic posture towards social demands, describing how companies try to influence their relationship with important stakeholders through formulating social responsibility programs. Companies which have an active posture, are more likely disclose more social responsibility information in order to reach optimal level of interdependence with stakeholders. As the third dimension, a company's past and current economic performance decides its operating and disclosing priority, and directly affects its financial capability to maintain programs related to social demands.

When it comes to the level of reporting, Mitchell, et al. (1997) developed a dynamic theory of stakeholder relations and stated that provision of information to particular stakeholders depends on how salient they are perceived to be with regard to their possession or attributed possession of one, two, or all three of the attributes: (1) the stakeholder's power to influence the firm, (2) the legitimacy of the stakeholder's relationship with the firm, and (3) the urgency of the stakeholder's claim on the firm.

Moser and Martin, in their comment (Moser & Martin, 2012), concluded that accounting researchers should view CSR issues more broadly. Because being motivated by both shareholders

and a broader group of stakeholders raises new and important questions that are unlikely to be studied by people who hold the traditional perspective that companies only engage in CSR activities that maximize shareholder value. Therefore, resorting to legitimacy theory and stakeholder theory, and considering managers' responsibilities beyond profit maximization might help us reach a more comprehensive understanding of environmental reporting practices. This study thus will also explore some effect from corporate governance that easily get neglected if one only concentrates on the maximization of shareholder value. For example, the characteristics of directors, such as personal values and knowledge background etc., which are more related to the moral power, might in some way influence a company's environmental reporting behavior. Prior studies also stressed the importance of taking a more contextual and nationally contingent approach to social responsibility when applying theories to specific regions and countries. Because each region has its unique social and political, regulatory, economic and cultural institutions (Abreu, et al., 2012; Chapple & Moon, 2005; Matten & Moon, 2008).

This research is mainly based on social-political theory. Strict economy theories were criticized since a primary focus on self-interest and wealth maximization is inappropriate considering that environment as a public good, should be studied in wider social context (Guthrie & Parker, 1990). As Gray, et al. (1995) stated, strict economic explanations are empirically implausible and even offensive because they assume organizations to focus only on short-term self-interest. As companies are not isolated entities, people cannot study them without considering the context in which they operate. It seems that strict economic theories leave out various political and social elements which companies face, such as public pressure, moral issues etc. Environmental disclosure is one of companies' main methods of communicating with the whole society, so it is logical that we take not only value maximum but also political and social factors into account when study about companies' disclosure practices.

## **2.3 HYPOTHESIS DEVELOPMENT**

### **Financial performance**

Financial performance is one of the dimensions that are under stakeholder theory and Ullmann employed it to explain the correlation between organizations' social disclosures and activities

(Ullman, 1985). Society provides organizations with all kinds of essential operation resources. Organizations might publish environmental information either to divert stakeholder's attention from relatively bad financial performance to good social responsibility behavior, or just to strengthen the ties with their stakeholders and try to gain legitimacy from whole society of its existence and growth.

Financial performance was assumed by many researchers as a factor that influences company's disclosure performance. However, the results of studies were very different. Some studies were not able to find a significant relationship between financial performance and environmental information disclosure (Brammer & Pavelin, 2006; Cowen, et al., 1987; Hackston & Milne, 1996; Patten, 1991; Suttipun & Stanton, 2012; Silva Monteiro & Aibar-Guzmán, 2010; Zeng, et al., 2012). Whereas many studies have found that social and environmental reporting and profitability are positively significantly related (Clarkson, et al., 2011; Zhang, et al., 2008; Cormier & Magnan, 1999; Cormier & Magnan, 2003; Haniffa & Cooke, 2005).

Interestingly, one study (Meng, et al., 2013) confirmed that there is a positive relationship between corporate economic performance and the level of environmental information reporting under the voluntary setting but a negative one under the mandatory setting. Besides, Roberts found a positive relationship between lagged social and environment disclosure and profits (Roberts, 1992). That is to say, companies most likely publish high current levels of environment disclosures if they showed relatively good financial performance in prior periods. This is in line with Ullmann's 1985 argument (Ullman, 1985) that certain level profit should be necessary before a company devotes its resources to meet stakeholders' demands.

Lang and Lundholm found that companies with better financial performance tend to release good news to capital markets (Lang & Lundholm, 1993). Zhang, et al. (2008) gave one possible explanation for such positive relationship, that is, some companies are willing to use relevant disclosure to prove their profitability is not at the cost of harming environment. Brammer and Pavelin argued that profits provide managers with abundant resources which are critical to fund the costs of making environmental reporting (Brammer & Pavelin, 2006). Castelló and Lozano found that organizations have inclination to obtain as much social acceptance of their profitable activities as possible because they are seeking for continuous operation resources which are

provided by society (Castelló & Lozano, 2011). Especially when an organization is facing potential negative social image of its environmental practices, it would be likely to publish more environmental information to improve the relation with its stakeholders and try to gain legitimacy of its existence and growth. This study hypothesizes that better financial performing companies disclose more environmental information.

**H<sub>1</sub>:** Companies' financial performance and the quality of environmental information disclosure are positively related.

### **Firm Value**

Another aspect that scholars have been studying is the relation between firm value and nonfinancial information disclosure which concerns things like environment and sustainability. This driver can be mainly supported by stakeholder theory. If a firm provides investors with good social and environmental reports so that there would be less uncertainty with regard to its socially responsible practices, and improved perceived firm prospects, market might reward the firm with increased value.

Spence & Gray (2007) argued that in most cases, economic thinking is the main motivation for a company to issue a non-financial report – Social and environmental reporting brings benefits to a number of stakeholders while being applied to increase shareholder value. More and more investors are using corporate sustainability reporting (integration of economic, environmental and social performance) to enhance investment strategies and shareholder value. (PricewaterhouseCoopers, 2012)

Matsumura, et al. (2014) found that the median firm value is much higher for firms that disclose their carbon emissions compared to firms which do not disclose them. Similarly, in study (Ioannou & Serafeim, 2014), the authors revealed that Shareholder's focus on CSR reporting is increasing and there is an initial unfavorable and a subsequently more favorable evaluation of firms with high CSR scores by investment analysts. Interestingly, Calace (2014) found that there is an optimum level of disclosure perceived by the market, with his analysis showing that the issuance of a GRI referenced report with partial disclosure (C and B GRI Application Levels) causes a positive effect

on market capitalization, while a full disclosure stance (A and A+ GRI Application Levels) has a negative effect on market value.

However, Cho, et al. (2015) documented that CSR disclosure, in apparent contrast to the arguments of the recent mainstream investigations, is not positively associated with differences in firm value. Xu, et al. (2011) examined stock market's reaction to the disclosure of environmental violations for Chinese listed companies, revealing that the average reduction in market value is estimated to be much lower than the estimated changes in market value for similar events in other developed countries. This indicates that currently in China, the environmental disclosures (contain negative information) have weak impact on the stock market.

Those who believe that environmental information reporting is associated with firm value made some good arguments. For example, when there is a big difference between the book value and the market value of a company, market valuation could be mostly driven by perceived company prospects, which tend to be associated with off-balance sheet and non-codified drivers of value. Among those prospects, one company's socially responsible practices are one of most important sources (Becchetti & Ciciretti, 2009). If a company can provide investors with detailed social and environmental reports, there would be less uncertainty regarding the company's activities and therefore, its value in the capital market can stay or even go up. Taking into account the previous studies, the adopted hypothesis is:

**H<sub>2</sub>:** Firm value and the quality of environmental information disclosure are positively related.

### **Age of companies**

A company's age is an interesting factor to show how the decision regarding non-financial disclosure would be affected by the company's attitude towards legitimacy. Clarkson, et al. (2008) argued that young companies tend to inform their shareholders of their environmental performance since younger organizations are likely equipped with newer and cleaner technology, thus might have better environmental performance.

However, Roberts (1992) found a very different result, that in his study, firm age is actually significantly positively associated with environmental disclosure. Also, Parsa & Kouhy (2008) and

Wang, et al. (2013) suggested the same relationship between firm age and environmental reporting. They gave some plausible explanations for this positive association. Firstly, older firms are generally bigger and most likely have more issues to report than younger ones. One reason for younger firms to avoid disclosing environmental information could be they want to keep their high competitiveness, and hide information that may be price-sensitive (Parsa & Kouhy, 2008). Furthermore, older firms might face more scrutiny from the public and thus need to make more effort on reporting to justify their existence and development, and to respond society's expectations and maintain legitimacy. As the results of previous studies are mixed, this study is going to test the following hypothesis:

**H<sub>3</sub>:** Companies' age and the quality of environmental information disclosure are related.

### **Sources of capital**

Liu & Anbumozhi (2009) suggested that corporate financial leverage can be used as a proxy for creditor's (one of stakeholders) power. Alsaeed (2006) and Roberts (1992) argued that a leveraged company ought to make more disclosures to satisfy creditors' expectations concerning the company's role in socially responsible activities. That is, the higher the leverage, the higher stakeholders' power is, therefore the higher level information the company need to provide with. Environmental information disclosure can be considered as one of monitoring mechanisms used by stakeholders (especially creditors) to ensure the users of capital make the best use of the available funds, and it is also one of possible ways to reduce the agency costs (Ho & Taylor, 2007; Ullman, 1985). In study (Dhaliwal, et al., 2011), the researchers found that whether a company releases the stand-alone disclosure of CSR activities in the current year, is associated with the cost of equity capital in the prior year. Companies that suffered from a high cost of equity capital in the previous year tend to initiate the disclosures of CSR activities in the current year, and that disclosing companies which were with superior social and environmental performance enjoy a subsequent reduction in the cost of equity capital after they initiate CSR reports. The release of environmental information reduces perceived uncertainty for the providers, so capital can be accessed by companies at lower required rates of return (Plumlee, et al., 2015; Lang & Lundholm, 1996).

However, some studies found that companies with low levels of financial leverage make higher extent of CSR disclosure. (Andrikopoulos & Kriklani, 2013; Brammer & Pavelin, 2006; Cormier & Magnan, 2003) They argued that low leveraged companies have the ability to expend their initiatives beyond the traditional business operations, funding largely discretionary practices of communication with stakeholders, such as environmental reporting; and only companies that are financially sound might be able to trade off the benefits (For example, gaining proper assessment of companies' financial risk) from social and environmental disclosure against the proprietary costs of revealing them.

Differently, there are many studies showing non-statistically significant relationship between financial leverage and the extent of environmental disclosures (Alsaeed, 2006; Grigoris, et al., 2014; Ho & Taylor, 2007). It was generally agreed that companies and creditors have some other private means to communicate with each other. Regarding the previous mixed results, non-directional hypothesis is stated as follows:

**H<sub>4</sub>:** The level of companies' external financing will affect the quality of environmental information disclosure.

### **Brand awareness**

Brand awareness is another factor that can only be explained by using social-political theories. Many studies have found that corporate environmental disclosure is positively associated with the extent of media attention (Hasseldine, et al., 2005; King, et al., 2005; Brown & Deegan, 1998; Wang, et al., 2013; Zeng, et al., 2012; Islam & Deegan, 2010). More media coverage would enhance the visibility of one corporation and thus raise its profile among the relevant public, making it the object of further public attention and scrutiny. So the corporation has to publicly account for its operations and performance, including environmental policies and impacts (Bansal, 2005; Brammer & Pavelin, 2008). Especially, negative media exposure with its perceived impacts, would particularly make corporations to disclose more information to repair their corporate legitimacy (Deegan, 2002; O'Donovan, 1999).

Also, "Image and reputation are treated as components of a symmetrical communication process between the organization and relevant stakeholders" according to (Whetten & Mackey, 2002).



Using stakeholder theory, Hasseldine, et al. (2005) argued that the quality of environmental disclosure has a strong impact on the creation of environmental reputation among executives and investor stakeholder groups. Therefore, corporations with good brand reputation are more likely to disclose information to secure their stakeholders (King, et al., 2005). Moreover, this driver represents customers' and suppliers' power as well.

However, in contrast to most of researches, Brammer & Pavelin (2008) found that the media exposure of companies plays no role in stimulating voluntary disclosures. Based on the above studies, this study form a hypothesis as follows:

**H<sub>5</sub>:** Companies' brand awareness (public exposure) and the quality of environmental information disclosure are positively related.

### **The existence of certified internal environmental management**

Ullmann discussed about the role of management's strategy when considering the response of an organization towards social demands (Ullman, 1985). According to stakeholder theory, an active strategic posture towards social demands is expected to result in greater social responsibility activities and thus more relevant disclosures. Organizations which have certified internal environmental management signify that their key decision makers are with an active strategic posture.

Development and maintenance of environmental management systems (EMS), is the part of overall environmental management. The International Standards Organization defines an EMS as "the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy" (International Organization for Standardization, n.d.). ISO 14001, an internationally recognized standard, is an act that conveys information about the existence of an internal EMS and performance improvement, a standard to assist corporations in designing an EMS to achieve their environmental goals (King, et al., 2005; Naudé, et al., 2012; Nazari, et al., 2015; Qi, et al., 2011). As regard to environmental disclosures, ISO 14001 asks corporations for "an open communication channel to foster dialog with different stakeholder groups" (Jose & Lee, 2007).

Many studies had their focus on whether an EMS would result in better environment performance, but very few of the earlier studies have investigated whether a certified EMS (ISO 14001) may facilitate sustainability reporting (Nazari, et al., 2015). However, all of those studies which did empirical analysis on the latter question, no matter what kind of samples and methods they adopted, came to same result – companies with ISO 14001 Certified EMSs are more likely to provide substantial environmental disclosures of their activities. In other words, the existence of an ISO 14001 certified environmental management system is an important driver for the enhancement of environmental information reporting and the increase in transparency of environmental information (Ienciu, 2012; Naudé, et al., 2012; Nazari, et al., 2015). To explain this finding, Naudé, et al. (2012) argued that those companies involved with ISO 14001 could be more environmentally engaged, and their business growth might require them to build and maintain good reputation with regard to environmental management. It is also likely that the ISO 14001 certification facilitates the whole environmental reporting process. For instance, it makes it easier for one company to have access to the relevant records. Taking into account the previous studies, the adopted hypothesis is:

**H<sub>6</sub>:** The existence of a certified environmental management system is positively associated with the quality of environmental information disclosure.

### **Knowledge background of top management**

This driver can be considered as managers seeking legitimacy for both themselves and their companies. Hemingway & Maclagan (2004) and Liu, et al. (2014) found that the business environmental commitment of one firm's top management, which in a large way represents the whole firm, could have significant influence on the environmental performance of the firm. Environmental practices not so much reflect corporate policy, as they are the result of individual values and action, and individual managers are not simply just acting as agents of corporate policy. Mohai & Twight (1987) asserts that individuals who are younger, better educated, less politically conservative, and more urbanized generally display higher levels of environmental concern than their counterparts.

Furthermore, Ewert & Baker (2001) suggested that a person's knowledge background is associated with his or her perspectives, values, beliefs and motivations. Thus the level of formal education and academic major could play mediating roles in the development of people's own beliefs and attitudes toward the environment, and people also tend to take "socially-acceptable" way in spite of how they truly felt or what they believed. Some studies brought knowledge background of top management and environment reporting together. For example, Michelon & Parbonetti (2012) suggested that the background and culture of the top management team may affect the disclosure policies made from the board. More broadly, Haniffa & Cooke (2005) found that corporate social disclosures have a significant relation with characteristics of the board of directors, including domination of the board by individuals who have great concern for social issues. Said, et al. (2013) confirmed that the existence of CEO with law background in the company can be a driver for the company to disclose environmental information of higher quality. According to previous researches, this study expects:

**H<sub>7</sub>:** The knowledge background of top management is associated with the quality of companies' environment disclosure.

### **Shareholder power**

Applying stakeholder theory, many researches have studied how dispersed or concentrated ownership affect the quality of companies' social and environmental disclosures, and most of them have found a positive relationship between dispersed ownership and the level of disclosures (Huang & Kung, 2010; Liu & Anbumozhi, 2009; Lu & Abeysekera, 2014; Roberts, 1992; Ullman, 1985). Keim states in (Keim, 1978) that a more diffused ownership structure would lead to broader and more diverse demands from shareholders on the company. Disperse corporate ownership heightens pressure for management to disclose social and environmental information to assure transparency with regard to various corporate activities (Ullman, 1985). Based on previous studies, this research hypothesizes that:

**H<sub>8</sub>:** There is a negative association between concentrated ownership and corporate environmental disclosure.

Table 1 was created in order to better illustrate the drivers tested in the study and their supporting theories respectively. (Size, Industry and Government power are the factors which are controlled in the test, and they would be explained in detail in next chapter.)

**Table 1: The Correspondence between the Potential Determinants and Social-political Theories**

<b>Determinants</b>	<b>Theories</b>
Financial performance	Legitimacy theory/Stakeholder theory
Firm value	Stakeholder theory
Age of companies	Legitimacy theory
Sources of capital	Legitimacy theory/Stakeholder theory
Brand awareness	Legitimacy theory/Stakeholder theory
The existence of certified EMS	Stakeholder theory
Knowledge background of top management	Legitimacy theory
Shareholder power	Stakeholder theory
Size	Legitimacy theory
Industry	Legitimacy theory
Government power	Legitimacy theory/Stakeholder theory

### **3 RESEARCH DESIGN**

#### **3.1 SAMPLE AND DATA**

The initial sample comprised 200 companies listed on the Shanghai Stock Exchange (SHSE) or the Shenzhen Stock Exchange (SZSE). After removing the sample that had missing data, or was with abnormal behavior that may affect the results of analysis, (for example, this study removed top and bottom 1% of the total companies that have extreme data with regard to financial performance, external financing etc.) the balanced panel of final 154 sample companies were

selected. The sample period is year 2014 and was selected randomly from different industries. Table 2 shows more information of the selected companies.

The data were mainly collected by going through the companies' public disclosures (of any forms), for example, annual reports, corporate social responsibility (CSR) reports and corporate websites. The annual report is widely perceived as the primary way for a corporation to communicate with the public about the company's activities (Al-Tuwaijri, et al., 2004; Cowen, et al., 1987; Deegan & Gordon, 1996; Gray, et al., 1995; Hackston & Milne, 1996; Patten, 2002; Wiseman, 1982), and has been the source for almost all previous social and environmental disclosure studies. Stand-alone environmental reports or CSR reports have been adopted by many researches as well (Clarkson, et al., 2008; Liu & Anbumozhi, 2009; Lu & Abeysekera, 2014). This study measured the environmental disclosure which was provided in the company's CSR report. When one company did not publish a separate CSR report, the annual report was then considered to be the source of environmental information. It is relatively fair to take CSR reports as the principle means to measure a company's environmental disclosure. Because the environmental information disclosed in annual report is mainly the simple summary of the environmental part in company's CSR report, and thus illustrating less information.

**Table 2: Distribution of The Sampled Companies**

<b>Industry Sectors</b>	<b>No. of</b>	<b>Pct. of the total</b>
<i>High profile</i>	71	46.10%
Metal	12	7.79%
Food & beverage	7	4.55%
Oil & gas	2	1.30%
Transportation	12	7.79%
Construction	9	5.84%
Chemical	10	6.49%
Electricity	2	1.30%
Paper	3	1.95%
Clothing & textiles	3	1.95%

Biotech & healthcare	8	5.19%
Energy	3	1.95%
<b><i>low profile</i></b>	<b>83</b>	<b>53.90%</b>
Real estate	11	7.14%
Finance & insurance	7	4.55%
Telecommunications, electronics & information service	16	10.39%
Retail	8	5.19%
Equipment & machinery	18	11.69%
Automotive	2	1.30%
Restaurant & tourism	2	1.30%
Manufacturing	4	2.60%
Agriculture	5	3.25%
Public utilities	4	2.60%
Others	6	3.90%
<b>TOTAL</b>	<b>154</b>	<b>100%</b>

In total, 22 different industry sectors are included in the sample. 11 industries (71 companies, 46.10% of the total) are high profile industries and 11 industries (83 companies, 53.90% of the total) are low profile ones. The State Environmental Protection Administration gave notice (Huanfa101, 2003) and (Huanban105, 2007) regarding Inspection and Verification of Environmental Protection of the Corporations Applying for Listing and the Listed Corporations Applying for Refinancing, in which 13 polluting industries are stipulated. Later on, NEPA (2010) released Environmental Information Disclosure of Listed Company Guidelines, and added another three polluting industries which should be strictly regulated. Among the companies in the sample, 10 industries such like Metal, Construction, Chemical, Paper etc. belong to polluting industries. Therefore, they are grouped as high profile industries. Furthermore, this study labeled Transportation industry as high profile type as well since the connection between people and the economic integration is strengthened more than ever it was in history. More and more transportation is required, therefore the quality of air and water is doomed to be impacted. It is fair to expect that this industry get relatively more concern from the public and government.

### **3.2 DEPENDENT VARIABLE**

When it comes to the way of judging the quality of environmental disclosures, content analysis has been used in many previous researches. Because it is a systematic, replicable technique for compressing text descriptions into fewer content categories based on explicit rules of coding (Stemler, 2001). There are mainly two methods of applying this content analysis technique to measure environmental disclosures.

One is to quantify the level of environmental information that published by companies, the information which is either from annual report or CSR report or environmental report. For instance, count words, sentences and number of pages that related to environmental subject (Deegan & Gordon, 1996; Gray, et al., 1995; Hackston & Milne, 1996; Suttipun & Stanton, 2012). However, purely quantifying the information without classification or further detail weighing is not enough, as it cannot take into account the use of non-textual information and the value of disclosed items (Al-Tuwaijri, et al., 2004).

The second method is to develop a content analysis index to measure the quality. More precisely, first identify specific environmental items in companies' reports; and then design a standard for scoring; eventually a score per company can be calculated. Even though the indexes (for example, according to GRI guidelines, local codes and standards, or specific environmental aspects etc.) and scoring criteria (such as monetary or non-monetary, quantitative or qualitative, hard or soft etc.) vary from one research to another, many researchers have chosen the disclosure-scoring measure to analyze companies' reports (Wiseman, 1982; Cormier & Magnan, 2003; Al-Tuwaijri, et al., 2004; Clarkson, et al., 2008; Zeng, et al., 2012; Dong, et al., 2014; Du, et al., 2013; He & Loftus, 2014; Cho, et al., 2015). A simple combination of some random disclosure indexes may fail to capture the contextualization of CSR disclosure and it also has the problem of connecting to the specificity in the disclosed information, leading to a dilemma of judging whether companies mainly focus on aims and intentions or on real activities (Bouten, et al., 2011). This study, therefore, draws upon a well-developed disclosure-scoring method to evaluate the quality of companies' environmental reporting.

On February 8, 2007, the State Environmental Protection Administration (SEPA) issued measures that standardize the disclosure of environmental information by enterprise. It is called Measures on Open Environmental Information (SEPA, 2007), which started to be effective on May 1, 2008. According to Article 19, enterprises are encouraged by the State to voluntarily disclose the following enterprise environmental information:

- 1) Their environmental protection guidelines, annual environmental protection objectives and achievements;
- 2) Their total annual resource consumption;
- 3) Information on their environmental protection investment and environmental technology development;
- 4) Type, volume and content of pollutants discharged by them and where the pollutants are discharged into;
- 5) Information on the construction and operation of their environmental protection facilities;
- 6) Information on the handling and disposal of waste generated from their production, information on recycling and comprehensive use of waste products;
- 7) Voluntary agreement entered into with environmental protection departments for environment improvement behavior;
- 8) Information on their performance of social responsibilities; and
- 9) Other environmental information voluntarily disclosed by them.

Thus this study will take main points listed above in the article as environmental indicators. All indicators can be summarized as: 1. General information, such as (a) guidelines, objectives and achievements; (b) agreements on protection; 2. Facilities information, such as (c) investment and development on protection; (e) construction and operation of facilities; 3. Specific information in



operation like (e) discharged pollutants information; (f) waste products information; (c) resource consumption; 4. Other information. See Table 3 for more details.

**Table 3: Environmental Disclosure Index**

<b>Index assessing based on Measures on Open Environmental Information</b>
<b>1. General information (Max. 10)</b>
a. environmental protection guidelines (Max. 1)
b. environmental protection objectives (Max. 4)
c. environmental protection achievements (Max. 4)
d. voluntary agreement on environment improvement (Max. 1)
<b>2. Facilities information (Max. 12)</b>
e. investment on environmental protection (Max. 4)
f. technology development on environmental protection (Max. 4)
g. construction and operation of environmental protection facilities (Max. 4)
<b>3. Specific information (Max. 24)</b>
h. resource consumption information (Max. 8)
i. detailed information regarding discharged pollutants (size, type, what, where) (Max. 8)
j. waste products disposal and recycling information (Max. 8)
<b>4. Other information (Max. 2)</b>
<b>Total: Max. 48</b>

GRI Sustainability Reporting Guidelines offer companies some principles to ensure the quality of information in the sustainability report: Balance; Comparability; Accuracy; Timeliness; Clarity; Reliability. All of these principles are fundamental to achieving transparency so that stakeholders can make reasonable assessment of performance and take proper actions, and meanwhile the public is able to know the whole picture of companies' activities.

This study creates a scorecard which is based on those principles described in GRI guidelines. Figure 2 demonstrates the relevant details. The disclosure indicators were measured by assigning

a value to each of them, a value that from one to five which reflects the quantity as well as quality of information. An indicator was assigned a value of 1) 1, if there is only qualitative data; 2) 2, if there is quantitative data (ACCURACY); 3) 3, if there are quantitative data and also time series (COMPARIBITLITY & TIMELINESS); 4) 3.5, if there are quantitative data, time series and targets (BALANCE & CLARITY); 5) 4, if there are quantitative data, time series, targets and external assurance (RELIABILITY).

**Figure 2: Principles Suggested by GRI for Ensuring the High Quality of Sustainable Disclosure**



Note that there are several exceptions when applying this scoring standard, as some indicators might only have qualitative data available, and some indicators are more important and objective in terms of “sensitive” information compared to others. Therefore, the indicators are further categorized into “hard” and “soft” measures. Clarkson, et al. (2008) argued that almost all environmental stakeholders demand for hard, objective measures of environmental performance in social responsibility reports, so that poor environmental performance performers cannot take their commitment to the environment only by simply providing soft and unverifiable claim. When

scoring indicators a and d, this study put 1 as maximum point. Clarkson, et al. (2008) explained why these kind of soft information should be given less credit, “Companies often disclose broadly that they have an environmental policy, that management is committed to protecting the environment, etc. Such disclosures can be genuine when put in the specific context but they can also be deceiving as they lack credibility and substantiation, and can be easily mimicked.” Furthermore, this study assigned higher weights on the category – specific information was given double points since it contains elements such like companies’ actual pollution emissions and their conservation and recycling efforts. These are the “hard” data that the public concern most and would have direct impact on environment.

### **3.3 INDEPENDENT VARIABLES**

In order to test the hypotheses, this study developed eight independent variables. They are financial performance, firm value, company’s age, external financing, brand awareness, certified environmental management system, knowledge background of top management, and shareholder’s power.

Among these variables, brand awareness, certified environmental management system and knowledge background of top management are dummy variables. In addition, the study also used natural logs of the values of the firm value in the analyses, instead of the original raw values. Data transformation can be applied when a value of interest ranges over several orders of magnitude. Using logarithm can usually induce symmetry in such data and therefore improve the model fit by altering the scale and making the variable more normally distributed (Wikipedia, 2016). Furthermore, considering corporate reports of year 2014 could be largely affected by the companies’ related performance in year 2013, this study took data of year 2013 for certain variables such as financial performance and external financing. More details related to independent variables can be found in Table 4.

### **3.4 CONTROL VARIABLES**

There have been a large number of empirical studies attempting to explain corporate environmental reporting by observing and analyzing the impact of corporation’s characteristics such as size, type

of industry, institution ownership etc. We select control variables on the basis of prior studies of corporate environmental disclosures.

In terms of the relationship between the size of a company and its environmental information disclosure, most of previous studies have found a positive association (Trotman & Bradley, 1981; Cowen, et al., 1987; Deegan & Gordon, 1996; Hackston & Milne, 1996; Adams, et al., 1998; Cormier & Gordon, 2001; Zeng, et al., 2012; Branco & Rodrigues, 2008). This driver mostly reflects legitimacy theory. In general, larger companies participate in more businesses area, therefore their activities have a greater impact on the natural environment. So larger companies are more likely pressured by the government and social groups, and have to respond social expectations with more disclosures. Also large companies can afford to use resources to take environmental initiatives and improve environmental accounting and related reporting.

Although many scholars used different industries classification, they reached a consensus that companies in highly environmentally sensitive industries (such as the oil, chemical, metal, utility, airline, paper and water sectors) are more exposed to the societal and regulatory scrutiny since their activities might put more pressure on natural environment, and therefore will tend to disclose more environmental information voluntarily than low profile companies (Patten, 1991; Roberts, 1992; Hackston & Milne, 1996; Deegan & Gordon, 1996; Adams, et al., 1998; Stray & Ballantine, 2000; Cho & Patten, 2007; Zeng, et al., 2012; Gao, et al., 2005; Campbell, 2003). From a similar legitimacy perspective, studies (Cho, et al., 2012) and (Grigoris, et al., 2014) revealed that companies with poor environmental performance tend to enclose more information in environmental disclosures.

There were also some scholars mentioning the impact of government power on companies' reporting behavior. Tagesson, et al. (2009) found that state-owned companies disclosed more environmental information than private companies because state-owned companies are under greater scrutiny, and the pressure from the owner, the state, and the mass media drives them to behave close to society's expectations. Zeng, et al. (2012) analyzed a large number of publicly listed companies in China, concluded that companies which are state-owned are more likely to disclose environmental information, but companies are not necessarily concerned about the content of disclosure if they were motivated only by external pressure. However, Suttipun &

Stanton (2012) found that the ownership status was slightly negatively correlated with the amounts of environmental disclosures, according to his investigation on the companies from Thailand.

Besides all the determinants we would discuss in this study, there are a few others with regard to corporate governance worth mentioning as well. First of all, Peters & Romi (2014) documented a positive association between corporate environmental governance mechanisms and voluntary disclosure and the firm's environmental transparency. While when it comes to a certain type – CEO duality, people have reached different results. Michelin & Parbonetti (2012) and Grigoris, et al. (2014) found that CEO duality has no significant effect on extent of CSR disclosure. But Jizi, et al. (2014) discovered that CEO duality is positively and significantly related to CSR disclosure by US banks.

Many other factors were more or less studied by scholars over these decades. The factors were broadly concerned: industrial peers, culture, religion, organizational image and reputation, country of origin of a company, the degree of development of environmental accounting practices, government, cost of equity capital, auditors, shareholders, board size and board independence employees, membership in ESI, sell-side analysts and so on. Some of them were supported by significant evidence, or at least were representative in certain areas, while others were hardly confirmed by empirical studies.

### **3.5 ECONOMETRIC MODEL**

The regression model was employed in the analysis of data. To study the determinants of corporate environmental information reporting, all kinds of possible drivers, for example, size and profitability were used as the independent variables, and the quality of environmental disclosure was used as the dependent variable.

$$EDI_i = \beta_0 + \beta_1 FIN_i + \beta_2 VAL_i + \beta_3 AGE_i + \beta_4 EXT_i + \beta_5 BRAND_i + \beta_6 EMS_i + \beta_7 DIR_i \\ + \beta_8 OWN_i + \beta_9 SIZE_i + \beta_{10} IND_i + \beta_{11} GOV_i + \varepsilon$$

where  $i = 1, 2, \dots, 200$ .

The variables in the model above are defined in Table 4.

**Table 4: Explanation of the Variables in the Model**

<b>Variable</b>	<b>Proxy</b>	<b>Measurement</b>	<b>Data source</b>
<b>FIN</b>	Financial Performance	return on assets (Income before extraordinary items divided by total assets at the end of 2013 )	Annual report
<b>VAL</b>	Firm Value	natural logarithm of the number of shares outstanding multiplied by the price per share of the firm's common stock at the end of 2014	Annual report
<b>AGE</b>	Company's age	company's actual age that starts from its business started	Corporate website
<b>EXT</b>	External Financing	the ratio of total debt to total assets at the end of 2013	Annual report
<b>BRAND</b>	Brand Awareness	the value of company's trademark (1 for companies that belong to China's 500 most valuable brands (2014), and 0 otherwise)	(world brand lab, 2016)
<b>EMS</b>	Certified environmental manage system	1 for companies that have ISO 14001, and 0 otherwise	Corporate website
<b>CHA</b>	Knowledge background of top management	1 for companies with Chairman that has bachelor's degree or above, or have law and environment related majors, and 0 otherwise	Corporate website and Baidu Wiki
<b>OWN</b>	Shareholder's power	Percentage of shares owned by the major shareholders at the end of 2014	Annual report
<b>SIZE</b>	Company's size	Natural logarithm of total revenues of 2014	Annual report

<b>IND</b>	Industry profile	1 for companies that belong to high-profile industry (including metal, constructions, paper, energy, transportation, oil & gas, chemical, and food & beverage) and 0 otherwise.	Shanghai stock exchange website and Shenzhen stock exchange website
<b>GOV</b>	Government's power	1 for central state-owned companies, and 0 otherwise	Corporate website

## 4 EMPIRICAL RESULTS AND DISCUSSION

### 4.1 DESCRIPTIVE STATISTICS

Table 5 illustrates the descriptive statistics for both dependent and independent variables. The descriptive statistics table includes the information of data such as mean, media, standard deviation, minimum, maximum, top 25% and top 75%. The dependent variable Score ranges from 0 to 44 with a mean of 17.315 and a median of 15. A score of 0 indicates that there was no stated environmental information, and the maximum score of 44 represents 91.67 percent of the possible score of 48. 25 is only a bit more than half of the full score, whereas it is still among top 25%. 9 is not even one fifth of the full score, while 25% of the total sample have either equal or even lower level. Relatively low mean and median value signifies that most of the sampled listed Chinese companies disclosed insufficient environmental information in year 2014.

As for independent variables, Financial performance, External financing and Shareholder concentration all show a wide range, and from their mean and median values, we can see that most of the sampled companies are witnessing good profits, that more than half of the companies are highly leveraged, and that shareholder power appears rather strong since the majority of the sampled companies' shares are mainly controlled by a few big shareholders. Regarding the variables Value and Size, the statistics show no considerable difference among companies (Top 25% and Top 75% of all the companies are quite close). This study used log transformation to eliminate the impact of significant difference in the order of magnitude of companies' value and size, so that the adopted proxies are more suitable for the model. The age of listed companies

ranges from a minimum of 5 years to a maximum of 35 years, with a mean value of 18.864, indicating that not many young companies were involved in this study. Moreover, the mean value of Brand is only 0.247 and not all Top 25% of the total sampled companies are 1, which means the majority of the sampled companies do not enjoy a high brand value. With a mean value of 0.721, the environment management system is illustrated to be adopted by most of the sampled companies. Similarly, we can see that the majority of companies here have a well-educated chairman on their board, as the mean value of CHA is as high as 0.870 and at least Top 75% of all the companies are 1. Finally, the sample companies were comprised of more government owned companies than private ones.

**Table 5: Descriptive Statistics of the Sampled Companies**

	<b>Mean</b>	<b>Median</b>	<b>SD</b>	<b>Min.</b>	<b>Max.</b>	<b>Top 25%</b>	<b>Top 75%</b>
<b>FIN%</b>	9.460	9.605	12.121	-73.89	33.75	15.88	4.29
<b>VAL</b>	14.237	14.220	1.330	11.431	18.555	14.968	13.188
<b>AGE</b>	18.864	18	5.193	8	35	22	15
<b>EXT</b>	54.587	56.735	19.591	10.99	94.86	68.53	40.7
<b>BRAND</b>	0.247	0	0.433	0	1	0	0
<b>EMS</b>	0.721	1	0.450	0	1	1	0
<b>OWN%</b>	57.273	58.925	16.350	19.95	96.504	67.19	47.17
<b>SIZE</b>	13.679	13.446	1.770	9.726	19.460	14.771	12.385
<b>IND</b>	0.468	0	0.501	0	1	1	0
<b>GOV</b>	0.558	1	0.498	0	1	1	0
<b>CHA</b>	0.870	1	0.337	0	1	1	1
<b>SCORE</b>	17.315	15	10.476	0	44	25	9

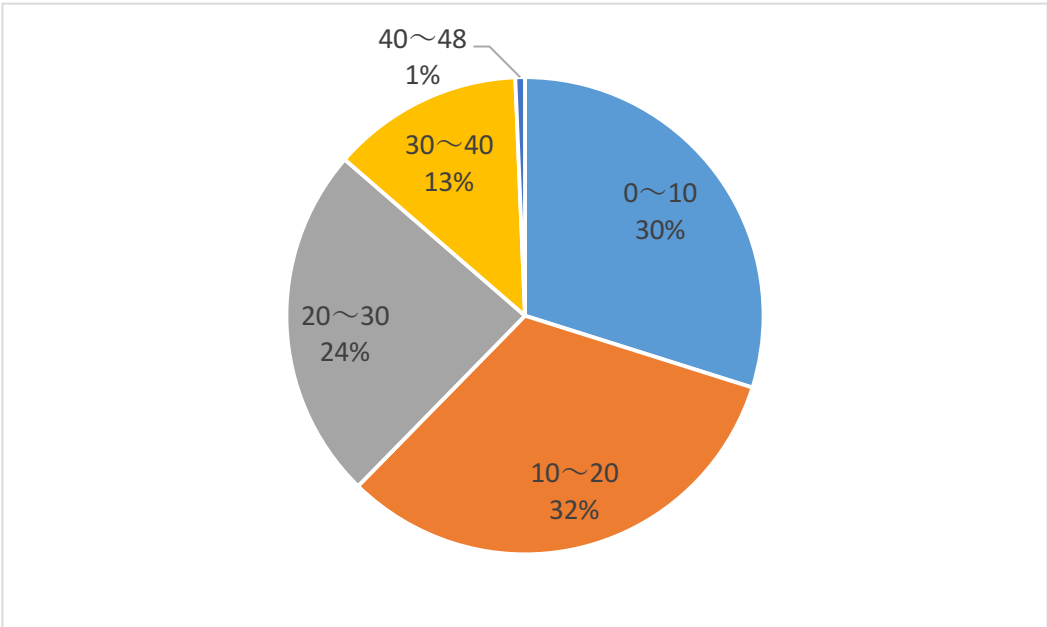


Table 6 and Figure 3 give further information about the quality of environmental disclosures of the sampled companies. Table 6 illustrates that the average and median scores of the high profile industries are obviously higher than those of the low profile industries. The highest score is also from a company in the high profile category. The rather big standard deviation of 10.32 and 9.95 respectively means that the quality of environmental reporting varies a lot from companies to companies.

**Table 6: Descriptive Statistics of Variable SCORE**

SCORE		
	High profile	Low profile
<b>Mean</b>	19.843	15.079
<b>Median</b>	19.5	13
<b>SD</b>	10.320	9.950
<b>Minimum</b>	0	0
<b>Maximum</b>	44	38

**Figure 3: Distribution of SCORE**



Pie chart shows us a vivid image of the overall score distribution. Around 62% of the total sampled companies have scores that below 20, which is not even half (24) of the full score. The companies which get 20~30 account for about 24% of the total sampled companies, and those which get 30~40 account for only 13% of the total. Only one company scores more than 40. Whereas approximately 30% of the whole sample are among the lowest score range. In general, we can learn that a big number of the sampled companies are not providing sufficient environmental disclosures to the public and far too little companies disclose environmental information of very high quality.

Figure 4 describes the level of sampled companies' environmental reporting on each category. That is, how much percent of environmental information the companies disclose on average. Among four different categories, only the disclosure of Facilities information goes above 50% of the full score, which almost reaches 70%, indicating the sampled companies on average tend to show the public their ambition of improving environmental performance by disclosing the relevant investment and equipment information. General information reflects one company's status of environmental management and culture development, and it gives the most basic frame of building an efficient environmental protection system. However, in terms of this category, on average merely 42.31% of the total score is covered by the sampled companies in their reports. Only a small number of the companies have disclosed their voluntary agreements with environmental protection departments for participation in certain kinds of environment improvement, and not many reports are with detailed environmental protection guidelines and objectives in them.

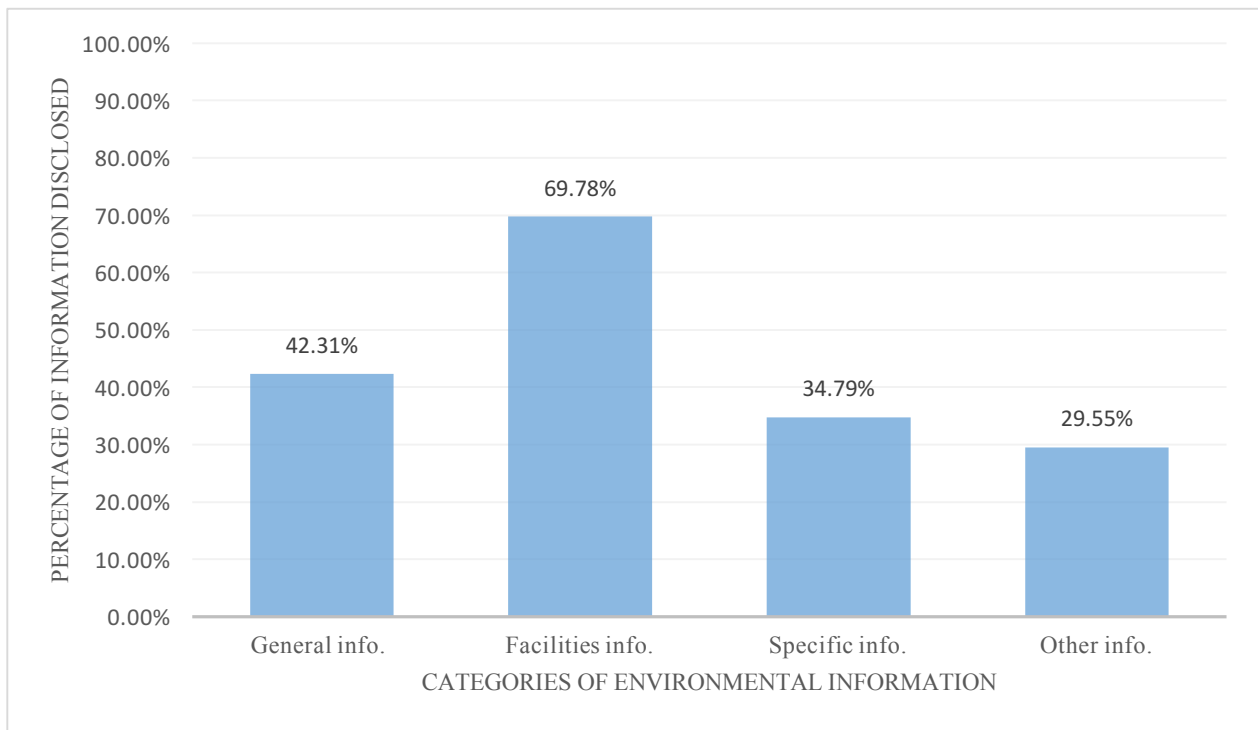
Specific information without any doubt is the most important part of the whole environmental discourse since it provides the public with "hard" information which tells about what exactly one company has done and its plan for future improvement. Only 34.79% of the possible highest score was achieved, which is obviously not satisfying – it signifies that most of the sampled companies were avoiding to insert practical and concrete information in their environmental reports, either because of the bad environmental performance or the lack of value and effort on environmental protection and reporting.

Furthermore, other information was the part that the companies value least, since less than 30% of the full score was obtained on average. As the most voluntary item that is encouraged to disclose,

other information represents one company's perceptions of the environmental protection and reporting, and the score can in a way represent the company's attitude and ability to innovate, rather than merely copying common framework of the same industry on environmental disclosures.

So as we can see, clearly there is still big room for the sampled companies to improve their reporting practices. The contents which are included in the report should be considered carefully by companies, to make sure they are in accordance with the guidelines, the audience's needs as well as the company's own business situation.

**Figure 4: Disclosure Ratio of Different Types of Environmental Information**



## 4.2 PEARSON'S CORRELATION ANALYSIS

Pearson's correlation analysis was used in this study to explore the correlation among all the explanatory variables. As generally agreed rule of thumb, a correlation coefficient greater than 0.8 or 0.9 is described as strong, which signifies severe multicollinearity may be present (Farrar & Glauber, 1967). In this study, the highest correlation coefficient was 0.820 (between VAL and

**Table 7: Correlation Coefficients between Explanatory Variables**

	FIN %	VAL	AGE	EXT	BRAND	EMS	OWN%	SIZE	IND	GOV	CHA	SCORE
<b>FIN(%)</b>	1	.219**	.154	-.062	.112	-.165*	.190*	.109	-.276**	-.207*	-.152	-.037
<b>VAL</b>	.219**	1	.135	.318**	.482**	-.062	.206*	.820**	-.044	.250**	.098	.537**
<b>AGE</b>	.154	.135	1	.249**	.222**	-.109	-.092	.064	-.361**	.128	-.033	.021
<b>EXT</b>	-.062	.318**	.249**	1	.206*	.080	-.043	.466**	.002	.216**	-.050	.228**
<b>BRAND</b>	.112	.482**	.222**	.206*	1	.020	-.041	.552**	-.125	.084	-.048	.317**
<b>EMS</b>	-.165*	-.062	-.109	.080	.020	1	-.006	.053	.208**	.088	-.025	.188*
<b>OWN%</b>	.190*	.206*	-.092	-.043	-.041	-.006	1	.226**	.140	.080	-.034	.182*
<b>SIZE</b>	.109	.820**	.064	.466**	.552**	.053	.226**	1	.083	.252**	-.019	.576**
<b>IND</b>	-.276**	-.044	-.361**	.002	-.125	.208**	.140	.083	1	.212**	.076	.229**
<b>GOV</b>	-.207*	.250**	.128	.216**	.084	.088	.080	.252**	.212**	1	.201*	.301**
<b>CHA</b>	-.152	.098	-.033	-.050	-.048	-.025	-.034	-.019	.076	.201*	1	.001
<b>SCORE</b>	-.037	.537**	.021	.228**	.317**	.188*	.182*	.576**	.229**	.301**	.001	1

\*\* . Correlation is significant at the 0.01 level

\* . Correlation is significant at the 0.05 level

SIZE) – less than 0.9, and all others coefficients were much smaller than 0.8. So we could roughly think that there was no indication of serious multicollinearity. Furthermore, the correlation matrix also shows that the variables such as VAL (Firm value), EXT (External financing), Brand (Brand awareness) and all three control variables (SIZE, IND and GOV) are all positively and significantly associated with the dependent variable SCORE of environmental reporting at the significant level of 0.05. This result is consistent with many previous researches as discussed earlier (Deegan & Gordon, 1996; Adams, et al., 1998; Wang, et al., 2013; Zeng, et al., 2012). See Table 7 for all the correlation coefficients.

### **4.3 MULTIPLE REGRESSION RESULTS**

Table 8 reports the regression results of our econometric model for examining the relations between suggested drivers and the level of environmental disclosure. R-square 0.395 reveals a quite strong strength of the relationship between the model and the variables, that approximately 40% of the variation in the output can be explained by the independent variables in the model. And this relationship is statistically significant as the F value (F:10.081; Sig. .000<sup>b</sup>) of the model is significant at the 0.01 level. This study also checked if the analysis suffered from possible multicollinearity by investigating the variance inflation factor (VIF). Generally if VIF goes above 10, then we think there is harmful multicollinearity among the variables (O'Brien, 2007). The highest VIF in our sample is from SIZE as 4.763, which is still much lower than the rule of thumb of 10. Values of VIF are very low in all other cases. Hence the analysis is not subject to the multicollinearity problem.

There are three direct findings from the examination. First, Supporting Hypothesis 2, firm value is shown to be an important factor which is positively significantly associated with the quality of environmental disclosure at the 0.01 significant level. Second, the certified environmental management system is found to have positive and significant effect on the level of environmental information disclosure (with the significance level of 0.05), so we can accept Hypothesis 6. Third, social-political theories indeed provide us with powerful explanation tools when it comes to environmental information disclosing practices.

The finding about explanatory variable firm value is inconsistent with some prior researches. (Matsumura, et al., 2014; Cho, et al., 2015; Calace, 2014) However, I think it makes sense that company's value goes up when it discloses better social and environmental information. As (Becchetti & Ciciretti, 2009) explained, one company's socially responsible practices are one type of most valuable sources which can be used by market to give a proper valuation with the existence of a big difference between the book value and the market value of a company. And even if there is no such big difference, a company may still witness an increase in its market value. Because it provides investors with detailed social and environmental reports, there would be less uncertainty regarding the company's activities, therefore less risk. Furthermore, in this new economic environment (especially in China), the market is more and more concerned with Companies' non-financial performance as well since it in a way reflects the sustainability of the companies.

The evident result regarding the existence of certified environmental management system is in line with many studies (Ienciu, 2012; Naudé, et al., 2012; Nazari, et al., 2015). The companies which employ EMS (ISO 14001) are most likely more environmentally engaged, and their business growth might require them to build and maintain good reputation with regard to environmental management (Naudé, et al., 2012). Environmental information disclosure can serve companies as a good medium for them to communicate with their shareholders. Moreover, by organizing and standardizing all the relevant steps and records, EMS helps companies with the whole environmental reporting process.

In light of control variables, SIZE and IND are found to be positively and significantly related to dependent variable SCORE, which means that the larger companies and the companies that have more impact on environment status tend to disclose higher quality of environmental information than those which are smaller and "cleaner" companies. This is consistent with most of previous relevant studies (Cormier & Magnan, 1999; Hackston & Milne, 1996; Roberts, 1992; Grigoris, 2014; Liu & Anbumozhi, 2009; Cowen, et al., 1987; van de Burgwal & Vieira, 2014; van de Burgwal & Vieira, 2014; Alsaeed, 2006; Araya, 2006). However, whether one company is state-owned or not does not seem to be a substantial influence here to the level of that company's reporting practices. This is not consistent with some studies. (Zeng, et al., 2012; Tagesson, et al., 2009; Cormier & Gordon, 2001) It could be because that not all the government-owned companies

are strictly following relevant regulatory requirements as long as they are not severely punished due to the consequences.

As far as the rest of the explanatory variables are concerned, they are not statistically significant to the quality of environmental information disclosure. The insignificant negative relationship between Financial performance and the level of environmental reporting is not in line with our hypothesis 1, but is consistent with (Brammer & Pavelin, 2006; Suttipun & Stanton, 2012; Patten, 1991; Zeng, et al., 2012; Grigoris, 2014; Bhattacharyya, 2014). Grigoris (2014) argued that this is probably due to the fact that it is not necessary to fund related reporting since reporting activities add cost without any direct benefits.

Also, inconsistent with studies (Parsa & Kouhy, 2008; Roberts, 1992; Wang, et al., 2013), this study finds that company's age has no effect on the extent of environmental information disclosure. One possible explanation could be that environmental legitimacy is so much concerned by the society nowadays, that companies cannot afford to lose it no matter what developing stage they are in.

In addition, explanatory variable source of capital is not statistically significant to the level of environmental reporting either. This result is consistent with many prior ones (Roverté, 2009; Alsaeed, 2006; Ho & Taylor, 2007; Michelon & Parbonetti, 2012). Even though financing source is rather crucial for companies to fund their business operation, but it was generally acknowledged that companies and their creditors have some other private methods to communicate with each other (Alsaeed, 2006).

Brand awareness, in a way revealing how much one company is exposed to the public, does not explain the situation in the sampled companies. This is inconsistent with many prior researches (Bansal, 2005; Brammer & Pavelin, 2008; Hasseldine, et al., 2005; King, et al., 2005). The result may be caused by the inappropriate proxy the study chose. Here we are more concerned with the brand awareness with regard to its media coverage and influence, while brand value assessment might include some other unrelated elements as well.

Hypothesis 7 and 8 receive no empirical support from the regression analysis either. In terms of the knowledge background of the top management, this study is not able to see that a higher education level would lead to a better environmental disclosure. It is possible that the level of education is not the main factor which would affect the management's decision. Or from the different point view, disclosures can be only symbolic forms, which may or may not on behalf of the true position of the manager's beliefs or effort (Clarkson, et al., 2011; Hopwood, 2009). As for the shareholder's power, inconsistent with some studies (Chiu & Wang, 2015; Huang & Kung, 2010) and consistent with the study (Liu & Anbumozhi, 2009), the examination shows no significant negative relation between centralized companies and the quality of environmental reporting.

**Table 8: Regression Results of the Model**

<b>Model</b>	<b>Expected direction</b>	<b>Standardized Coefficients</b>	<b>t</b>	<b>Sig.</b>	<b>Tolerance</b>	<b>VIF</b>
<b>(constant)</b>			-5.057	.000	***	
<b>FIN%</b>	+	-.081	-1.135	.258	.771	1.297
<b>VAL</b>	+	.319	2.641	.009	***	.271
<b>AGE</b>		.052	.708	.480	.732	1.367
<b>EXT</b>		-.045	-.587	.558	.663	1.509
<b>BRAND</b>	+	.040	.498	.619	.606	1.649
<b>EMS</b>	+	.151	2.312	.022	**	.928
<b>OWN%</b>	-	.042	.618	.538	.837	1.195
<b>SIZE</b>	+	.253	1.844	.067	*	.210
<b>IND</b>	+	.190	2.633	.009	***	.757
<b>GOV</b>	+	.105	1.471	.144	.781	1.280
<b>CHA</b>		-.048	-.717	.475	.885	1.130

R Square: .438; Adjusted R Square: .395; F:10.081; Sig. .000<sup>b</sup>

\*\*\* indicate significance at the 0.01 level; \*\* indicate significance at the 0.05 level;

\* indicate significance at the 0.1 level.



#### 4.4 ROBUSTNESS TEST

In order to measure the quality of environmental information reports, this study designed many environmental disclosure indexes based on the guidelines that issued by Chinese government. However, as further globalization development, and increased connection between Chinese companies and other foreign organizations, it is also important to see if Chinese companies are following international disclosing standards and trends. Hence, this study did one more regression test with a new method to measure the dependent variable.

The newly adopted measurement was the content analysis index developed in (Clarkson, et al., 2008). It was created with the help from an expert in the field of environmental reporting and strictly based on sustainability reporting guidelines which was issued by the Global Reporting Initiative (GRI). It was concrete and made to address the main issues that the public is concerned about. Many studies have used or referred to it in their data analysis (van de Burgwal & Vieira, 2014; Du, et al., 2013; Liu & Anbumozhi, 2009). See Appendix for the detailed index.

As indicated in Table 9, the results using the environmental disclosure index that developed according to generally agreed International standards are very similar to the original multiple results shown in Table 8. We can still see the positive significant relationship between VAL and EMS and the dependent variable SCORE at very low significant level. And control variables SIZE and IND are both positively significant associated with the dependent variable as expected. Therefore, we can claim that the test in this study is robust in this sense, since it still provides similar insights even though having one of its important measurement changed. This also shows us the consistency between the reporting guidelines issued by Chinese government and common international standards.

**Table 9: Regression Results of the Model With a Different Method of Measuring Dependent Variable SCORE**

<b>Model</b>	<b>Standardized Coefficients</b>	<b>t</b>	<b>Sig.</b>
<b>(Constant)</b>		-5.397	.000 ***

<b>FIN %</b>	-1.100	-1.407	.162	
<b>VAL</b>	.275	2.300	.023	**
<b>AGE</b>	.081	1.109	.269	
<b>EXT</b>	-.058	-.763	.447	
<b>BRAND</b>	-.018	-.228	.820	
<b>EMS</b>	.172	2.671	.008	***
<b>OWN%</b>	.047	.686	.494	
<b>SIZE</b>	.321	2.369	.019	**
<b>IND</b>	.197	2.765	.006	***
<b>GOV</b>	.113	1.604	.111	
<b>CHA</b>	-.044	-.669	.505	

R Square: .452; Adjusted R Square: .409; F:10.630; Sig. .000<sup>b</sup>

\*\*\* indicate significance at the 0.01 level; \*\* indicate significance at the 0.05 level;

\* indicate significance at the 0.1 level.

## 4.5 FURTHER REGRESSION FINDINGS

### 4.5.1 High profile companies and low profile companies

In order to see if there are any differences between the high profile companies and the low profile companies, I divided the sample based on the industry information and studied about the two different types of companies separately. I kept all the possible influencing factors in the regression model except for the IND.

Table 10 shows the regression results about the relationship between all potential determinants and the quality of environmental disclosures of low profile companies. As we can see, 40.9% of the variation in the outcome can be explained by the independent variables in the current model. (Adjusted-R Square: .409) And with F value 6.676 and Sig. .000<sup>b</sup>, the model significantly predicts the outcome.

Similar with the result when the whole sampled companies' data included, VAL and EMS are still demonstrated to be positively significantly related to the quality of corporate environmental

disclosure at 0.05 and 0.1 significant level respectively. However, the control variables SIZE and GOV, which were positively significantly related to the dependent variable, now are found not to have significant impact on it. Another difference is that shareholders' power OWN seem to have its positive significant effect (with significance level 0.1) on the low profile companies' environmental reporting behavior. Which means the more centralized ownership low profile companies have, the better quality of environmental disclosures they would release. This is not in line with our hypothesis that disperse corporate ownership lead to a higher level of environmental reporting, since decentralized ownership is supposed to increase pressure for management to make effort on environmental practices. The most unexpected result here is that CHA is negatively significantly related to the score of environmental disclosures provided by low profile companies. It is hard to explain that the Chairman with higher education background actually to some degree discourages the company's disclosing behavior. I think one possible reason for this is that one person's values, beliefs and attitudes to the public good can be well-developed even before he/she steps into degree level study. And especially if he/she pursues further level of education, such as Master and PhD study, he/she will mostly gain a deeper knowledge of some specific subject instead of certain perception of common issues.

Table 11 illustrates regression result of the relationship between the independent variables and the dependent variable in high profile company context. Unfortunately, significant the model is (with  $F:6.676$ ;  $Sig.: .000^b$ ), we are not able to identify significant association between any included drivers and the quality of reporting. This may be caused by the imperfection of the sample selection and scoring process.

**Table 10: Regression Results of the Model (the Low Profile Companies Only)**

Model	Standardized Coefficients	t	Sig.	
<b>Constant</b>		-3.977	.000	***
<b>FIN %</b>	-.152	-1.498	.139	
<b>VAL</b>	.351	2.378	.020	**
<b>AGE</b>	.137	1.456	.150	
<b>EXT</b>	-.063	-.569	.571	

<b>BRAND</b>	.053	.429	.669	
<b>EMS</b>	.152	1.692	.095	*
<b>OWN %</b>	.174	1.746	.085	*
<b>SIZE</b>	.236	1.258	.212	
<b>GOV</b>	.133	1.446	.153	
<b>CHA</b>	-.209	-2.325	.023	**

R Square: .481; Adjusted R Square: .409; F:6.676; Sig.: .000<sup>b</sup>

\*\*\* indicate significance at the 0.01 level; \*\* indicate significance at the 0.05 level;

\* indicate significance at the 0.1 level.

**Table 11: Regression Results of the Model (the High Profile Companies Only)**

<b>Model</b>	<b>Standardized Coefficients</b>	<b>t</b>	<b>Sig.</b>	
<b>(Constant)</b>		-1.883	.064	*
<b>FIN %</b>	-.056	-.491	.625	
<b>VAL</b>	.228	.965	.339	
<b>AGE</b>	-.088	-.755	.453	
<b>EXT</b>	-.019	-.154	.878	
<b>BRAND</b>	.152	1.251	.216	
<b>EMS</b>	.124	1.167	.248	
<b>OWN %</b>	-.095	-.887	.379	
<b>SIZE</b>	.309	1.249	.216	
<b>GOV</b>	.097	.774	.442	
<b>CHA</b>	.104	.908	.367	

R Square: .410; Adjusted R Square: .312; F:4.169; Sig.: .000<sup>b</sup>

\*\*\* indicate significance at the 0.01 level; \*\* indicate significance at the 0.05 level

\* indicate significance at the 0.1 level

#### **4.5.2 Different sample**

Considering that some sampled companies have score 0 due to the missing environmental information in their report, this study furthermore tested the relationship between the independent variables and the dependent variable with the revised sample. The new sample included 148

companies. It could be less extreme and more representative, since the companies which had score 0 were removed.

As we can see in Table 12, the results using the different sample still reflect the similar empirical evidence as the original multiple results shown in Table 8. VAL and EMS are positively significantly associated with the dependent variable SCORE at the low significant level of 0.05. And control variables SIZE and IND both have positive significant relationship with the dependent variable as expected. In addition, variables FIN, EXT and CHA are negatively insignificantly with SCORE, which was also the case in the previous results.

**Table 12: Regression Results of the Model (Different Sample)**

<b>Model</b>	<b>Standard coefficients</b>	<b>t</b>	<b>Sig.</b>	
<b>(Constant)</b>	-38.609	-4.311	0.000	***
<b>FIN %</b>	-0.063	-1.022	0.309	
<b>VAL</b>	2.256	2.333	0.021	**
<b>AGE</b>	0.018	0.121	0.904	
<b>EXT</b>	-0.016	-0.382	0.703	
<b>BRAND</b>	0.927	0.470	0.639	
<b>EMS</b>	3.219	2.100	0.038	**
<b>OWN %</b>	0.018	0.396	0.693	
<b>SIZE</b>	1.573	1.943	0.054	*
<b>IND</b>	2.537	1.673	0.097	*
<b>GOV</b>	2.155	1.449	0.150	
<b>CHA</b>	-2.342	-1.081	0.282	

R Square: .414; Adjusted R Square: .367; F:8.753; Sig.: .000<sup>b</sup>

\*\*\* indicate significance at the 0.01 level; \*\* indicate significance at the 0.05 level

\* indicate significance at the 0.1 level

## **5 CONCLUSIONS**

### **5.1 DISCUSSIONS AND SUMMARY**

Using social-political theories, this study intends to find the determinant factors for the quality of environmental information disclosure provided by Chinese companies, and then to come up with some suggestions with regard to the improvement of quality.

The study confirms that firm value and the adoption of certified environmental management system are positively significantly associated with the quality of environmental information reporting. This finding supports the stakeholder theory: If a company provides its shareholders with environmental disclosures of high quality to reduce the relevant uncertainty, it could be rewarded by market with an increased firm value; A company's employment of environmental management system can be taken as its manager's active strategic posture toward social demands, which is expected to result in greater social responsibility activities and thus more relevant disclosures. Control variables firm size and industry profile are also found to have positive significant relationship with the quality of environmental information disclosure. This serves as evidence for the good explanation power of legitimacy theory, that in order to gain and maintain the legitimacy, one company need to response to social needs with efforts.

Market value is one of the major concerns of all companies. It may encourage companies to disclose a higher level of environmental information if China Securities Regulatory Commission (CSRC) makes certain regulations or instructions which would affect market's reaction to the companies with low quality disclosures. For instance, CSRC could emphasize more about the importance of non-financial disclosures and put authoritative evaluation of companies' environmental reporting on the noticeable place for investors' information.

China has witnessed a rapid increase in the number of ISO 14001 certifications and it was one of the top ten countries which obtained the most certifications by the end of 2008 (Bai, et al., 2015). This represents that many Chinese companies are actively participating in environmental management, which is very valuable for the current environmental situation in China. A good environmental management system helps one company prepare informative and credible reports

that are to needs of both the company itself and its stakeholders. Since the cost to gain and maintain the system depends largely on the size of the companies, medium and small companies should be able to afford this high-return “investment”.

One company is advised to build effective environmental control systems on both strategic and operational levels, so as to facilitate the whole environmental reporting preparation procedures. If the company intends to maximize the benefit of employing environmental management system, it should also try to develop a corresponding corporate culture and plant the values of environmental protection into company’s daily operating – so that there would be generally agreed guidelines to lead the company taking environmental responsibility.

When assessing the companies’ environmental disclosures, I found that those companies which report the level of their compliance with Global Reporting Initiative guidelines, are often providing the environmental information of high quality. Companies as Air China, Fosun Pharma, Bank of Communications are very good examples to support this finding (See companies’ webpages for more information). Matching the content of environmental reporting with the generally accepted International Standards GRI indexes, companies enjoy many benefits. Firstly, they are provided with detailed guidelines to ensure the quality of their disclosures. Besides, they can be better connected to the overseas market by following the global disclosing trends, and their business activities may be legitimized and accepted by the worldwide organizations and customers. Furthermore, matching with GRI indexes, companies are able to justify the quality of their reporting through intensively focusing on specific items which are actually related to their operations. This not only helps companies to obtain their environmental and social legitimacy, but also makes it easier for investors and regulators to properly evaluate the quality of the companies’ environmental disclosures.

In addition to the lack of the comparison with Global Reporting Initiative indexes, I noticed that most of companies are missing external assurance for their environmental reports. It could be due to the “extra” cost for verification, especially if one company think that releasing this kind of information would not bring it any benefit. However, those companies who have their environmental reports verified by the third-party, tend to have a better performance in disclosing practices. For example, company China Shen Hua, China Ping An, and SPD Bank were among

the companies who scored the highest in the assessment of quality, and all of them had their CSR reports verified. The government should guide and support the development of relevant independent external assurance organizations, and encourage companies to enhance the reliability of their disclosures by taking third-party certification.

This study may be useful for the companies that concern about environmental issues and their public image, and the regulators in China who take action in ensuring the high quality of public corporate environmental information as well as in the overall protection of the environment.

## **5.2 LIMITATIONS AND FUTURE RESEARCH**

This study is subject to some limitations. First, the sample is rather small and limited to listed companies. Due to the difficulty of information collection, the study did not touch on non-listed companies, which might be of high value for overall environmental information disclosure research. The study only included data from one single financial year and analyzed the latest performance of companies, therefore missing the longitudinal comparison, which may give us a good view of the companies' progress.

Second, to control the potential impact of the characteristics of industry, all the sampled companies were divided into two big groups according to their main business. This study used high profile industries and low profile industries to differentiate the companies which are subject to strict regulations from those which do not face mandatory disclosing requirements. However, this research did not further group companies based on more specific individual features and problems, and thus it could not explain the issues related to rather detailed reporting behavior or particular differences among all types of industries.

Third, there could have been better ways to choose the sample companies and to evaluate the quality of the companies' environmental disclosures. This study randomly selected the listed companies from different industries without making more specific rules that may help collect representative targets. In addition, the design of environmental disclosure indexes and corresponding scoring card might be still too simple and not enough detailed indicators were developed to cover all the possible items in the sampled disclosures – this increases the difficulty



of assessing reporting quality and thus the scoring process can be subject to subjective opinions. For example, when scoring the companies' reports, I realized that the category "other information" was far too abstract and missing more detailed definition, and it was very difficult to give score to this index as well because the companies' reports did not all have standard disclosing manners. As the indexes were strictly developed by following the government instructions - Measures on Open Environmental Information, this limitation also reflects that the current Chinese regulations related to environmental reporting are still too general for companies to take as reference.

Future research may try to find a more appropriate method to evaluate the quality of companies' environmental reports. For instance, given the nature of entity's operations, a measurement need to be developed, so that it is able to detect the differences of weighing focuses for wide varieties of companies.

In addition, even though this study is not able to verify the influence of Chairman's education background over the company's environmental reporting practices, I believe that with a better proxy and proper aspect, the top management team such as Chairman and CEO should have their managing power impact on the quality of the company's disclosures. This is an interesting field after all. However, according to my data collecting experience, when studying the influence of the top management, one major problem may be the difficult access to the source such as the characteristics or beliefs of the top management. It can be solved by having interviews or surveys, which, unfortunately require a large amount of time and effort.

Furthermore, companies of medium and small size are often neglected by previous researches, and more attention was given to a Top few percentages of the total (Brammer & Pavelin, 2006; Calace, 2014; Cho, et al., 2010; KPMG, 2013). Large companies have more significant social impact and their corporate information is relatively more transparent. However, future environmental accounting research is advised to bring some evidence on a big number of medium and small companies (even unlisted ones if possible). Take the situation in China as an example: 94.15% of the total companies in China are Medium and small sized companies. All the final goods and service produced by medium and small companies account for around 60% of the total GDP of China (State Administration For Industry & Commerce , 2014). We can see that these non-large companies are a very big and crucial part of our environment protection project, and thus need to

be well regularized and motivated. Relevant environmental studies could be very precious for the benefit of the whole society.

## APPENDIX

<b>Index assessing the quality of discretionary disclosures about environmental policies, performance and inputs</b>
<b>Hard disclosure items</b>
<b>(A1) Governance structure and managements systems (maximum score is 6)</b>
<b>1. Existence of a department for pollution control and/or management positions for env. managements (0-1)</b>
<b>2. Existence of an environmental and/or public issues committee in the board (0-1)</b>
<b>3. Existence of terms and conditions applicable to suppliers and/or customers regarding env. practices (0-1)</b>
<b>4. Stakeholder involvement in setting corporate environmental policies (0-1)</b>
<b>5. Implementation of ISO14001 at the plant and/or firm level (0-1)</b>
<b>6. Executive compensation is linked to environmental performance (0-1)</b>
<b>(A2) Credibility (maximum score is 10)</b>
<b>1. Adopting of GRI sustainability reporting guidelines or provisions of a CERES report (0-1)</b>
<b>2. Independent verification/assurance about environmental information disclosed in the EP report/web (0-1)</b>
<b>3. Periodic independent verifications/audits on environmental performance and/or systems (0-1)</b>
<b>4. Certification of environmental programs by independent agencies (0-1)</b>
<b>5. Product certification with respect to environmental impact (0-1)</b>
<b>6. External environmental performance awards and/or inclusion in a sustainability index (0-1)</b>
<b>7. Stakeholders involvement in the environmental disclosure process (0-1)</b>
<b>8. Participation in voluntary environmental initiatives endorsed by EPA or Department of Energy (0-1)</b>
<b>9. Participation in industry specific associations/initiatives to improve environmental practices (0-1)</b>
<b>10. Participation in other environmental organizations/assoc. to improve, environmental practices (if not awarded under 8 or 9 above) (0-1)</b>
<b>(A3) Environmental performance indicators (EPI) (maximum score is 60)</b>
<b>1. EPI on energy use and/or energy efficiency (0-6)</b>
<b>2. EPI on water use and/or water use efficiency (0-6)</b>
<b>3. EPI on green house gas emissions (0-6)</b>
<b>4. EPI on other air emissions) (0-6)</b>
<b>5. EPI on TRI4 (land, water, air) (0-6)</b>
<b>6. EPI on other discharges, releases and/or spills (not TRI) (0-6)</b>
<b>7. EPI on waste generation and/or management (recycling, re-use, reducing, treatment and disposal) (0-6)</b>
<b>8. EPI on land and resources use, biodiversity and conservation (0-6)</b>
<b>9. EPI on environmental impacts of products and services (0-6)</b>
<b>10. EPI on compliance performance (e.g. exceedances, reportable incidents) (0-6)</b>

<b>(A4) Environmental spending (maximum score is 3)</b>
<b>1. Summary of dollar savings arising from environment initiatives to the company (0-1)</b>
<b>2. Amount spent on technologies, R&amp;D and/or innovations to enhance environ. perf. and/or efficiency (0-1)</b>
<b>3. Amount spent on fines related to environmental issues (0-1)</b>
<b>Soft disclosure items</b>
<b>(A5) Vision and strategy claims (maximum score is 6)</b>
<b>1. CEO statements on environmental performance in letter to shareholders and/or stakeholders (0-1)</b>
<b>2. A statement of corporate environmental policy, values and principles, environ codes of conduct (0-1)</b>
<b>3. A statement about formal management systems regarding environmental risk and performance (0-1)</b>
<b>4. A statement that the firm undertakes periodic reviews and evaluations of its environ. performance (0-1)</b>
<b>5. A statement of measureable goals in terms of future env. performance (if not awarded under A3) (0-1)</b>
<b>6. A statement about specific environmental innovations and/or new technologies (0-1)</b>
<b>(A6) Environmental profile (maximum score is 4)</b>
<b>1. A statement about the firms' compliance (or lack thereof ) with specific environmental standards (0-1)</b>
<b>2. An overview of environmental impact of the industry (0-1)</b>
<b>3. An overview of how the business operations and/or products and services impact the environment (0-1)</b>
<b>4. An overview of corporate environmental performance relative to industry peers (0-1)</b>
<b>(A7) Environmental initiatives (maximum score is 6)</b>
<b>1. A substantive description of employee training in environmental management and operations (0-1)</b>
<b>2. Existence of response plans in case of environmental accidents (0-1)</b>
<b>3. Internal environmental awards (0-1)</b>
<b>4. Internal environmental audits (0-1)</b>
<b>5. Internal certification of environmental programs (0-1)</b>
<b>6. Community involvement and/or donations related to environ. (if not awarded under A1,4 or A2,7) (0-1)</b>

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