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Corporate Environmental Transparency in China

A thesis

submitted in fulfilment

of the requirements for the degree

of

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at

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by

Wei Cai



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DEDICATION

To My Dear Wife,

Fengnan Wang

To My Dear Parents,

Zhijun Zhang, Fengli Cai, Lijun Feng

Thank You for Your Love, Sacrifice, and Support

ABSTRACT

The intensification of the environmental crisis has led stakeholders to pay increasing attention to corporate environmental transparency (CET). One obvious manifestation of this interest is that they require companies to present openness and disclose various information related to the environment. As an influential stakeholder group, policy-makers have also attached greater significance to the adoption of environmental policies based on information disclosure. For example, the International Sustainability Standards Board (ISSB), whose objective is to develop global sustainability disclosure standards, was established at the 2021 United Nations Climate Change Conference (COP26). In policy-making practice, transparency is often advocated as a prerequisite for legitimacy, policy efficiency, and good governance.

The direction of accounting research is often inextricably linked to changes in the field of practice. In recent years, the concept of transparency has attracted extensive attention among accounting scholars. However, current research tends to use corporate environmental disclosure as a measure of corporate transparency. In the context of the general absence of environmental disclosure regulation, and therefore of standardised (and comparable) disclosures, this trend is highly controversial. Some scholars have critically commented that in addition to corporate environmental disclosure, there are other channels, such as government websites, media news report, etc., through which to make corporate environmental information transparent to the public.

As the country with the world's highest share of carbon emissions, China is determined to accelerate various reform measures to achieve the carbon neutrality it has committed to reaching by 2060. Since 2017, China has implemented a mandatory environmental disclosure policy to promote the environmental transparency of listed companies and in so doing provides a promising policy environment and comparable standards for conducting CET research. Therefore, as a response to the academic call for more studies on the complex concept of transparency in the environmental accounting field, this thesis focuses particularly on the concept of CET and its related practices in the Chinese context.

The objective of this thesis is to develop a measure of CET and to apply that measure to assess both the environmental transparency of listed companies in China and the impact environmental transparency has on corporate financial performance. Furthermore, the thesis also aims to gain an in-depth understanding of the internal and external driving forces behind CET. To achieve this goal, the thesis set five specific research objectives and asked five research questions. Meeting these objectives and answering these questions involved both finding empirical results (such as correlations) and searching for explanations to gain a deeper understanding of causal mechanisms.

Driven by its research objectives and questions, this thesis follows a pragmatism philosophical stance. This paradigm can reconcile the contradiction between research objectives which stems from the long-standing subjective and objective debate between positivism and constructivism. In addition, pragmatism is regarded as providing philosophical and theoretical elements of mixed methods research design that lend mixed research argumentative coherence and validity. Therefore, a mixed research design is chosen for this thesis because the application of both quantitative and qualitative research methods contributes to a more comprehensive and in-depth understanding of the subject (i.e., CET) of the thesis.

Guided by the mixed methods research design, this thesis consists of quantitative and qualitative investigations. There are two main findings in the quantitative investigation. First, the environmental transparency of Chinese listed companies does not meet the expectations of policy-makers. This finding is based on the assessment of CET in the Chinese context. Specifically, the mandatory environmental disclosure policy is not well followed; listed companies are suspected of concealing information about significant environmental administrative penalties, and there is a strong sense of mistrust among stakeholder groups towards corporate environmental disclosure, etc. Second, a significant negative correlation between CET and corporate financial performance was obtained through regression analysis on the sample companies. That finding shows that in the short term greater environmental transparency means higher environmental resource allocation, which in turn affects resource inputs in the production process and consequently has a negative impact on profits.

In addition, the qualitative investigation identifies the internal and external driving factors behind CET in the Chinese context. First, the internal driving forces are accountability and impression management. The interviewees suggest that, while society's awareness of corporate environmental accountability is the starting point of CET-related practices, an underlying motivation for these practices is impression management. It is worth mentioning that whether or not the board of directors is an internal driving force behind CET is still controversial. Second, the external driving forces are regulation and stakeholder pressure. The interviewees generally agree that it is the government and its regulatory policies that have an overwhelming influence on CET in the Chinese context. In addition, stakeholder groups, such as investors, the public, third parties, and industrial competitors, are thought to exert varying degrees of pressure to have CET in China.

The findings of this thesis have rich theoretical and practical implications. In terms of theoretical implications, this thesis not only supports and develops legitimacy and signalling theories in the environmental disclosure field, but also expands the application scope of stakeholder theory. In addition, the thesis indicates that government intervention theory may have strong explanatory power in the Chinese context. In terms of practical implications, several recommendations are made to environmental policy-makers. For example, legal requirements for mandatory environmental disclosure should be considered; environmental disclosure items need to be improved; reward and penalty mechanisms need to be established; environmental assurance standards need to be developed; and, green financial policies need to be optimised.

The findings of this thesis also contribute to existing knowledge. First, the thesis contributes new evidence to the argument that corporate environmental disclosure does not fully represent transparency. Second, the thesis establishes a conceptual framework for CET and contributes a measure of CET and so responds to the calls for more work that reviews existing research on transparency and which explores its measure and significance. Third, the thesis extends the existing studies on CET in emerging economies. Finally, the empirical finding in this thesis expands the previous literature on the relationship between CET and corporate financial performance, thus making an important contribution to knowledge.

This thesis sheds light on future research potential. In light of the exploratory nature of its qualitative investigation, there are still several unknown issues that require further academic attention, such as how much explanatory power the impression management perspective has on the CET, whether and to what extent the board of directors influences CET, and, how exactly peer pressure affects CET, etc. In addition, another promising direction would be to explore what consequences CET can have for companies over a long period of time, as the green transformation often takes a relatively long time to achieve. Future research on the long-term impact of CET will help to understand the true mechanisms of CET's effect on companies.

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When I wrote these passages, my eyes were full of tears. In a wink, various scenarios of the past 4 years emerged in front of my eyes, which contained too many pictures and emotions. I couldn't describe exactly how I feel at the moment. For an ordinary person, 4 years may be too long, because it is long enough to complete so many things that one needs to carefully recall what one has done. However, 4 years may be too short, because it may not be enough for one to accomplish a thing perfectly. I am very fortunate that I have now experienced both feelings in my known life.

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LIST OF ABBREVIATIONS

CET	Corporate Environmental Transparency
ISSB	International Sustainability Standards Board
COP26	2021 United Nations Climate Change Conference
COVID-19	Coronavirus Disease 2019
KPEs	Key Pollutant-discharging Entities
CSRC	China Securities Regulatory Commission
CCRs	Command and Control Regulations
MBIs	Market-Based Instruments
IBAs	Information-based Approaches
MEE	Ministry of Ecology and Environment
SZSE	Shenzhen Stock Exchange
SSE	Shanghai Stock Exchange
EIA	Environmental Impact Assessment
PDP	Pollutants Discharge Permit
EPS	Environmental Policy Stringency
EDI	Environmental Disclosure Index
SEAPI	Significant Environmental Administrative Penalty Index
ENHI	Environment News Headline Index
BNAI	Beijing National Accounting Institute
ROA	Return On Assets
MV	Market Value
MBR	Market-to-book Ratio
MKRET	Market Return
SME	Small and Medium Enterprises Board
ChiNex	Growth Enterprises Market Board
ROE	Return on Equity

Chapter 1

Research Overview

“transparency will help stakeholders make better decisions, and it will increase confidence in the fairness of the markets. Simply put, it’s in everybody’s interests”.

— Levitt (1998)

1.1 Introduction

The concept of ‘transparency’ has attracted the attention of the accounting world in recent years (Bushman et al., 2004; Bushman & Smith, 2003; Davey, 1985; Gray & Kang, 2015). In policy-making practice, transparency is often advocated as a prerequisite for legitimacy, policy efficiency, and good governance (Davey & Coombes, 1996; Forssbaeck & Oxelheim, 2014). In the meantime, the environmental crisis has triggered an increased interest across many countries in environmental regulatory reform of transparency via information disclosure (Bowen et al., 2020; Davey et al., 1995). Among these countries, China deserves to be carefully observed, not only because China is the so-called world factory, accounting for nearly a third of global carbon emissions (Union of Concerned Scientists, 2020), but also because China has pledged to reach carbon neutrality by 2060, which is apparently a very bold commitment given its current situation (Normile, 2020).

Increased transparency is an ideal which has a bearing on China’s environmental regulatory reform in many areas. For example, environmental authorities at all levels are required to release environmental information, including environmental laws and regulations, environmental management and supervision, and, environmental violations and penalties to the public within their jurisdictions (Ahmad et al., 2019). A-share listed companies that are on the list of key pollutant-discharging entities (KPEs) managed by environmental authorities are mandated to

disclose 12 environmental items in their annual report; these include pollutant discharge information, pollution prevention information, and environmental compliance information, etc. (CSRC, 2017).

In parallel with these developments, as noted by Forssbaeck and Oxelheim (2014), the concept of transparency has emerged in academic research across a wide range of social science disciplines. The increased importance of transparency has called for more studies that review existing research on transparency and explore its meaning and significance in different areas. In response, this thesis specifically focuses on the corporate environmental transparency (CET) in China and its economic impact on A-share listed companies.

By looking at certain dimensions of CET (i.e., perceived disclosure, accountability, and information quality), the thesis contributes to the literature on a comprehensive measure of CET. It constructs a CET index by examining corporate environmental disclosures and information disclosed by governments and media. This thesis adopts the CET index rather than any of the environmental disclosure indices commonly used in existing studies to test the relationship with corporate financial performance. The study's empirical results show that there is a negative relationship between CET and corporate financial performance. In addition, the influencing powers of the driving forces behind CET and implications for improvements of CET in China are discussed based on interviews.

The rest of the chapter is structured as follows. Section 1.2 provides the setting for the research problem in this thesis. Section 1.3 reveals research opportunities on CET through a brief review of the extant environmental policy studies in China. Section 1.4 states the research problem and gap. Section 1.5 describes the research objectives and questions. Section 1.6 introduces the research methodology and methods. Section 1.7 indicates the scope and limitations of this thesis. Last, the structure of the thesis is presented in section 1.8.

1.2 Background

Historically, the focus on transparency from accounting researchers and policy-makers is not new. Dating back to as early as the 18th century in England, the South Sea Bubble (1719-1720) is commonly regarded as the trigger for the world's first independent audit from which the British government started to explore the establishment of a transparent modern-enterprise system (Paul, 2011). Harris (2000) showed how the business evolved and how English law finally took account of these developments between the passage of the Bubble Act in 1720 and the sweeping reforms of the General Incorporation Act of 1844.

During the 1930s, the world suffered a severe economic recession, known as the Great Depression, that originated in the United States. Many companies fell into a state of insolvency and went bankrupt (Brunner, 2012). Lack of transparency and loose accounting practices were believed to have played a major role in the collapse of the capital market in the United States (Zeff, 2003). Policy-makers were then driven to raise corporate transparency to a new level. Two major pieces of reform legislation were signed into law: the Securities Act of 1933 and the Securities Exchange Act of 1934, the second of which created the Securities and Exchange Commission (SEC). These Acts required that all listed companies must register with the SEC and publish their financial statements through it (Benston, 1969). The financial statements had to be prepared in accordance with generally accepted accounting principles and audited by Certified Public Accountants (Keller, 1988). Decades later, Levitt (1998) publicly indicated that transparency is a core concept when the SEC issued a statement regarding high-quality international accounting standards.

Although the 18th to 20th centuries highlight increasing corporate transparency, more recent experience, including but not limited to the Enron Scandal in 2001, the WorldCom scandal in 2002, and the financial crisis of 2007-2008, also reminds us of the importance of transparency. Several major corporate and accounting scandals including Enron and WorldCom spurred on the implementation of the Sarbanes–Oxley Act of 2002, also known as the Public Company Accounting Reform and Investor Protection Act or Corporate and Auditing Accountability, Responsibility, and Transparency Act, which sought to both improve the transparency of public

companies' financial reporting as well as regulate internal control and business practices (Romano, 2004). Similarly, in the wake of the financial crisis in 2008, the International Accounting Standards Board accelerated the mandatory institutional change of international standards for financial instruments. These however are often considered less transparent due to their complexity (Bengtsson, 2011). These experiences reveal not only the disasters that lack of transparency can cause, but the direction of policy-making when we confront new crises.

Since the second decade of the 21st century, extreme weather events and public health events have occurred more frequently than ever before (Bell & Masys, 2020). The National Oceanic and Atmospheric Administration (NOAA) (2019) officially announced that in the span of 141 years of climate records there has never been a warmer decade than the last decade. Furthermore, according to their report, January 2020 was Earth's hottest January on record (NOAA, 2020). In the meantime, there have been five Public Health Emergency of International Concern declarations by the World Health Organisation since 2010, including the latest COVID-19 pandemic (World Health Organization Europe, 2020). According to Wu et al. (2016), changes in climate variables and extreme weather events will affect the development, survival, reproduction, and liveability of disease pathogens, hosts, and their interaction with human beings.

Though we have been witnessing how COVID-19 put the global economy into a recession, radical economic uncertainty such as this might recur if we cannot learn a lesson from it (Chudik et al., 2020). A growing number of economists agree that environmental crisis will be a major cause of future economic uncertainty (Balint et al., 2017; Balsalobre-Lorente et al., 2018; Friedman, 2006; Harris & Roach, 2016; Mäler & Fisher, 2005; Omri et al., 2015; Tiba & Omri, 2017; Tietenberg & Lewis, 2014; Zhang et al., 2017). The World Economic Forum (2020) recently released its global risks report 2020. For the first time in the survey's 10-year outlook, the top five global risks in terms of likelihood are all environmental, namely extreme weather events (e.g., floods, storms, etc.); failure of climate change mitigation and adaptation; major natural disasters (e.g., earthquake, tsunami, volcanic eruption, geomagnetic storms); major biodiversity loss and ecosystem collapse; and, human-made environmental damage and disasters.

The outbreak of COVID-19 as a global health emergency and the resulting socioeconomic crisis have shown the importance of showing responsible, responsive attitudes in countries with large populations (Greer et al., 2020). Similarly, in the face of the potential environmental crisis, some countries can play key roles in tackling the crisis because of factors such as their size, population, consumption capacity, and level of economic development. Among major countries, China is the world's largest emitter of carbon dioxide, being responsible for around 28% of global emissions (Union of Concerned Scientists, 2020). In late September 2020, China set its first long-term climate goal and promised to become carbon neutral before 2060 (The UN General Assembly, 2020). The ambitious pledge came as a surprise to the academic community and the general public, even in China, who were not expecting such a bold target (Normile, 2020). Meeting it will require China to rein in CO₂ and probably other greenhouse-gas emissions to net zero, which means that an enormous amount of effort needs to be made from both a policy-making and technical perspective.

So far, there have been some interesting findings on air quality improvement and global warming. If China achieves the macro control of pollution emissions, the global air deterioration can reduce effectively (Hu et al., 2017). Shahbaz et al. (2015) showed that coal consumption adds to China's CO₂ emissions significantly. If the country's existing energy consumption structure remains, China's temperature contribution to global warming will rise to 21.76% by 2050, given the 2-degree target (Duan, 2017). Encouragingly however China's recent green initiatives, such as dismantling coal-fired power plants, reducing overall emission levels, and cutting particulate-matter emission rates are starting to yield results. There are now fewer smog days in China's largest cities (Song, 2018). After years of heavy industrialisation, China's environmental challenges are nearing a tipping point (Qiang et al., 2011). In a bid to tackle these challenges, China's government has declared a 'war on pollution'. Winning this war means taking all possible measures, including making various environmental policies that make environmental information more transparent to the public (Greenstone & Schwarz, 2018).

1.3 Literature Review

Studies on China's environmental policies are not new to the literature. Research on these has been conducted mainly at two different levels: the country level and the company level. From the perspective of country-level research, environmental policies formulated by authorities can be divided into three categories: command and control regulations (CCRs); market-based instruments (MBIs); and, information-based approaches (IBAs) (Downing & White, 1986; Kotchen, 2013; López-Gamero et al., 2010; Magat, 1979; Milliman & Prince, 1989; Testa et al., 2011; Tietenberg, 1998; Walley & Whitehead, 1994; Williams, 2012).

In recent years, China has accelerated the adoption of MBIs and IBAs. Companies that discharge taxable pollutants directly into the environment within the territorial areas of China have been forced to pay environmental protection tax since 1st January 2018 (The National People's Congress, 2016). KPEs listed companies managed by environmental authorities have been asked to disclose environmental-related information in their annual report since 2017 (CSRC, 2017). In addition to the requirements for companies, environmental authorities at all levels are required to release environmental information to the public within their jurisdictions, including environmental laws and regulations; environmental management and supervision; and, environmental violations and penalties (Ahmad et al., 2019).

Several well-cited papers examine China's nationwide environmental information disclosure programmes including L. Zhang et al. (2016), Sun et al. (2019) Ahmad et al. (2019), Pan et al. (2019), and Yew and Zhu (2019). L. Zhang et al. (2016) suggested that the diversification in the methods of transparency and disclosure has significantly changed environmental governance in China. Sun et al. (2019) empirically examined how government environmental disclosure shapes corporate environmentalism in the context of China. They argued that the information transparency of environmental disclosure can promote corporate environmentalism. Ahmad et al. (2019) presented evidence to support the Porter hypothesis in China that stricter environmental disclosure leads to increased firm profitability and innovation intensity. Pan et al. (2019) went further to point out that the changes in technological innovation are affected by MBIs and IBAs, whereas CCRs have no obvious impact on technological innovation in China.

Although studies have been positive about China's state-guided environmental information disclosure policy, there are concerns about its transparency. For instance, the doubt raised by Yew and Zhu (2019) indicated that studying environmental innovation under certain political regimes like that of China should be distinguished from study in democratic contexts where environmental innovation is a product of pluralistic interactions among state and nonstate actors. Guo et al. (2021) found that countries with low levels of civil liberties (typically developing countries) have less transparency in social and environmental information. In general, country-level studies tend to focus on the role of environmental policies in promoting environmental governance and innovation. In the absence of a clear measure of transparency, the study of CET is an area which therefore still needs to be developed.

From the perspective of company-level research, the most discussed topic is the links between corporate environmental disclosure, environmental performance, and financial performance—see D. Li, Y. Zhao, et al. (2017), He et al. (2019) and Y. Yang et al. (2020). According to D. Li, Y. Zhao, et al. (2017), Chinese firms have few motivations to disclose environmental information or improve environmental performance due to weak financial performance correlation; therefore, mandatory disclosure of environmental information is necessary, and proper environmental policy should be made to punish environmental violations and encourage better environmental performance. He et al. (2019) claim that the increases in environmental costs and decreases in financial performance are associated with a company's environmental disclosure. Y. Yang et al. (2020) found that corporate environmental disclosure significantly affects the firm value in eastern and western China but has little impact on central China.

However, in addition to disclosure in corporate reports, there are other channels available for making corporate environmental information transparent to the public, e.g., government websites, news media, etc. (Guo et al., 2021). Given administrative penalties or news media coverage about companies is predominantly negative (Vogler & Eisenegger, 2021), such information can play a greater role in testing the quality of environmental information disclosed by a company and whether the company is transparent enough. Although most of the existing research

findings are based on corporate environmental disclosure, an important premise of studying corporate environmental disclosure is the quality of environmental information (Deegan & Rankin, 1997). The quality of information contributes to our understanding of transparency (Schnackenberg & Tomlinson, 2016). Therefore, it is necessary to build on existing company-level research and further explore CET, including, but not limited to, its components, measures, determinants, and consequences.

1.4 Problem Statement

Stakeholder concerns about corporate transparency have led to greater social awareness and pressure for companies to embody openness and disclose relevant information about their operations (Davey, 1985). This trend extends to the environmental field as the environmental crisis intensifies (Davey & Coombes, 1996). In the existing studies, there is some debate on whether corporate environmental disclosure can be considered transparency (Dando & Swift, 2003; Moneva et al., 2006). Davey and Coombes (1996), Roberts (2009), Forssbaeck and Oxelheim (2014), Coslor (2016), Gold and Heikkurinen (2018) and other scholars also call for more reviewing of existing transparency studies to explore its significance and importance in the environmental accounting field.

However, academics are often constrained by the difficulty of conducting effective study on standardised (i.e., comparable) disclosure due to the lack of environmental disclosure regulations (Davey et al., 1995). Unexpectedly, China has implemented a mandatory environmental disclosure policy for listed companies since 2017. While this may be a small-scale attempt in response to environmental pressures, it provides researchers with an opportunity to comprehensively study and understand CET. Therefore, this thesis takes this opportunity to deepen the comprehensive understanding of CET in the Chinese context.

1.5 Research Objective and Questions

The purpose of this thesis is to develop a measure of CET and apply it not only to assess the environmental transparency of Chinese listed companies, but also to investigate how CET affects corporate financial performance. In addition, particular

attention will be paid to the driving forces behind the CET of Chinese listed companies from the perspective of stakeholders. To achieve the research purpose, the thesis sets the following five specific objectives. To:

- Build a conceptual framework of CET and apply it in constructing a weighted comprehensive CET model.
- Develop a CET index for Chinese listed companies via the CET model and the results of content analysis and a stakeholder survey.
- Test the relationship between CET and corporate financial performance in the Chinese context.
- Gather stakeholders' perceptions of factors affecting (improving and reducing) CET in the Chinese context.
- Make recommendations for environmental policy-makers.

In order to achieve these research objectives, this research will answer the following research questions:

- What should a CET conceptual framework be?
- How environmentally transparent are listed companies?
- What is the relationship between CET and corporate financial performance?
- What are the driving forces behind CET from the perspective of stakeholders?
- What are the implications for environmental policy-makers?

1.6 Research Methodology and Methods

1.6.1 Research methodology

Positivism, constructivism, and pragmatism are common research paradigms in accounting research (Brierley, 2017; Riley, 2007; Schwandt, 1998). Among them, positivism and constructivism are often viewed as opposite to and incompatible with each other in terms of ontological, epistemological, axiological, and methodological assumptions, a conflict which leads to the so-called subjective-objective debate (An & Davey, 2011; Sun & Davey, 2021). However, pragmatism researchers focus on “what works” rather than on reality and the nature of

knowledge. They often mix both qualitative and quantitative approaches in a single study not only to provide the best understanding of a research problem, but also to best produce the desirable outcomes (Baker & Schaltegger, 2015). Pragmatism therefore offers a way to reconcile the subjective-objective debate (Liu & Davey, 2014).

The methodological choices which a research adopts should be driven by, and appropriate to, the research objective and questions (Gill & Johnson, 2010). As can be seen from the research objectives and questions, this thesis searches not only for empirical outcomes (e.g., correlations), but also for explanations that can provide in-depth understanding of causal mechanisms. From this perspective, it is appropriate for this thesis to adopt a pragmatic stance. Pragmatism is regarded as providing philosophical and theoretical elements of mixed methods investigation design which lend mixed research argumentative coherence and validity (Morgan, 2014). Therefore, inspired by the philosophical stance of pragmatism, a mixed methods research design which combines both quantitative and qualitative research methods was selected to study CET in China in this thesis.

1.6.2 Research methods

Johnson and Onwuegbuzie (2004) suggested that an important feature of mixed method research design is its diversity and eclecticism, which often lead to richer findings compared to single-method research. In the area of the social sciences, it is possible to collect quantitative and qualitative data separately using different methods and then integrate the findings (Onwuegbuzie et al., 2009). The mixed research methods design for this thesis therefore comprised two parts: quantitative investigation and qualitative investigation.

The quantitative part aimed to fulfil the second and third research objectives, while helping to achieve the last one. Three specific methods, namely content analysis, questionnaire survey, and statistical analysis, were adopted in this research to collect, process, and analyse quantitative data. The content analysis was first divided into three phases. Each phase analysed one of the following: corporate data, government data, and media data. Second, a total of 133 valid responses were collected from a questionnaire survey, providing valuable information on the

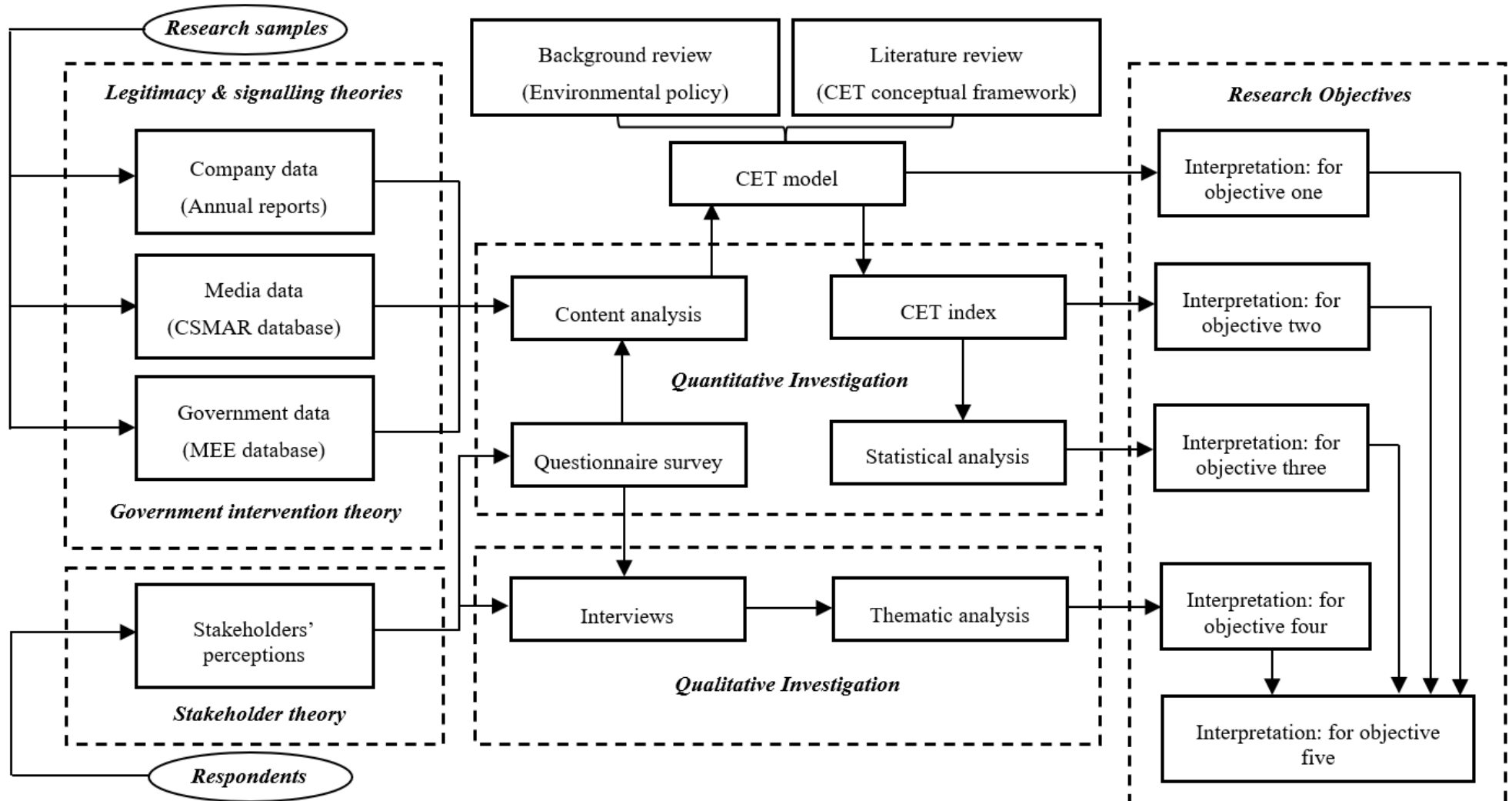
development of a CET index from the perspective of stakeholders. Last, the research sample for statistical analysis included information on 148 A-share listed companies for a 2-year period, resulting in a total of 296 observations. Corporate information and financial data for the sample companies were obtained from the CSMAR¹ database.

The qualitative part was intended to meet the fourth research objective, while attempting to seek in-depth explanations which are contextually related to the findings indicated by the quantitative investigation. Two specific methods, namely interviews and thematic analysis, were applied to collect qualitative data on stakeholders' perceptions and to examine themes or patterns of meaning within the qualitative data. The target group for interviews were the participants of a high-end training programme at the Beijing National Accounting Institute. Twenty-nine out of the 195 target population expressed an initial willingness to be interviewed. The 29 potential interviewees came from six different industries. To ensure the diversity of the interviewees and increase the efficiency of the interview process, two senior executives in different positions were selected from six different industries. These individuals made up the final 12 interviewees and they are broadly representative of Chinese companies.

Considering the lack of comprehensive research on CET in the Chinese context, a combination of qualitative and quantitative approaches was able to provide more rigour for this thesis. Both qualitative and quantitative data were collected and analysed to achieve the five specific research objectives shown in Figure 1.1.

¹ CSMAR, short for the China Stock Market & Accounting Research Database, is a comprehensive research-oriented database focusing on China's finance and economy. The CSMAR database covers 18 series, including stocks, financials, news, etc. and contains 150 subdatabases.

Figure 1.1 Mixed methods research design



To ensure that the five specific research objectives of this thesis could be achieved, the corresponding research methods were designed:

- To critically examine the existing literature for constructing a weighted comprehensive CET model for Chinese listed companies.
- To conduct content analysis and a questionnaire survey for developing a CET index for Chinese listed companies.
- To apply statistical analysis on testing the relationship between CET and corporate financial performance in China.
- To conduct interviews with stakeholders and carry out thematic analysis on their perceptions of driving forces behind CET in China.
- To compare and combine the findings from quantitative and qualitative investigations to make recommendations for policy-makers.

Overall, the mixed methods research design was considered to be appropriate in this thesis since it enabled the researcher to gain more comprehensive understanding of the research problem by comparing and combining the results from qualitative and quantitative investigations.

1.7 Scope and Limitations

1.7.1 Scope

As CET is a complex phenomenon that has not yet been adequately researched, it would be unrealistic to cover all aspects of CET through a single monograph. Therefore, to foster a better understanding of this phenomenon, this thesis focuses in the main on the following areas:

- The scope of the CET concept.
- Environmental disclosure practices of Chinese listed companies over the 2 years from 2017 to 2018.
- Significant environmental administrative penalties imposed on Chinese listed companies by environmental authorities over the 2 years from 2017 to 2018.

- Environment news headlines related to 148 Chinese listed companies over the 2 years from 2017 to 2018.
- Perceptions of environmental information from different channels provided by 133 information users.
- Environmental transparency of 148 Chinese listed companies over 2 years from 2017 to 2018.
- Perceptions of factors affecting (improving and reducing) CET in Chinese listed companies obtained from 12 interviewees.

In addition, it is worth noting that the age of the respondents involved in this thesis ranged from 20 to 69. The gender ratio is nearly 1:1. Sixty per cent of respondents have a master's degree or above; 36% are working for state-owned enterprises, while 32% are from private enterprises. Government employees account for 23%. Seventy-seven per cent of respondents have an income which is higher than China's per capita disposable income, as reported by China's statistics authorities in 2018 (National Bureau of Statistics, 2019). Chen et al. (2004) suggested that the impact of demographics such as income and the type of employment on the stakeholders' perceptions is strong in China. Overall, the respondents of this thesis are considered to be representative in the Chinese context at this stage.

1.7.2 Limitations

A few areas should be noted which might constrain the findings of this thesis. First, as the questionnaire survey and interview respondents in this thesis are mainly senior financial executives of their organisations, there may be some group bias. The findings therefore reflect the espoused perceptions and beliefs of this group. To minimise the impact of the potential bias on the results, the researcher set very strict stakeholder selection criteria, which are detailed in section 5.3.3.2 of chapter 5. Second, the research is limited to A-share listed companies and might not be generalisable to the extensive small and medium-size companies in China. Last, the empirical results of this thesis should be interpreted with caution as there are some differences between China's financial market and western countries' financial markets.

1.8 Thesis Outline

The thesis is presented in nine chapters as follows:

Chapter One: Research Overview

This chapter offers an overview of the thesis. It includes a summary of the research's topic, background, literature review, objectives and questions, methodology and methods, scope and limitations, and thesis outline.

Chapter Two: Research Background

This chapter provides a setting for studying CET in China. It begins with an introduction to the environmental situation in China and then proceeds to a review of the origin of environmental policy-making. In addition, this chapter categorizes the development of China's environmental policy into three stages and discusses the measure of success of China's environmental policy compared with that of other countries.

Chapter Three: Theoretical Foundation for CET

This chapter constructs a theoretical foundation for CET in China by combining four theories (i.e., government intervention theory, stakeholder theory, legitimacy, and signalling theories). From this theoretical combining, a theory triangulation is formed for explaining CET in China and demonstrating the interconnections between the theories.

Chapter Four: Literature Review and the CET Model

This chapter provides a systematic review of the extant literature on the definition, components, and research tools of CET. It constructs a conceptual framework that reflects CET as a system. Several important knowledge gaps in CET literature are revealed and research motivations for chapters 6 to 8 are proposed. In addition, based on the existing literature, this chapter develops a CET model applicable to Chinese listed companies.

Chapter Five: Research Methodology and Methods

This chapter first introduces the mainstream research paradigms in accounting and, on the basis of a review of research purposes, indicates why this thesis selected the pragmatism paradigm as its philosophical stance. The chapter continues by discussing the study's two-part mixed method research design: quantitative investigation and qualitative investigation. Specific strategies for sample selection, data collection, and data analysis are also justified in each of these two parts.

Chapter Six: Results and the Development of the CET Index

This chapter shows the results of the content analysis and stakeholder questionnaire survey. On the basis of the results and findings as well as the CET model proposed in chapter 4, the CET index of Chinese listed companies is developed at the end of the chapter.

Chapter Seven: CET and Corporate Financial Performance

This chapter develops two hypotheses regarding the relationship between CET and corporate financial performance based on the theoretical foundations of CET. Various statistical tools (i.e., descriptive statistics, correlation test, regression analysis, and robustness test) are used to conduct the hypothesis testing. The chapter also provides interpretation and discussion of the empirical results.

Chapter Eight: Stakeholder Interview

This chapter presents the results of the thematic analysis on the stakeholder interviews. The interview topic centred on the potential influencing power behind CET in China. Seven themes arising from the semistructured interviews are discussed in detail. The results provide additional evidence on the driving forces for CET resulting from both the internal and external contexts of the corporate operations.

Chapter Nine: Research Conclusion

This chapter reviews the thesis and presents the results of the qualitative and quantitative investigations respectively. The chapter also reveals the research implications and states the thesis' main contributions to the current literature. Additionally, future research potential is shown at the end of this chapter.

Chapter 2

Research Background

2.1 Introduction

As a result of its continuous economic growth and increasing energy consumption China has since the late 1970s faced the severe challenge of environmental pollution (Carter & Mol, 2013). In response, a series of environmental policies have been implemented alongside its economic reforms. As with China's economic reforms, this pattern is also led by the Chinese government, with an emphasis on policy-making and regulatory measures (Lo, 2015). However, these also raise issues such as the lack of transparency (Gupta & Mason, 2014; L. Zhang et al., 2016).

To understand the setting of the topic, a review of the development of China's environmental policy is necessary (Kitagawa, 2017; Sternfeld, 2017). In this chapter, the environmental situation in China and the origin of environmental policy-making are introduced to help readers understand how China's environmental policy has evolved. In addition, the cross-country comparisons show that despite being a late starter China has made some important progress in environmental policy. The chapter is structured as follows.

Section 2.2 describes China's environmental situation. Next, section 2.3 reviews the origin of environmental policy-making. Section 2.4 categorises the development of China's environmental policy into three stages, each with a different focus, while section 2.5 uses an index to measure the success of China's environmental policy compared to the policies of other countries. Finally, section 2.6 summarises the chapter.

2.2 The Environmental Situation in China

Every aspect of Chinese society has undergone huge changes over the past four decades since China's reform and opening up in 1978. Among them, the most outstanding achievement in economic development has been hailed by the world as the 'growth miracle' (Cai, 2018). However, rapid economic growth, industrialisation, and urbanisation have brought great environmental pressure to China since that reform and opening up. China's environmental problems erupted in an all-round way (Lu et al., 2019).

Statistics from environmental authorities show that point source pollution appeared in the 1970s, and urban river and air pollution became serious in the 1980s (MEEPRC, 2016). In particular, the serious pollution accident in the Huai River in 1994 and the floods in the Yangtze, Songhua, and Nen rivers in 1998 have sounded the alarm at the overall deterioration of the ecological environment. From 1999 onwards when China entered the heavy chemical industry era, the discharge of industrial waste gas, waste water, and solid waste began to grow rapidly. The country's average annual growth rate was 22%, 8.5%, and 17% respectively. At the same time, the volume of municipal solid waste has been growing at an annual rate of 9.7%.

Table 2.1 *Environmental pollution and economic losses*

Year	Number of environmental pollution and damage accidents	Direct economic losses from pollution and damage accidents (thousand yuan)
2001	1,842	122,724
2002	1,921	46,409
2003	1,843	33,749
2004	1,441	363,657
2005	1,406	105,150
2006	842	134,711

Data extracted on 20 Aug 2020 14:03 UTC (GMT) from National Environmental Statistics Bulletin

Note. Retrieved from <http://www.sepa.gov.cn/plan/zk gb/06hjzkgb/>

Serious ecological and environmental problems caused huge economic losses to the country and people's health was greatly endangered. The economic costs of China's environmental pollution (excluding ecological degradation and associated losses) since the 1980s have been roughly 3-8% of its gross domestic product (GDP) (Lu et al., 2019). According to the China Green GDP Report compiled by environmental authorities and statistics authorities, the overall costs of environmental degradation in 2004, namely the annual economic losses caused by environmental pollution, were as high as 511.8 billion yuan, accounting for 3.05% of China's GDP that year. From 2003 to 2010, the cost of environmental pollution in China accounted for about 8%-10% of its GDP (Wang et al., 2014). In 2013, the medical expenditure per capita in China increased by 15.85 times compared to the figure in 1990, while the real income per capita grew by only 6.49 times. Medical expenses related to the environmental pollution have become a serious social burden (Fan et al., 2016).

In the second decade of the 21st century, air pollution became the most representative pollution problem in China when its urbanisation process had developed to a new stage (W. Wang et al., 2019). Traffic, industrial activities, biomass burning, and rapid population growth in urban areas all accelerate particulate matter pollution, which rapidly reduces the air quality of cities (Chirizzi et al., 2017; Karagulian et al., 2015). Particulate matter-driven haze became a common air pollution phenomenon in many urban areas of China (Liu et al., 2018). The concentration of particulate matter far exceeds the national air quality standard of China (Wang et al., 2014). In 2018, only 29.3% (99 of the 338) cities in China met the environmental air quality standards (MEEPRC, 2018). Existing studies have shown that industrial activities contribute the most to China's air pollution (Jiang et al., 2018; Liu & Liu, 2018; Zhao et al., 2019). One recent piece of evidence is that China's air pollution has declined significantly as industrial production has ground to a halt due to the lockdown caused by COVID-19 (Bao & Zhang, 2020).

All the figures in this section show that China is facing unprecedented challenges in protecting its environment and natural resources. By and large, concerns about continued environmental degradation and threats to public health have accelerated a consensus in China from the government to the media and individuals that there

is a need to address environmental issues at the earliest opportunity (Ren & Liu, 2020).

2.3 The Origin of Environmental Policy-Making

The environmental policies in place today across the globe have been arrived at through a process of evolution, adoption, and adaptation (Richard, 2020). They have evolved over time, including how their scope has broadened from looking at primarily industrial pollution to addressing a host of other environmental problems such as climate change, biodiversity loss, and human-made environmental damage and disasters, etc. (Isenberg, 2014). Accordingly, the measures that have been adopted by governments to tackle environmental problems have changed from mainly command-and-control measures to a mix of policy instruments that include market interventions and information transparency initiatives (Nicita, 2019; OECD, 2003, 2007; Richard, 2020; Roberts, 2011).

2.3.1 The definition of environmental policy

Different definitions of environmental policy have been offered in recent decades. Some of these focuses only on actions and see government as the only actor capable of making policy, for example,

“any actions deliberately taken or not taken by government that are aimed at managing human activities with a view to preventing harmful effects on nature and natural resources, and ensuring that man-made changes to the environment do not have harmful effects on humans.”
(McCormick, 2001).

Richard (2006) defined environmental policy as “all government actions that alter natural environmental conditions and processes, for whatever purpose and under whatever label”. Roberts (2011) offered a better and more comprehensive definition i.e., “a set of principles and intentions used to guide decision-making about human management of environmental capital and environmental services”. Noteworthy in this latter definition is that it defines policy as principles and intentions rather than as actions. This definition of environmental policy is followed in this thesis. Based on this definition, policy instruments are defined as the means by which these principles and intentions are turned into action. These instruments are not necessarily used by public agencies, although they often are.

2.3.2 The global developments of environmental policy

In the late 1960s and early 1970s, a number of environmental crises prompted governments around the world to establish new environmental agencies and to introduce a range of environmental policies that sought to remedy environmental pollutions through imposing mandatory standards, requirements, and limits (Dovers, 2013). These environmental policies were mostly restricted to promoting end-of-pipe or end-of-smokestack solutions, bolting environmental controls onto existing industrial plant (Barnes & Barnes, 2000). The pollution standards adopted under these so-called CCRs were based on laboratory research into the effects, and dose-response relationships, of various dangerous chemicals—some of them in common use—and their breakdown products (Tietenberg, 1990). Most of these studies were carried out in the United States and Europe.

As environmental agencies became better equipped and the extent of environmental problems became more widely recognised, there was a conversion of strategy in the way that governments addressed environmental issues (Patten, 1990). Governments increasingly realised that CCRs did not work for all kinds of environmental problems and that environmental policies that did more than control industrial pollution were needed (Cooper, 1986). Environmental damage was seen as fundamentally a market failure due to the absence of pricing for environmental quality (Frey et al., 1985). A new market-oriented atmosphere of relying on the power of the market and economic incentives to change environmentally harmful human behaviour thus became the new wave in environmental policy-making in the 1980s and early 1990s. These market-based instruments are termed MBIs here (Meister, 1990).

This new wave of policies is predicated on an underlying assumption that humans will generally respond to the same set of incentives and disincentives in identical ways. However, while physiological responses to a dose of a given pollutant may be more or less uniform in humans, it is highly questionable whether people of all cultures and socioeconomic conditions will have the same behavioural responses. A prominent example is that researchers have come to completely different

conclusions when testing the ‘double-dividend’² hypothesis in different parts of the world (Freire-González, 2018; Fullerton & Metcalf, 1998; Glomm et al., 2008; Jansen & Klaassen, 2000; Metcalf et al., 2004; Patuelli et al., 2005; Takeda, 2007). Hence, transferring MBIs directly from developed countries to developing countries such as China is more problematic than the direct transfer of CCRs was.

Another noticeable thing at this stage was that new sectors became more important; industry increasingly moved towards self-regulation; and, there was an environmental policy intersection with virtually all aspects of the economy (Gupta & Lad, 1983). With concepts of sustainable development resting on three pillars—economic, social, and environmental—it was realised that environmental policy needed to be integrated with the other two areas (Pearce, 1988). However, environmental policy generally remains a separate field of endeavour and its relationship to economic, cultural, and social activities remains one of mitigating, modifying, or softening the impacts that they create on the environmental domain (Norgaard, 1985). The notion of sustainable development, integrating the environmental, social, and economic pillars therefore remains theoretically and politically attractive but operationally constrained (Daly, 1990).

Since the late 1990s, environmental and social information disclosure and self-funded environmental auditing have replaced the policing role of early environmental regulators, thus reducing the need for massive increases in staff and resources to meet the ever-expanding mandates of the environmental agencies (Harrison, 2017). This shift presented a new trend that is growing in importance in developed countries and regions such as the United States and the European Union (Beeck, 2007). In 1997, the Global Reporting Initiative was established and the guidelines were formally published 3 years later by the Coalition for Environmentally Responsible Economies and the United Nations Environmental Programme (Isaksson & Steimle, 2009). The significant operator embedded within

² The double dividend hypothesis can be traced back to the exposition of Pigou (1920) on ‘Pigouvian tax’. Pigou believes that the imposition of Pigouvian tax on the behaviour of environmental pollution, which has negative externalities, can rectify the distorted market so that it will improve the efficiency of resource allocation. In the 1990s, the term ‘double dividend’ was formally put forward for the first time in the study of carbon tax reform (Pearce, 1991). The study shows that in the revenue-neutral carbon tax reform, income with carbon tax instead of distorting taxes can provide double dividends: environmental improvement (first dividend) and reduced efficiency losses (second dividend).

the Global Reporting Initiative guidelines enhances the quality of sustainability reporting (Kolk & Perego, 2008; Perego & Kolk, 2012) and engages most stakeholders, including the community and environment (Gray et al., 2015). In 2002, Novozymes, a Danish company, started issuing integrated reports and the AES Corporation, Royal Philips, Coca-Cola and other Fortune Global 500 companies followed suit by publishing their integrated reports (Eccles & Serafeim, 2015). In 2013, the International Integrated Reporting Council issued the International Integrated Reporting Framework to advocate that all companies in the world should prepare integrated reports based on certain principles (Cheng et al., 2014).

Early gains from such trends, essentially through employing a ‘low-hanging policy fruit’, convinced many that if only all the market flaws could be removed then the environment would be protected automatically (Steinebach & Knill, 2017). These cost-effective IBAs were enthusiastically supported by both industries and ministries of finance. Information transparency initiatives became part of the policy process (Bowen et al., 2020). For example, the Republic of South Africa implemented a compulsory integrated reporting policy in domestic listed companies in 2010 (Ahmed Haji & Anifowose, 2016). It appeared as if environmental issues were finally being mainstreamed into economic and social planning, aided and abetted by increased public-private partnerships, civil society participation, and decentralisation.

However, the policy backlash also appears to have been driven by concern, especially among the academy, that the new IBAs had not made substantial improvements in environmental quality and that many aspects of the global environment were now approaching possibly irreversible thresholds (Albertini, 2017; Knill et al., 2020; Smith, 2017). There have been many voices questioning whether these various initiatives can bring real changes (Hahn et al., 2015; Hickmann, 2017; Southworth, 2009; Sullivan & Gouldson, 2013). Some argued that organisational transparency through corporate environmental and social reporting is the key to meaningful stakeholder engagement (Arena et al., 2015; Dingwerth & Eichinger, 2010; Fernandez-Feijoo et al., 2014). Supporters of this approach believe that the new IBAs are based on the stakeholder theory (Qu et al., 2013). The success of IBAs depends on whether stakeholder participation is fully

and appropriately implemented (Amran & Keat Ooi, 2014; Dobbs & van Staden, 2016). Meanwhile, another group of researchers tried to use legitimacy theory to explain the growing interest in corporate environmental and social reporting (Cho & Roberts, 2010; Cormier & Magnan, 2015; Kuo & Chen, 2013). They believe that businesses continually seek to ensure that they operate within the bounds and norms of their respective societies by taking advantage of social and environmental reporting (Deegan, 2002).

Although studies of IBAs are still controversial, there are some consensuses. Most researchers have agreed that a sophisticated policy mix is necessary to solve environmental problems (Barton et al., 2017; Mori, 2017; OECD, 2003, 2007; Pacheco-Vega, 2020; Taylor et al., 2012). IBAs are only effective if organisational transparency is guaranteed and there is a willingness and competitive advantage to self-regulating (Castilla-Polo & Sánchez-Hernández, 2020; D'Amico et al., 2016). Such incentives are often provided, in part, by the threat of introducing tougher CCRs, which would bind industry in red tape if industry did not reach required environmental standards through self-regulation (Kennedy, 2016).

2.4 The Development of China's Environmental Policy

China's environmental policies started following the United Nations Conference on Human Environment (1972 in Stockholm) and have made great progress over the past decades (Sternfeld, 2017). In order to achieve the shift from the 'three wastes' governance to the ecological civilisation construction, China has basically formed a relatively complete environmental strategy and policy system in line with its national conditions through three stages (Kitagawa, 2017). A striking feature is that China has paid great attention to learning lessons from the developed countries (Zhang & Wen, 2008).

2.4.1 Exploring and start-up stage (1973-1991)

This period covered the enlightenment stage and the initial development of environmental protection consciousness. China had just gone through the '10 years of turmoil' of the Cultural Revolution when it shifted from class struggle to economic development (Tai, 1997). However, environmental protection work

failed to keep pace with economic development (Zhang et al., 2002). The environmental pollution supervision of township companies was out of control and has caused serious environmental problems (Xie, 1992). The pollution incident in Dalian Bay, Ji Canal, and the dead fish event in Guanting Reservoir in 1972 showed that China's environmental problems had become prominent (J. Wang et al., 2019). In May of the same year, the United Nations held the first Conference on the Human Environment in Stockholm. China sent a representative to participate (Engfeldt, 1973). In August 1973, the first National Conference on Environmental Protection was held in Beijing, marking the beginning of China's environmental policy-making (Ying, 2002).

In September 1979, the Environmental Protection Law (for Trial Implementation) was passed (Standing Committee of the National People's Congress, 1979). With this, China's environmental protection began to step into the domain of legal management (Palmer, 1998). At this stage, the government began to explore the treatment of industries' three wastes (waste water, waste gas, and solid waste) and designated key cities such as Beijing, Hangzhou, Suzhou, and Guilin for experimental governance (Wang & Chen, 2005). However, due to the constraints of low-level economy, ideology, and other factors, environmental policies did not play a significant role, and only a few CCRs were introduced (Lake, 1982).

In 1989, the Chinese State Council held the third National Conference on Environmental Protection and, for the first time, environmental protection was included in the government work report (Wu et al., 2020). In the same year, the Environmental Protection Law was revised and promulgated after a 10-year trial implementation period (Palmer, 1998). By 1991, the government had formulated and promulgated more than a dozen resource and environmental laws and more than 20 administrative regulations and departmental rules, including the Water Pollution Prevention and Control Law, the Air Pollution Prevention and Control Law, and the Regulations on the Prevention and Control of Environmental Noise Pollution (Jahiel, 1997). The environmental policy system had taken shape.

Overall, the so-called three major principles, namely polluter pays, prevention first and comprehensive treatment, and emphasis on environmental management (Bachner, 1992) were formed at this stage. These policies helped to mitigate the

worsening environmental situation, and some are still working today (Qin & Chang, 2015).

2.4.2 Framing and constructing stage (1992-2012)

In 1992, the United Nations held a Conference on Environment and Development and issued Agenda 21, which put forward a strategy for sustainable development (Sitarz, 1993). As a response, the Chinese State Council launched China's Agenda 21 in March 1994 (Bradbury & Kirkby, 1996). It upgraded the overall strategy of sustainable development to a national strategy (Gan, 1998). This further elevates the status of environmental protection as a basic state policy (Kitagawa, 2017). However, with the rapid development of an extensive economy, China's industrialisation process began to enter the first phase of the heavy chemical industry era (Geng et al., 2009). The urbanisation process was accelerated at the same time (Zhou et al., 2004). Inevitably, environmental problems broke out in an all-round way (Edmonds, 2006). Although governments at all levels were attaching more importance to the prevention and control of pollution, there was still an intensified trend towards industrial pollution and ecological destruction (Kristen, 2016). Basin and regional pollution began to appear. As a result, the prevention and control of pollution has gradually shifted from the industrial sector to the comprehensive control of pollution in river basins and cities (Sternfeld, 2017).

The unprecedented pressure on the environment caused by rapid economic growth has prompted policymakers in China to accelerate the introduction of new environmental policies or improve existing ones (Zhang et al., 2007). In 2002, the Environmental Impact Assessment Law was adopted (Y. Wang et al., 2003). The scope of the application of the 'Three Simultaneities' system was extended to all engineering construction projects and natural development projects that might cause pollution and damage to the environment (Zhang, 2001). The Total Amount Control system was raised to the level of a national environmental protection strategy, and the environmental protection planning changed from soft constraints to tough constraints (Shi et al., 2010). Sulphur dioxide and chemical oxygen demand were regarded as two 'rigid constraints' indices (Liu & Wang, 2013). Meanwhile, the investment in environmental protection was greatly increased, accounting for more than 1% of GDP for the first time (J. Wang et al., 2019). This

strategy has effectively improved the environmental infrastructure. According to statistics from 2005 to 2012, the rate of municipal sewage treatment in all cities rose from 52% to 72% and the proportion of harmless disposal of municipal solid waste increased from 52% to 78% (Xie, 2019).

Table 2.2 *CCRs classification in China*

CCRs	Advance Control	Environmental Planning
		Environmental Impact Assessment
	Intermediate Control	Three Simultaneities
		Pollutant Discharge Permit
	Afterwards Control	Total Amount Control
		Deadline Pollution Treatment

During this period, China basically formed an environmental governance framework dominated by CCRs (Carter & Mol, 2013; Mol & Carter, 2006). These policies were broadly divided into advance control, intermediate control, and afterwards control (Yang, 2009). First, the Environmental Impact Assessment system and the Three Simultaneities system are typical advance control measures (Zhang, 2001). The former is the environmental management in the decision-making stage of a project, while the latter mainly plays a role in the implementation stage (Lindhjem et al., 2007; Swanson & Lin, 2009). However, both of them take the newly built project as the control object, and both belong to the basic system to prevent new pollution of the environment (Yang, 2009). Second, the Total Amount Control system and the Pollutants Discharge Permit system are a combination of intermediate control (Zhang, 2001). The Total Amount Control system is taken as the basis and implementation requirements of the Pollutants Discharge Permit system, while the Pollutants Discharge Permit system serves as the legal form and means of the implementation of the Total Amount Control system (Mingyuan, 2008). Last, the Deadline Pollution Treatment system refers to the system whereby the administrative authority provides a certain time limit for companies that discharge pollutants in excess of standards to control and amend their practices in order to meet the standards (Swanson et al., 2001).

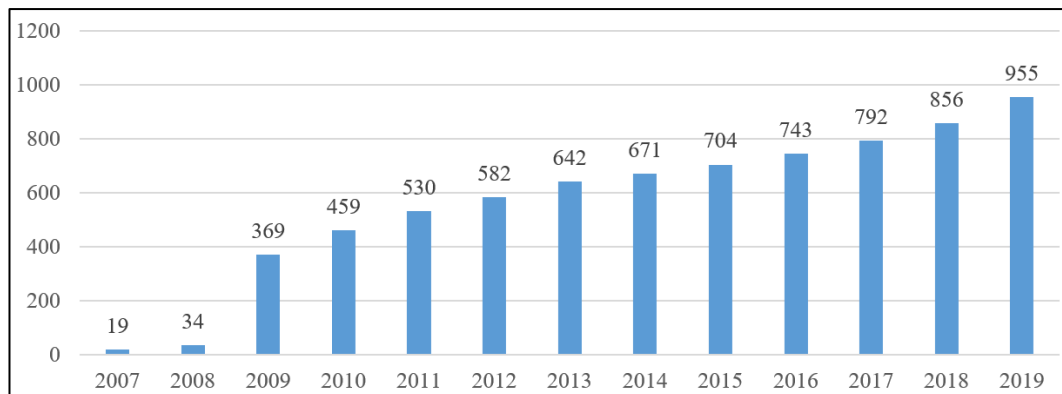
However, for a country like China that was accelerating its industrialisation, economic development and environmental protection were a difficult contradiction to reconcile (Sun et al., 2016). This difficulty made it easy for the government to fall into a dilemma in the process of decision-making and management (Wang & Shen, 2016). For example, in order to obtain large foreign investment, many provinces or cities were willing to introduce some projects that are restricted abroad because of high pollution (Lan et al., 2012). Some local governments turned a blind eye to the environmental violations of some large polluting companies, or even helped them evade supervision by law enforcement authorities in order to increase local fiscal revenue (Economy, 2014). Apparently, the CCRs used by local governments tend to lose their effectiveness under the pressure of economic development priorities (Xu & Faure, 2015).

2.4.3 Reforming and improving stage (2013 to the present)

After 30 years of extensive economic growth, China has finally shifted its focus from high growth rates to quality growth (Zhao, 2020). Various reforms in the economic field are being accelerated and deepened, which objectively promotes the reform of environmental policies (Sun & Hu, 2014). In April 2014, China completed the revision of the Environmental Protection Law, the latest revision after 25 years of the 1989 version; the new revision has been called the strictest environmental protection law in history (Zhang et al., 2015). The emphasis on market-led regulations demonstrates a marked change in policy-makers' thinking on environmental policies. Subsequently, the Water Pollution Prevention and Control Law and the Air Pollution Prevention and Control Law were amended. The newly enacted Environmental Protection Tax Law and Soil Pollution Prevention and Control Law have also been implemented recently (Wu et al., 2020). In December 2017, China announced the launch of a national carbon emissions trading system (Duan et al., 2018). The system is being piloted in some regions and industries (Li et al., 2020). When fully implemented, China's emissions trading system will be the largest in the world, handling more than 3 billion tonnes of greenhouse gas emissions (almost a quarter of the global emissions), nearly twice the size of those in the European Union (Cao et al., 2019).

At this time, with the maturity of the stock exchange market and the improvement of corporate governance capability, Chinese companies actively responded to the updated round of information transparency initiatives (Liu et al., 2010). As a result, IBAs were introduced in China. The Shenzhen Stock Exchange (SZSE) and the Shanghai Stock Exchange (SSE) have successively issued guidelines on corporate social responsibility (CSR) disclosure and environmental information disclosure to encourage A-share listed companies to publicly disclose social and environmental information in their annual reports or CSR reports (Situ & Tilt, 2018). In addition, A-share listed companies are encouraged to voluntarily disclose environmental information in other forms, such as sustainability reports or integrated reports, though few have responded to this call (Ouyang, 2017; Tong & Aiguo, 2018). Consequently, Chinese A-share listed companies increasingly began to publish CSR reports as supplementary reports to annual reports (Sun et al., 2018). All these initiatives and IBAs highlighted the sudden upsurge in corporate social and environmental disclosure in China. In 2019, 955 out of 3,706 A-share listed companies published CSR reports in addition to their annual reports (Zhang et al., 2019).

Figure 2.1 *CSR reports of A-share listed companies*



However, in addition to the SSE and SZSE's guidelines on CSR reports, A-share listed companies may also follow some other CSR standards, such as the Global Reporting Initiative guidelines or issue CSR reports based on their own rules and understanding. According to Pirovska et al. (2019), the SSE's CSR guidelines were the most widely cited, while the Global Reporting Initiative guidelines were the second most widely referenced guidelines for companies that issue stand-alone

CSR reports. Although in terms of quantity A-share listed companies have made great progress in disclosing CSR reports in recent years, there are still serious problems, such as irregular contents and formats and inconsistent forms of disclosure. In general, environmental information disclosure in China is regulated mainly by the following three types of policies and guidelines:

- The Environmental Protection Law defines the responsibilities of key pollutant-discharging entities (KPEs) in disclosing environmental information.
- The China Securities Regulatory Commission (CSRC) issues relevant policies on information disclosure content and format standards for listed companies.
- The SSE and SZSE issue guidelines on environmental and social responsibility information disclosure of A-share listed companies, and further provisions are made on environmental protection and pollution prevention and control that A-share listed companies should disclose.

In the context of this regime, China's IBAs can be broadly divided into two categories (mandatory and voluntary). The mandatory category focuses on KPEs only as defined in the Environmental Protection Law. The list is managed by several environmental authorities including the Ministry of Ecological Environment and its subsidiaries at provincial level. The voluntary element is included in almost all IBAs to encourage Chinese companies to voluntarily disclose environmental information. Two points are particularly noteworthy. First, although the environmental information disclosure requirements on companies that are KPEs are mandatory, even some A-share listed companies on the KPEs' list may partially follow or ignore these requirements due to the lack of punitive measures. Second, there are 12 specific environmental disclosure items in the CSRC's annual reporting standards for A-share listed companies. The 12 items focus mainly on pollutant discharge, prevention, and control measures as shown below in article 44 extracted from the CSRC's annual reporting standards (CSRC, 2017):

Article 44. A-share listed companies or its important subsidiaries that are on the list of key pollutant discharge entities managed by environmental authorities shall disclose the following major environmental information:

- Pollutant-discharge information including but not limited to the name of major pollutants and specific pollutants, way of discharge, amount of discharge outlets, distribution of discharge outlets, concentration of discharge and total discharge volume, excess discharge, execution standards for pollutant-discharge, permitted total discharge volume.
- Pollution prevention information including but not limited to the situation of construction and operation of pollution prevention facilities.
- Environmental compliance information including but not limited to the situation of Environmental Impact Assessment (EIA) of construction projects and Pollutants Discharge Permit (PDP).
- Company policies and procedures including but not limited to the emergency plans for unexpected environmental incidents, and environmental self-monitoring programmes.

Overall, the evolution of China's environmental policies has gone through three stages: the exploring and start-up stage (1973-1991), the framing and constructing stage (1992-2012), and the reforming and improving stage (2013 to the present day) during which environmental strategy theory and environmental policy direction have been significantly changed (Wu et al., 2020). Since 2013, China's environmental policies have accelerated reform of a strategy dominated by CCRs to one which gives priority to MBIs and IBAs (Li & Ramanathan, 2018). Unlike the gradual process of environmental policy development in developed countries, China resorted to both MBIs and IBAs almost at the same time after realising that CCRs did not fundamentally curb environmental deterioration (Ren et al., 2018). Such a policy mix, according to the existing studies, is more likely to achieve better results (Sterner & Robinson, 2018). In fact, the environmental policy stringency (EPS) index, which is used to compare the stringency of environmental policies between countries, also shows the great progress China has made (OECD, 2020).

However, it is too early to predict a successful story for China's environmental policies, as it will take a long time to prove real environmental improvements have occurred. Many researchers have agreed that it is high time to re-examine the assumption that China's environmental policies are effective (Li & Taeihagh, 2020; Sun, 2016; Wu & Tal, 2018; Yin et al., 2019). The assumption is that companies and other organisations which engage in efficient environmental management are transparent about their environmental data and reporting (Walker, 2008). Given the

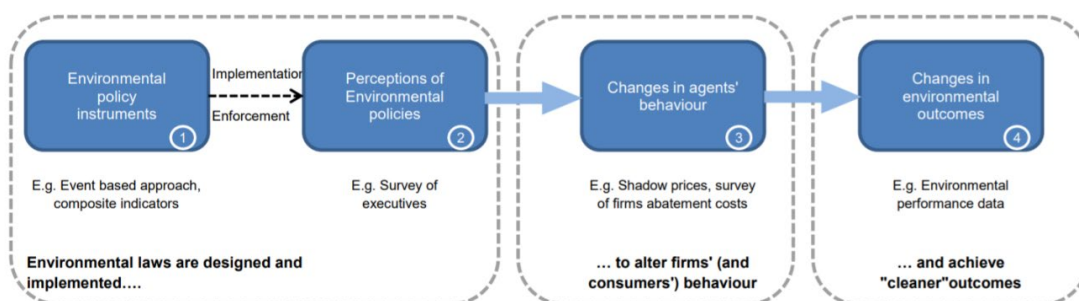
existing concerns about China’s corporate environmental disclosure policy, an initial and exploratory research on CET is needed.

2.5 The Measure of Stringency

After years of exploration, China has formed its own environmental policies for dealing with environmental issues. However, the question of just how stringent China’s environmental policies are and how effective they are also arises. To answer such questions, it is necessary to place China’s environmental policies in a global perspective and introduce a set of criteria to measure the success of the country’s environmental policies.

Among the existing cross-country analyses of the economic effects of environmental policies, the most influential are quantitative indices of EPS (Y. Wang et al., 2019). These indices were developed by Botta and Koźluk (2014). Up until then, the lack of reliable, comparable measures of the stringency of environmental policies had hindered the study of China’s environmental policies. Botta and Koźluk (2014) filled this gap by providing a policy-based composite index. The index has been included in the environmental database of the Organisation for Economic Co-operation and Development (OECD) (OECD, 2020); it is widely used by scholars as an appropriate proxy for environmental regulation that covers various market-based instruments and nonmarket instruments (Martínez-Zarzoso et al., 2019).

Figure 2.2 *Botta and Koźluk (2014)’s approaches to the measure of stringency*



Note. Reprinted from *Measuring Environmental Policy Stringency in OECD Countries* by Botta and Koźluk (2014). Copyright 2014 by OECD iLibrar.

The research methods and results in the EPS index provide a clear way to understand the current position of China’s environmental policies. The index also opens the door to more environmental policy research in the context of China. Figure 2.2 shows the approaches to the measurement of stringency. They can be classified according to ‘where’ they attempt to measure environmental stringency. Single policy change events and composite measures of regulation build on the assumption that it is possible to directly observe environmental regulations or at least representative elements of them and therefore that it is possible to represent a country stance on environmental regulation by summarising measures of the enforced laws (Figure 2.2, bubble 1). The second group of measures—surveys on stringency—attempt to measure perceived regulations (bubble 2). Third, shadow prices for environmental inputs or environmentally related expenditures (e.g., on pollution control) focus on the first-level consequences of regulation, namely companies’ cost and production choices (bubble 3). Environmental performance approaches look at the second-level consequences of instruments, that is, the variation in environmental performance of companies, sectors, or countries, in order to evaluate the stringency of the policy itself.

According to the latest data from OECD.Stat (Table 2.3), China’s EPS index shows a rapid growth trend from 2006 to 2015. To some extent, this upward trend could be seen as a signal of the early success of environmental regulatory reform in China. On the other hand, there is still a lot of criticism that China’s environmental pollution has worsened over that period, especially the air pollution (Song et al., 2017). Besides, China’s EPS index has not been updated since 2016. Given its past as a so-called information-poor and authoritarian country (L. Zhang et al., 2016), if doubts about China’s environmental transparency cannot be addressed, it is too early to say that China’s environmental policies have succeeded.

Table 2.3 *Environmental policy stringency index*

Variable Unit	Environmental Policy Stringency									
	Index									
Country\Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Australia	2.01	2.01	2.26	2.69	2.50	3.34	3.72	4.07	2.67	3.17
Canada	2.17	3.27	3.31	3.85	3.35	3.67	3.42	3.36	3.28	3.28
France	3.28	2.86	2.90	3.69	3.15	3.70	3.57	3.50	3.54	3.58
Germany	3.00	2.67	2.64	3.06	3.02	3.14	2.92	3.11	3.07	3.13
Italy	2.72	2.34	2.60	2.73	2.84	2.79	2.77	3.21	3.21	3.28

Variable Unit	Environmental Policy Stringency									
	Index									
Country \Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Japan	1.63	1.69	1.69	1.73	2.03	2.96	3.50	3.08	3.08	3.17
Korea	2.96	2.96	3.38	3.52	3.52	3.44	2.63	2.70	2.74	3.07
Turkey	1.50	1.50	1.50	1.54	2.06	2.21	1.83	1.92	1.92	1.92
United Kingdom	2.29	1.95	2.40	2.58	3.62	3.47	3.29	3.77	3.72	3.83
United States	2.13	2.34	2.47	2.93	2.68	2.47	3.17	2.67	2.58	2.69
Non-OECD Economies	Brazil	0.42	0.42	0.42	0.42	0.42	0.38	0.38	0.38	0.54
	China	0.77	0.77	0.81	0.98	1.10	1.35	2.04	1.99	2.16
	India	0.67	0.63	0.63	1.13	1.20	1.26	1.30	1.30	1.28
	Indonesia	0.50	0.50	0.50	0.50	1.17	1.17	1.17	1.08	1.08
	Russia	0.65	0.65	0.60	0.60	0.60	0.60	0.60	0.85	0.85
	South Africa	0.52	0.52	0.48	1.52	1.75	1.71	0.71	0.71	0.71

Data extracted on 05 Aug 2020 22:35 UTC (GMT) from OECD.Stat

Note. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=EPS>

Based on the background presented above, B. Zhang et al. (2016), Wu and Tal (2018), Shi and Yang (2019), and Li et al. (2019) have suggested that, although China seems to be doing well in terms of the diversity and stringency of its environmental policies at the design level (Botta & Koźluk, 2014), much is still unknown at the implementation level, for example, the extent to which the environmental information disclosed by Chinese companies under the mandatory policy reflects their environmental performance (Situ & Tilt, 2018); how environmentally transparent Chinese companies are (Gupta & Mason, 2014); and how to address the risks associated with information asymmetry (Wu & Tal, 2018). To foster a better understanding of these issues, a systematic monograph is appropriate, as for the first time the depth and breadth of these issues is being formally presented in a focused manner.

2.6 Chapter Summary

The purpose of this chapter is to help readers better understand China's environmental policy and the need for a systematic monograph of CET in China. First, after years of heavy industrialisation, China's environmental challenges are nearing a tipping point. In a bid to tackle these challenges, China's government has declared a 'war on pollution', which means taking all possible measures to defeat pollution, including making various environmental policies that make environmental information more transparent to the public. As China is the world's

most populous economy and largest emitter of pollutants (Union of Concerned Scientists, 2020), its efforts to address its environment issues are of global significance (Greenstone & Schwarz, 2018).

Second, China's current environmental policy is inextricably linked to the global development of environmental policy. Environmental policy was born out of the direct physical threat and health risks of industrial pollution. As a result of bolting environmental controls on to existing industrial plant, early environmental policy was defined as CCRs. The command element is the presentation of quality standards/targets by a government authority that must be complied with. The control part signifies the negative sanctions that may result from noncompliance (e.g., administrative penalties). As the use of economic incentives, which frequently include the use of taxes and subsidies as incentives for compliance, gradually replaced the earlier CCRs, MBIs subsequently became the mainstream approach. Later, with the emerging efforts of industry organisations and international institutions, most notably the Global Reporting Initiative and the International Integrated Reporting Council, IBAs represented by the standardisation and improvement of information disclosure mechanisms began to play an increasingly important role in dealing with the growing environmental crisis.

Third, China resorted to both MBIs and IBAs at almost the same time after realising that CCRs did not fundamentally curb its environmental deterioration. Although the existing EPS index suggests that China has done well in making environmental policies more stringent, it is not yet clear what the actual effect of these policies is on companies in terms of the first-level and second-level consequences. Given the fact that China is a major contributor to the world's environmental problems, an accurate and comprehensive interpretation of its responses is crucial. Through focusing on Chinese companies' CET, this thesis responds to calls in the literature for more insight into China's corporate environmental disclosure policy.

Overall, under the unprecedented environmental pressure, China is pushing forward the implementation of MBIs and IBAs. For these newly environmental policies that rely more on transparency, the key to their effectiveness lies in whether policy-makers can make

sense of CET and adjust their policies accordingly. Therefore, it is necessary to gain in-depth insights into CET in order to make recommendations on how to improve China's environmental policies.

In the next chapter, a theoretical review of the literature underpinning and guiding this research is conducted.

Chapter 3

Theoretical Foundation for CET

3.1 Introduction

A theoretical foundation refers to the intellectual cornerstone upon which research is built (Watts, 1986). It consists of one or more existing theories that can be used to explain the issue that underpins the research. In the studies related to CET, traditional theories are often used to explain environmental information disclosure [e.g., voluntary disclosure theory (Clarkson et al., 2008); legitimacy and signalling theory (Liu & Anbumozhi, 2009); stakeholder theory (Brammer & Pavelin, 2008); institutional theory (Ali & Rizwan, 2013); and resource-based theory (Russo & Fouts, 1997)], but not CET itself. Part of the reason is that CET is an interdisciplinary concept, and its theoretical foundations are rooted in a broader context of social science. In addition to the accounting discipline, areas such as environmental economics (Winston, 2008) and business ethics (Turilli & Floridi, 2009) also have a significant influence on the concept. In this chapter, the theories related to these areas are reviewed. Four theories: government intervention theory, stakeholder theory, and legitimacy, and signalling theories are selected from the disciplines to form a theoretical foundation for CET. The remainder of the chapter is organised as follows.

Section 3.2 reviews the three disciplines related to CET. Section 3.3 presents theoretical traditions for CET. Four theories, namely government intervention theory, stakeholder theory, and legitimacy, and signalling theories are elaborated and introduced in detail in relation to CET. Section 3.4 constructs a theory triangulation by combining the four theories and examines the connections between the theories. Finally, section 3.5 summarises the chapter.

3.2 CET Related Disciplines

The theoretical foundation consists of various theories that play a supporting or guiding role in the construction of a topic (Godfrey, 2010). These theories may have been widely used in related disciplines. The disciplines related to CET studied in this thesis include mainly environmental economics, business ethics, and environmental accounting.

Environmental economics is a subfield of economics that studies the economic and environmental effects of national or local environmental policies around the world by using the principles of economics (Endres, 2010). Its core subject is how to balance economic development with environmental protection (Hussen, 2019). Environmental economics regards the environment as a kind of asset that can provide the survival support for human economic activities (Buchholz, 2019). It makes full use of the basic principles and methods of economics (Hussen, 2019), for example, the cost-benefit analysis, the economic analysis of environmental policy, the assessment of the economic value of the environment, etc. These methods are often related to government intervention theory and are widely used in the research of eco-tax reform, environmental policies, pollution control, and utilisation of ecological resources, etc. (Karagiannis, 2001; von Mises, 1998).

Government intervention theory has been used in environmental economics (Phaneuf, 2017). It emphasises the internalisation of environmental externalities through the implementation of environmental policies, thereby addressing information asymmetries (Winston, 2006). The purpose of applying this theory in environmental economics as a whole is to outline a mode of economic operation mechanism in which economic development and environmental protection develop harmoniously (Endres, 2010). However, as environmental economics emphasises the use of economic instruments to deal with environmental issues, the discipline is also limited by a lack of business perspective on the environment (Tisdell, 2010).

In terms of the relationship between companies and the environment, business ethics studies how to unify the economic benefits, social benefits, and environmental benefits of companies from a business ethical perspective (Tencati & Perrini, 2011). A broad definition of business ethics is that it is a series of norms

that guide behaviours of all parties involved in business activities (Storchevoy, 2017). Participants in business activities include employees, customers, suppliers, competitors, governments, communities, etc. The narrow definition of business ethics limits the target audience of the norms to the company and its employees (Wasioleski & Weber, 2019). Stakeholder theory is a common theory in business ethics, and it fits well with the definition of business ethics (Freeman & Reed, 1983).

Business ethics not only studies common concepts, such as the functions and forms of the norms, but dynamic evolving concepts, including the construction of business ethics, the evaluation of business ethics, and the characteristics and shaping of ethical business culture (Werhane, 1999). Business ethics directly serves companies, focusing on the analysis and solution of ethical problems in the process of business operation and practice, such as the abuse of resources, environmental pollution, workplace insecurity and so on (Tricker, 2014). The subject analyses these problems from the perspective of ethics and seeks for countermeasures from macro and micro aspects (Stanwick, 2014). At the same time, it points out the direction of correct corporate behaviour and explores a new business management mode that is not only in line with ethics, but can also bring benefits to companies (Surdam, 2020).

However, taking on environmental responsibilities is sometimes inconsistent with the goal of maximising companies' profits in the short term (Stanwick, 2014). Moreover, from an accounting perspective, the goal of corporate behaviour is to maximise profits (Werhane, 1999). Therefore, an important issue to be addressed in business ethics concerns integrating the concepts of long-term sustainability into the profit-maximising behaviour of companies (Tencati & Perrini, 2011). Business ethics holds that a sustainable way of profit maximisation requires companies to produce not only in their own economic interests and short-term benefits, but also in the long-term interests of the society and environment (Freeman & Velamuri, 2006; Webley, 2003). To achieve this outcome, the perspective of environmental accounting is essential.

Environmental accounting, also called green accounting, is a subset of accounting, its target being to process and measure the impact of the activities of a particular economic entity on the environment as well as the impact of the environment on the entity (Schaltegger, 2000). Environmental accounting distinguishes or separates

the measurement and reporting of environmental issues relating to a particular economic entity from the estimation of the financial results of that entity's operations (Hopwood et al., 2010). It can be conducted at the macro level or micro level.

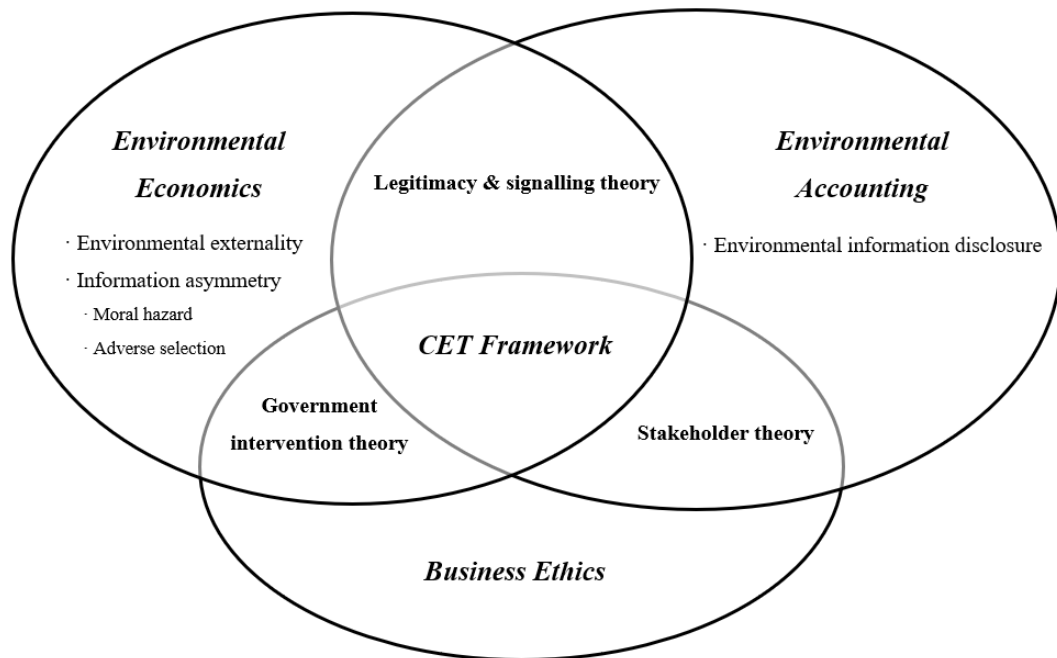
In the main, macro environmental accounting focuses on the content related to natural resources and the environment in the national economy (Hecht, 2005). It is the measurement of the consumption of national natural resources by using physical and monetary units. Therefore, it is often called 'natural resource accounting'. Micro environmental accounting enables businesses to see the ecological impact of their business activities and corporate management and the impact of ecologically sustainable practices on their businesses (Pramanik, 2008). It allows accountants to report on the economic and environmental impact of corporate environmental behaviour to stakeholders so as to allow for proactive decision-making about processes that simultaneously meet environmental regulations while adding to the bottom line. The environmental accounting involved in this thesis refers mainly to the micro level.

Corporate environmental disclosure is an important element of environmental accounting (Giordano-Spring et al., 2018). The existing financial statements focus mainly on the disclosure of financial information but ignore nonfinancial information, such as environmental information (Lee & Schaltegger, 2018). In view of the demand, corporate environmental information has gone beyond the traditional concept (Gray et al., 1996). At the same time, stakeholders require information related to companies' future development prospects (Giordano-Spring et al., 2018). It is important for companies to disclose environmental information to clearly reflect or explain the reporting items (Gray et al., 1996). Therefore, on the basis of daily accounting, it is necessary for companies to reflect their performance of environmental responsibilities in the form of reports (Pramanik, 2008).

Legitimacy and signalling theories are widely used in the study of corporate environmental disclosure. Legitimacy theory can be used to explain the behaviour of companies seeking their own legitimacy through environmental disclosures (Deephouse et al., 2017), while signalling theory argues that environmental information communication between senders and users will reduce information

asymmetry and enhance market efficiency (Gupta et al., 1999; Rao et al., 1999; Spence, 1978; Zijl et al., 2017). This communication also highlights the significance of the signal environment in the signalling process. The signal environment is the environment in which signalling information is generated and communicated. This environment affects the extent to which the signalling reduces information asymmetry (Lester et al., 2006). These two theories are often put together when explaining corporate environmental disclosure (Gerab & Ching, 2017). Figure 3.1 shows the relationships between the above theories and their related disciplines.

Figure 3.1 *CET-related disciplines and theories*



3.3 CET Theories

This section continues the theoretical construction and justifies why government intervention theory, stakeholder theory, legitimacy, and signalling theories are appropriate theoretical bases in this thesis. Given that each theory has its own limitations, there is no single theory that can interpret the topic of this research entirely. Thus, the five theories are combined to form a theoretical foundation for CET.

3.3.1 Government intervention theory

Government intervention theory was put forward and widely accepted when traditional economic theories could not cope with economic crises (Mises, 1998). In the areas of market failure, for instance in public goods and services, appropriate government intervention or policies can help to correct the market failure or make up for its effects (Wang et al., 2021). Environmental resources and environmental information have the nature of public goods (Kahneman & Knetsch, 1992). The consumption of natural resources and environmental pollution in the process of production and operation could lead to negative externalities (Baumol, 1975), while the environmental information asymmetry may lead to ‘adverse selection’³ and ‘moral hazard’ (Klein et al., 2016). Therefore, government intervention, such as making and implementing environmental policies, provides the possibility of internalising negative externalities and reducing information asymmetry problems (Droste et al., 2016). In this process of correcting market failure, CET has been improved.

3.3.1.1 Environmental externality

According to the glossary of environmental statistics published by the United Nations (1997), environmental externality refers to the economic concept of uncompensated environmental effects of production and consumption that affect consumer utility and company cost outside the market mechanism. As a consequence of negative externalities, private costs of production tend to be lower than its ‘social’ cost (Yang, 2021). It is the aim of the polluter/user-pays principle to prompt households and companies to internalise externalities in their plans and budgets (Gaines, 1991).

The internalisation of environmental externalities is unlikely to be achieved without the direct or indirect intervention of the government (Baumol & Oates, 1988). CCRs⁴ are common forms of direct government intervention (Holling & Meffe,

³ In economics, adverse selection is a market situation where buyers and sellers have different information, so that a participant might participate selectively in trades which benefit them the most, at the expense of the other party. A standard example is ‘the market for lemons’.

⁴ CCRs refers to environmental policies that relies on command-and-control regulations (permission, prohibition, standard setting, and enforcement) as opposed to financial incentives, that is, economic instruments of cost internalisation. See section 2.3.2, chapter 2 for more information about CCRs.

1996). It has been proposed that by imposing fixed standards with the force of law behind them, CCRs can respond more quickly to activities which do not abide by the set standards (Tang et al., 2020). Setting fixed standards also has benefits politically, as the regulator (often the government) is seen to be acting swiftly and decisively (Baldwin et al., 2012). Although practices may be changed at a superficial level through the use of CCRs, it may not be able to achieve the changes of behaviour necessary for more sustainable environmental practices (Gunningham et al., 1999).

Given the disadvantages of direct government intervention, policy-makers increasingly prefer indirect government intervention or mixed measures (OECD, 2007). Indirect government intervention includes but is not limited to MBIs⁵ and IBAs⁶ (Mori, 2017). As a typical MBI, Pigouvian tax is a tax on any market activity that generates negative externalities (Mitchell Polinsky & Shavell, 1982). The tax is intended to correct an undesirable or inefficient market outcome (a market failure), and does so by the tax's being set equal to the external marginal cost of the negative externalities (Sandmo, 2008). For instance, China's recent environmental protection tax is a Pigouvian tax according to environmental economics (Wu & Tal, 2018). IBAs are also common forms of indirect government interventions and are used mainly to reduce information asymmetry (OECD, 2003).

3.3.1.2 Information asymmetry

Information asymmetry has played a very active part in the field of economic research (Rosser, 2003). The incomplete information model has also become an indispensable logical starting point in economic analysis tools (Stiglitz, 2002). The reasons for the widespread existence of information asymmetry are as follows:

- People's cognitive ability and knowledge are very limited.
- The acquisition of relevant information by market participants is accompanied by the incurring of costs. If market transaction participants believe that the search cost is higher than the expected revenue, the information collection and acquisition will not occur.

⁵ See section 2.3.2, chapter 2 for more information about MBIs.

⁶ See section 2.3.2, chapter 2 for more information about IBAs.

- The information holder can monopolise information because of information superiority.

In economics, information asymmetry deals with the study of decisions in transactions where the information of each party is incomplete and asymmetrical (Palgrave et al., 2018). This asymmetry also extends to noneconomic behaviour. As private companies have better information than regulators about the actions that they would take in the absence of a regulation, the effectiveness of a regulation may be undermined (Fullerton & Wolfram, 2012). Information asymmetry can sometimes cause moral hazard and adverse selection. An example of this problem is the so-called ‘market for lemons’⁷ (Akerlof, 1978). The market itself cannot solve and eliminate the market for lemons problem. It needs to standardise the parties’ self-interest activities with the help of laws and systems.

The system of information disclosure, as one of the important forms of communication between companies and information users ensures the openness and transparency of information (Lev, 1992). It eliminates the information advantage of management, helps information users (especially investors and regulators) to make decisions, and reduces the moral hazard caused by information asymmetry. Environmental information disclosure is an important embodiment of a company’s performance of its environmental responsibility (Al-Tuwaijri et al., 2004). The moral hazard and adverse selection problems brought by information asymmetry also exist in the disclosure and supervision of environmental information.

In the principal-agent relationship, it is assumed that the company pursues an environment-friendly strategic orientation, and the principal expects the management to increase investment in environmental protection and maximise environmental performance while pursuing economic benefits. However, in the case of information asymmetry, the existence of moral hazard makes environmental performance behaviour difficult to measure. Moreover, the existence of adverse selection will lead to less investment in environmental protection and worse environmental performance. In order to avoid the market for lemons, government

⁷ ‘The market for lemons: Quality uncertainty and the market mechanism’ is a well-known paper by economist George Akerlof which examines how the quality of goods traded in a market can degrade in the presence of information asymmetry between buyers and sellers, leaving only ‘lemons’ behind. In American slang, a lemon is a car that is found to be defective after it has been bought.

should intervene appropriately in the market and strengthen the role of supervision through IBAs.

3.3.1.3 Government intervention theory and CET

The defects of the market mechanism, namely environmental externality and information asymmetry, make it necessary for the government to intervene appropriately. Stiglitz (2013), the Nobel Prize-winning economist, argued that government intervention in the economy not only compensates for market failures, but also has advantages that market mechanisms do not have. Specifically, environmental policies can be used by governments to internalise negative externalities, reduce information asymmetry, and also improve CET in the process of correcting market failures.

First, government intervention can be more targeted. Environmental information disclosure has costs. Due to the ‘free-rider problem’⁸, there will be a market failure in the process of supply and demand of environmental information (Jansen, 2008). The government therefore needs to intervene appropriately and require companies to disclose environmental information in the capital market in accordance with environmental information disclosure laws and regulations (Cohen & Santhakumar, 2007). Transparent environmental information can also avoid the adverse selection and moral hazard behaviours and ensure the operational efficiency of the capital market (Jehiel, 2014).

Second, government intervention is more in line with the principle of equity. As environmental resources and environmental information have the nature of public goods, appropriate government intervention is in the public interest (Kahneman & Knetsch, 1992). Through different environmental policies, the government can encourage companies to pay more attention to environmental protection and improve the quality of environmental information disclosure (Sterner & Robinson, 2018). The more transparent the environmental information disclosure is, the more conducive it is to the public interest. The interests of investors and creditors are also

⁸ In the social sciences, the free-rider problem is a type of market failure that occurs when those who benefit from resources, public goods (such as public roads or hospitals), or services of a communal nature do not pay for them or under-pay. Corporate environmental information has the characteristic of typical public goods, that is, consumption is nonexclusive and noncompetitive.

protected. Eventually, the general climate of social equity will promote the virtuous cycle in the economy and so benefit the whole of society (Schneider et al., 2010).

Last, government intervention is more authoritative. The government can punish violations of laws and regulations (Li et al., 2019). In accordance with the principle of equality before the law and the spirit of the rule of law, government regulation is authoritative, solemn, and impartial (Pacheco-Vega, 2020). By promulgating laws and regulations to implement environmental supervision, an important aspect of government intervention is to establish and constantly improve the environmental information disclosure mechanism (Bowen et al., 2020).

3.3.1.4 Limitations of government intervention theory

Just as the market is not perfect, government intervention is not a panacea. There will also be malfunctions in the process of government regulation (Tullock, 2002). Samuelson and Nordhaus (2009) argued that “government failure occurs when government policy or collective action fails to adopt measures that improve economic efficiency or morally acceptable income distribution”. In the main, government failure comes about for the following reasons:

- Differences between the goal of government behaviour and social public interest (Winston, 2006). Theoretically, the government is the representative of the public interest. In fact, however both government officials and government agencies have their own behavioural goals, and these behavioural goals are not necessarily equal to the public interest.
- Inefficient government agencies (Le Grand, 1991). Due to the lack of effective supervision of government officials, government agencies are natural monopoly organisations. The lack of competition and profit motive leaves government agencies with little incentive or pressure to improve efficiency.
- Misplaced role of government (Dolfsma, 2011). The scope and intensity of government intervention may exceed the reasonable limit of correcting market failure, that is, the government is in charge of things that should not be undertaken.

- The lag effect (Pennington, 2000). It takes time for the government to intervene in the making and implementing of policies, and it also takes time for policies to take effect on the economy. The policy lag effect will mean that the policy results are far from the expected goals.
- Conflicts with the market mechanism (Winston, 2006). Government intervention depends on the ‘visible hand’, while the market mechanism depends on the ‘invisible hand’. These may produce contradictions and conflicts.
- Incomplete information (Andrew, 2008). It is impossible for governments to obtain 100% accurate information because of the wide range of private interests. Policies based on incomplete and inaccurate information may not achieve the desired effect.
- The rent-seeking activity (Helm, 2010). Rent-seeking refers to obtaining higher profits or excess profits via ‘pork-barrel’ behaviour. The rent-seeking activity will inevitably lead to government failure. It creates a scramble for power among government officials, which reduces the reputation of the government and leads to a huge waste of social resources.

To avoid government failure, a broader and more holistic theoretical perspective, namely stakeholder theory, is introduced in the next section.

3.3.2 Stakeholder theory

Stakeholder theory is a theory of organisational management and business ethics that accounts for multiple constituencies impacted by business entities (Lin, 2018). Penrose (1959) put forward the concept that “a company is the collection of human assets and interpersonal relations”, and so laid a foundation for the construction of stakeholder theory. It was not until 1963 that the term ‘stakeholder’ in its current use first appeared in an internal memorandum at the Stanford Research Institute (Freeman & Reed, 1983). Subsequently, Rhenman (1968) defined the stakeholders in an organisation as “the individuals and groups who are depending on the company in order to achieve their personal goals and on whom the company is depending for its existence”. This definition makes stakeholder theory an independent branch of theory.

Stakeholder theory became a common theory in the business ethics fields only; it is used as one of the frameworks in corporate social responsibility, intellectual capital, environmental information disclosure, and various areas of corporate reporting (An & Davey, 2011; Freeman & Velamuri, 2006; Liu & Anbumozhi, 2009; Roberts, 1992; Sun & Davey, 2021). The theory encompasses a wide range of concepts, whereas organisational accountability, as an important concept in stakeholder theory, is widely used in the study of various types of corporate reports (Freeman et al., 2018).

3.3.2.1 Organisational accountability

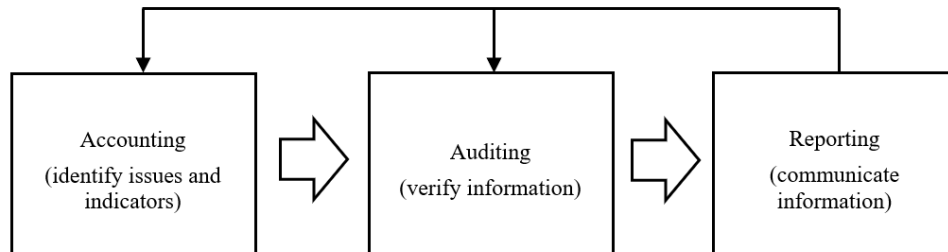
There are many definitions for organisational accountability. The lack of a clear and agreed-upon definition results in confusion and often makes the topic appear blurry and ill-defined (Göbbels & Jonker, 2003; Gray, 2001). Following Gray et al. (1996), in this thesis organisational accountability is defined as “the duty of an organisation to provide an account of its judgments, intentions, acts, and omissions for relevant stakeholders when appropriately called upon to do so”. Such a definition aims to reduce the likelihood of conflict and its negative repercussions. Accountability thus entails a mechanism of effective control by stakeholders, allowing an evaluation of the private or public good provided (Bonnafeous-Boucher, 2016). In this sense, since environmental resources and environmental information have the nature of public goods, corporate environmental accountability⁹ can be considered as part of organisational accountability.

There are three essential processes (see Figure 3.2) when thinking about organisational accountability (Belal, 2002). The first step, accounting, reflects the need to identify relevant issues and thus determines the scope of accountability-related actions at the beginning of the process (Bebbington & Thomson, 2007). Accounting also means deriving indicators that enable organisations to define clear performance targets. Second, auditing can then be defined as the process of externally or internally verifying the content and quality of accountability-related information to build trust with stakeholders (Zadek et al., 2013). Auditing can also mean taking corrective measures. Third, reporting includes all practices undertaken

⁹ See section 4.4, chapter 4 for a fuller introduction to corporate environmental accountability.

to communicate and measure the impact of accountability-related actions to gather feedback from stakeholders and consequently improve accounting and auditing practices (Gray, 2001).

Figure 3.2 *Processes fostering organisational accountability*



Accounting, auditing, and reporting are key process steps in managing information. However, the question remains: who are the stakeholders of a company? According to the stakeholder theory, a company is a community composed of stakeholders (Freeman et al., 2018). Stakeholders can provide the company with key resources that are beneficial to its earnings, and they interact with each other (Bonnafous-Boucher, 2016). The company needs to meet the needs of stakeholders and adopt appropriate methods to coordinate various interest demands (Harrison et al., 2019).

3.3.2.2 Stakeholder classification

According to Ackermann and Eden (2011), companies should win the support of stakeholders by fulfilling social responsibilities (such as environmental protection). The stakeholders are closely related to the survival and development of companies (Roberts, 1992). Some of them share the business risks of companies; some pay a price for companies' business activities; and some supervise or control companies. Different stakeholders have different mechanisms of action that affect the company (Freeman et al., 2010). Freeman and other scholars study stakeholders from different perspectives, as Table 3.1 below shows.

Table 3.1 *Classification of stakeholders*

Scholar	Research Perspective	Stakeholder Classification Model
Freeman et al. (2007)	From the perspectives of ownership, economic dependence, and social benefit	<ul style="list-style-type: none"> • Stakeholders with ownership <ul style="list-style-type: none"> ○ Managers ○ Directors ○ Other shareholders • Economically dependent stakeholders <ul style="list-style-type: none"> ○ Managers ○ Employees ○ Consumers ○ Suppliers ○ Creditors ○ Competitors ○ Local communities ○ Regulatory bodies • Related stakeholders in social interests <ul style="list-style-type: none"> ○ Government administrators ○ Special groups ○ Media
Charkham (1992)	From the perspective of whether there is a contractual relationship with the company	<ul style="list-style-type: none"> • Contracted stakeholders <ul style="list-style-type: none"> ○ Shareholders ○ Employees ○ VIP customers ○ Distributors ○ Suppliers ○ Lenders • Public stakeholders <ul style="list-style-type: none"> ○ Consumers ○ Regulators ○ Government departments ○ Media ○ Local communities
Darnall et al. (2010)	From the perspectives of corporate environmental strategy	<ul style="list-style-type: none"> • Direct stakeholders <ul style="list-style-type: none"> ○ Daily consumers ○ Commercial purchasers ○ Suppliers ○ Managers ○ General employees • Indirect stakeholders <ul style="list-style-type: none"> ○ Environmental groups ○ Communities ○ Trade unions ○ Government environmental departments
Huang and Kung (2010)	From the perspectives of stakeholders in environmental disclosure	<ul style="list-style-type: none"> • External stakeholders <ul style="list-style-type: none"> ○ Governments ○ Creditors, suppliers ○ Consumers ○ Competitors • Internal stakeholders <ul style="list-style-type: none"> ○ Shareholders ○ Employees • Intermediate stakeholders <ul style="list-style-type: none"> ○ Environmental protection organisations ○ Accounting companies

Specific to the environmental information disclosure, various stakeholders, whether internal stakeholders (e.g., managers, etc.) or external stakeholders (e.g., investors, creditors, governments, environmental groups, etc.), are very concerned about the environmental information disclosure in terms of the effects this has on their decisions (Bellucci & Manetti, 2018). What they have in common is their concern about whether their interests can be guaranteed (Giordano-Spring et al., 2018). Due to the differing significance stakeholders have as regards the survival of a company, it is unrealistic for the company to treat all the stakeholders equally (Amran & Keat Ooi, 2014). In practical terms, the company usually assigns different priorities when it comes to the information demands and needs of its stakeholders in line with its strategic objectives (Ackermann & Eden, 2011). For instance, if a company such as the heavy chemical industry is facing huge environmental pressure from the public and regulators, it would be inclined to disclose more environmental information voluntarily (Cormier & Magnan, 1999).

3.3.2.3 Stakeholder theory and CET

As suggested by stakeholder theory, the increased level of environmental awareness creates the need for companies to extend their communications to include stakeholders in order to adapt to changing social demands (Fernandez-Feijoo et al., 2014). Corporate environmental reporting has been the subject of various studies in recent years (Arena et al., 2015; Clarkson et al., 2011; Dobbs & van Staden, 2016; Helfaya et al., 2018; Raiborn et al., 2011). In whatever form, the environmental report demonstrates, first, the degree to which a company has accepted responsibility for environmental impacts caused by its products and production processes; second, the increased openness towards stakeholders; and finally, the importance of strategic environmental management (Arena et al., 2015). Given that there are costs involved in providing such disclosures—magnified by the fact that environmental reporting is largely unregulated—it is not surprising that prior studies indicate a wide diversity of corporate environmental reporting practices.

Some researchers in the area, such as Deegan and Rankin (1996), Hooghiemstra (2000), and Beck et al. (2010) suggested that environmental information disclosure helps improve the company's image. Others believed that companies continually seek to ensure that they meet the expectations of their respective stakeholders by

taking advantage of environmental reporting (Cho & Roberts, 2010; Cormier & Magnan, 2015; Deegan, 2002; Kuo & Chen, 2013). Although the stakeholder theory or some concepts of the theory have been applied to interpret corporate environmental reporting practices, empirical evidence in those studies indicates that companies have rarely proactively sought out the information requirements of their stakeholders (Bellucci & Manetti, 2018; Martín-de Castro et al., 2016). As a result, whether the environmental disclosure of companies can reflect their environmental performance is still a controversial issue. In other words, not only is there insufficient research on whether the environmental disclosure of companies is transparent, but also little is known about CET.

In this thesis, the researcher argues that this question could be answered by gaining a better understanding of stakeholder perceptions of environmental disclosure. Such understanding is fundamental in assessing the quality of corporate environmental information.

3.3.2.4 Limitations of stakeholder theory

Although the stakeholder theory is widely referenced, it also has some defects and inadequacies. First, there is no single agreed-upon scholarly definition for the term stakeholder, as it is difficult to define the boundaries around stakeholders (Harrison et al., 2019). Despite scholars' having developed various stakeholder classification models, most of these simply stay at the stage of discussion and hypothesis. Nor is it clear which of the dozen or so stakeholders is more important than another. The theory has not solved the problem of quantitatively measuring the weight of different stakeholders so far (Bryson, 2004; Crane & Ruebottom, 2011; Mitchell et al., 1997). Second, for most stakeholders, corporate reporting-based communication is not interactive (Bellucci & Manetti, 2018). To date, no truly feasible plan about how these stakeholders can engage in the decision-making process of the company has emerged. Without resolving these issues, the impact of stakeholders on the companies cannot be determined (Manetti, 2011). Last, by focusing on the organisational accountability, the theory ignores other factors which also influence CET, such as the need for companies to signal their superior quality to the market to attract investors and the need to legitimise their activities to meet

the societal norms and expectations. In the following section, the legitimacy and signalling theories are described.

3.3.3 Legitimacy and signalling theories

While legitimacy theory and signalling theories can exist separately, they are typically applied in combination within the social and environmental accounting literature (Cho et al., 2015). Initially, they both started with the idea of information asymmetry, which relates to the notion that two parties could get around the asymmetric information problem by having one party send a signal that would reveal some piece of relevant information to the other party (Spence, 1978). That party would then interpret the signal and adjust its behaviour accordingly (Zijl et al., 2017). A key assumption of legitimacy theory is that the company operates in society via a social contract where it agrees to perform various socially desired actions in return for approval of its objectives, other rewards, and its ultimate survival (Deegan, 2019). As an observable signal, social and environmental disclosure legitimises these actions. In legitimising its actions via disclosure, the company hopes ultimately to justify its continued existence (Guthrie & Parker, 1989).

Legitimacy and signalling theories suggest that companies aim to produce congruence between the social values inherent (or implied) in their activities and societal norms (Ashforth & Gibbs, 1990). Social and environmental disclosures may then be conceived as reacting to the environment where they are employed to legitimise corporate actions. In other words, as a signal, the social and environmental information disclosed by companies is used to secure organisational legitimacy. Organisational legitimacy is the core concept of legitimacy and signalling theories.

3.3.3.1 Organisational legitimacy

Definitions of organisational legitimacy are relatively broad and tend toward vague assertions about legitimation arising from consistency with sociocultural values (Deephouse et al., 2017). Frequently cited definitions of the term include:

“Legitimacy can be defined as 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. If a disparity, actual or potential, exists between the two value systems, there is a threat to the entity’s legitimacy” (Lindblom, 1994), and

“Legitimacy is a generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.” (Suchman, 1995)

More recently, following Suchman (1995), Bitektine (2011) offered an enumerative definition of legitimacy:

“The concept of organisational legitimacy covers perceptions of an organisation or entire class of organisations, judgment/evaluation based on these perceptions, and behavioural response based on these judgments rendered by media, regulators, and other industry actors (advocacy groups, employees, etc.)”

The enumerative definition is a helpful summary of legitimacy research that highlights the concept itself and reminds researchers that organisational legitimacy is a perception of organisations by stakeholders. However, its breadth and intricacy may challenge scholars attempting to operationalise the concept in a consistent and replicable fashion. Based on a critical review of prior definitions, Greenwood et al. (2017) offered a concise definition: “Organisational legitimacy is the perceived appropriateness of an organisation to a social system in terms of rules, values, norms, and definitions”.

This definition of organisational legitimacy is followed in the thesis. It can be seen from the definition that organisations seek to be perceived by stakeholders as legitimate. Because legitimacy is a moving target, organisations have to be pragmatic. The legitimacy gap, which refers to a discrepancy between an organisation's actions and a society's expectations of the organisation, is subject to change over time. As time progresses, the environment in which organisations operate will shift, which in turn can create a shift in societal expectations. These changing expectations affect the legitimacy of an organisation, and this shift creates a ‘legitimacy gap’ (Moloi & Marwala, 2020).

Lindblom (1994) defined the legitimacy gap as “the difference between the expectations of the relevant stakeholders relating to how an organisation should act,

and how the organisation does act”. According to Islam (2017), a legitimacy gap is based on relational perception which accepts a relationship between organisations and society. Essentially, two main sources of the legitimacy gap have been outlined, namely the changes in societal expectation and information asymmetry.

Changes in societal expectations and information asymmetry may put the organisation’s legitimacy at risk (Mahmud, 2019). When a body of information about whether or not an organisation is meeting society’s expectations has not been made available to the public, it can be expected that the failure to disclose will potentially become a ticking time bomb as regards the reputation of the organisation (Nasi et al., 1997). To mitigate the threat, an organisation has to put strategies in place to deal with the legitimacy gap. Organisations that do not have legitimacy strategies in place will be vulnerable, and this vulnerability will be exacerbated should threats arise. Fiedler and Deegan (2002) suggested that such strategies may include targeted disclosures. In Islam (2017) view, managing legitimacy effectively requires the organisation to consider the following actions:

- Identifying its conferring publics
- Establishing its conferring publics’ social and environmental values and perception of the corporation’s public pressure variables
- Deciding on the purpose of any potential organisational response to legitimacy threats
- Deciding on what tactics and disclosure options are available and suitable for managing legitimacy related to the purpose of the organisational response.

Cormier and Gordon (2001) proposed that legitimacy is based on perceptions. Should the crisis of legitimacy emerge, the organisation concerned will have to formulate the remedial actions required. In order for remedial actions to affect external parties, they must address the core issues. Further, these remedial actions must be accompanied by publicised disclosure. Consequently, Deegan (2002) stated that it becomes essential to manage this process through publicised corporate disclosures and other publicly released documents.

3.3.3.2 Legitimacy and signalling theories and CET

In concert with the strategic approach to organisational legitimacy, companies use corporate communication media (such as annual reports and CSR reports) to manage perceived environmental legitimacy by signalling to relevant stakeholders that their behaviour is appropriate and desirable and, at the same time, they react to public pressures by adapting the level, content, and quality of their environmental information dissemination processes (Aerts & Cormier, 2009).

Environmental performance is an increasingly important component of organisational legitimacy, as societal norms increasingly recognise the negative impacts on the local, national, and global commons that often result from corporate operations (Mobus, 2005). Pressures on companies to mitigate externalities continue, and organisations failing to respond risk the sanctions of public censure and loss of organisational legitimacy over and above any regulatory sanctions that may be imposed (Peters & Romi, 2013). Companies bear the burden of demonstrating environmental responsibility, and legitimacy dynamics are instrumental in accomplishing this end (Kuo & Chen, 2013).

Transparency via environmental disclosure is increasingly important for companies as a key strategy of offering supportive symbolic accounts of organisational responsibility on environmental performance (Tadros & Magnan, 2019). In the absence of a clear cultural definition of environmental performance, and with few consequential measures of outcomes, environmental reporting may be partially understood as efforts to signal procedural moral legitimacy ((T. Wilmshurst, D. & G. Frost, R., 2000). By producing reports that communicate positive organisational efforts, companies both contribute to culturally defining ‘sound practices’ and signal moral legitimacy by creating accounts of good-faith efforts to be socially responsible in the ensuing cultural space of environmental performance (Cho & Patten, 2007).

Over the last 20 years, legitimacy and signalling theories have been widely used to explain the proliferation of environmental information disclosure (Zijl et al., 2017). High-quality environmental disclosures signal that potentially significant business risks are being effectively managed; thus, they reduce information asymmetry and

lower the cost of equity if the reliability and relevance of these disclosures are guaranteed (de Klerk et al., 2015; de Villiers & van Staden, 2011). This view is supported by a growing body of research which finds a positive correlation between nonfinancial reporting and return on equity (de Klerk & de Villiers, 2012), the quality of an organisation's management (Churet & Eccles, 2014), and a company's perceived sustainability (Eccles & Saltzman, 2011).

Although prior studies (Aerts et al., 2008; Alipour et al., 2019; Gozali et al., 2002; Plumlee et al., 2015) hold a positive attitude towards high-quality environmental information disclosure, they have not yet reached unanimity in terms of measuring what constitutes high-quality environmental information disclosure¹⁰ (Helfaya & Whittington, 2019). This lack of consensus affects researchers' perception of CET. Based on the existing application of legitimacy and signalling theories, this thesis therefore tries to apply different perspectives to interpret CET by combining government intervention theory and stakeholder theory.

3.3.3.3 Limitations of legitimacy and signalling theories

Although legitimacy and signalling theories are commonly applied to explain corporate environmental disclosure, they have some limitations. First, legitimacy motives can be abused. An important unresolved question of theoretical and practical importance is whether the increasing prevalence of environmental information disclosure is an increase in actual CET and accountability or merely symbolic action (Marquis et al., 2016). For example, greenwashing is portrayed as a common type of selective disclosure whereby companies "mislead stakeholders about their actual environmental performance" (Delmas & Burbano, 2011) to create a false impression of transparency and accountability. Second, signalling comprehensive and transparent environmental information may prevent companies from maintaining a competitive advantage (Jinghua & Dan, 2016). For instance, because some environmental information (e.g., environmentally-related research and development and energy consumption involved in production) are critical resources for a company to maintain its competitive advantage, the disclosure of such commercially sensitive information might impair the interests of the company

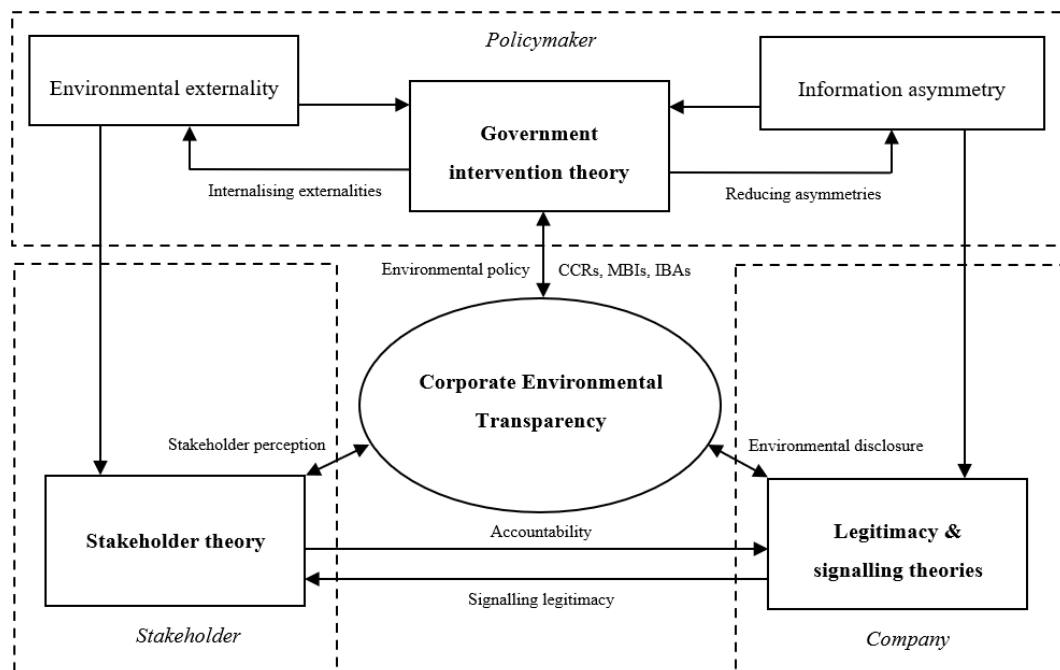
¹⁰ Section 4.5.1, chapter 4 discusses in detail the difficulty of measuring the quality of environmental information and the various existing methods and their drawbacks.

(e.g., be used or imitated by competitors). Last, legitimacy and signalling theories do not address whether any particular stakeholder groups are more readily affected by legitimising disclosures than others (Deegan, 2002).

3.4 Theory Triangulation for CET

Although each of the four theories discussed here can be applied to interpret some aspects of CET in China based on the above analysis, none of them is sufficient to be an adequate theoretical foundation in itself. Connecting them to each other could therefore help to make up for their respective limitations. Creswell (2018) suggested that theory triangulation is a strategy that involves the application of multiple theoretical perspectives when examining a situation or phenomenon. The idea is to look at a situation/phenomenon from different perspectives, through different lenses, with different questions in mind. In this thesis, four theories are integrated to construct a theory triangulation explaining CET in China. Figure 3.3 below demonstrates the relationships between the theories.

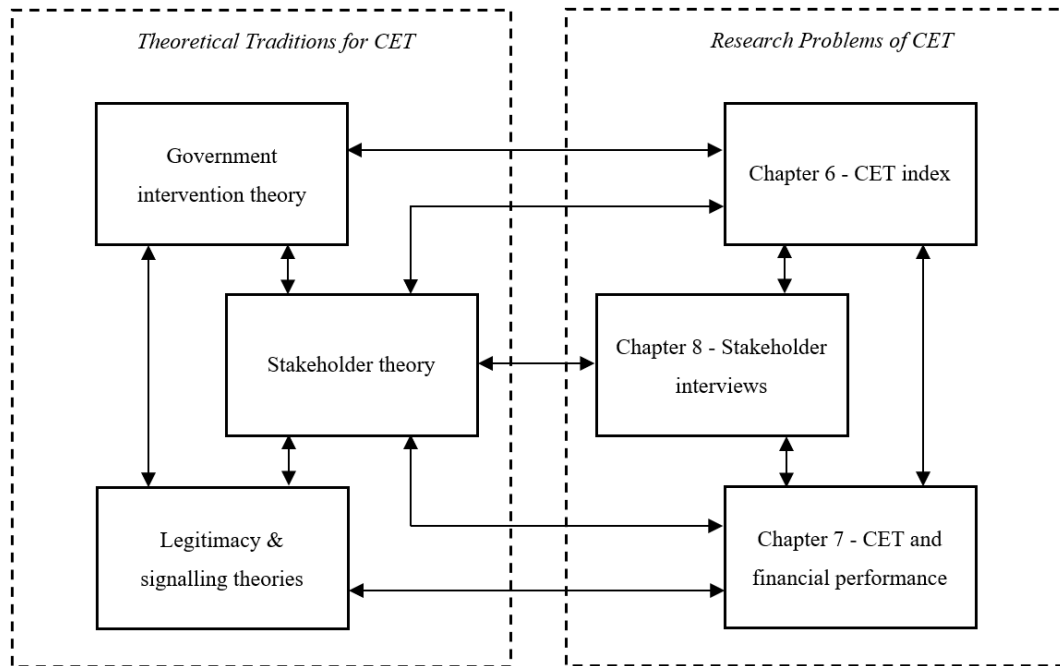
Figure 3.3 *Theory triangulation for CET*



Additionally, these theories also correspond to the problems addressed in chapters 6, 7, and 8, as Figure 3.4 below shows. Combined with the results of content analysis and the stakeholder questionnaire responses, chapter 6 develops a CET

index that considers the impact of different types of government environmental policies on Chinese listed companies. Chapter 7 develops a hypothesis based the theories behind CET and then tests the relationship between CET and corporate financial performance. Following the stakeholder theory, chapter 8 gathers and analyses stakeholders' perceptions of CET in China.

Figure 3.4 *CET theories and research problems*



3.4.1 Government intervention theory and stakeholder theory

Government intervention theory deals with how to correct the market failure that results from negative externalities (Baumol & Oates, 1988). The increasingly prominent issue of negative environmental externalities caused by production and operation of companies has spurred groups of organisational stakeholder to act and triggered community awareness of the problem (Gupta & Mason, 2014). A manifestation of these responses is shown by the emergence of lobby groups like Greenpeace and the Wilderness Society, the World Wide Fund for Nature, and so on. Likewise, the global community promotes worldwide commitment to ecological sustainability by coming together at Earth Summits such as those held in Rio de Janeiro in 1992, Johannesburg in 2002, and Le Bourget in 2015. These collective efforts create public pressure for governments to intervene (Deegan & Gordon, 1996). As a result, legislation such as the Environmental Offences and Penalties

Act 1989 in Australia, the Clean Air Act 1977 in the U.S., and the Environmental Protection Law 1989 in China were enacted.

Corporate environmental practices and reporting are important areas in which much community awareness has developed (Azzone et al., 1997). According to the stakeholder theory, corporate environmental practices and reporting can be regarded as a normal channel through which companies can respond to the interests of stakeholders (Amran & Keat Ooi, 2014). As one of these, the government as a representative of the public interest ensures that the public can obtain environmental information that is conducive to its decision-making (Harrison et al., 2019). The government's intervention in the supply and demand of environmental information is mandatory to some extent (Situ & Tilt, 2018). However, media coverage guides corporate behaviour through reputation mechanisms, such as moral standards and social norms (Tench et al., 2007).

Government regulation and media coverage are both external pressures on companies. The former forms 'hard constraints', while the latter forms 'soft constraints' (Hook et al., 2017). Under these two external constraints, the interests of stakeholders must be taken into account when companies are constructing their environmental strategies (Shen & Feng, 2012). If, in the event of an environmental accident, the interests of stakeholders have not been taken into account, the government is likely to impose punitive measures, and the media may expose companies to negative coverage (Shen & Feng, 2012; Sun et al., 2019). As a result, creditors are unwilling to support such companies, shareholders sell their shares, and the risk of bankruptcy increases sharply (Laszlo, 2003).

In the stakeholder theory, the government is often regarded as the external stakeholder of the organisation (Charkham, 1992; Darnall et al., 2010; Freeman et al., 2007; Huang & Kung, 2010). Organisations meet regulatory expectations in the form of compliance with laws and regulations (Freeman et al., 2010). According to government intervention theory, the government exerts a considerable influence on the decision-making of companies by making policies (Prado-Lorenzo et al., 2009), especially in countries where a collectivist culture is prevalent (Greenleaf, 2003). Taking China as an example, the interactions between governments and companies over the past 40 years suggest that such influence has been further amplified and

used to facilitate the goal of government intervention¹¹ (Heilmann, 2018; Lin et al., 2020; Lopatta et al., 2017; Shao et al., 2015). Theoretically, the process of internalising the negative externalities of the environment might also be smoother (Li et al., 2019). This view is consistent with the expectation of broader stakeholders, who engage in the decision-making of companies via the agent, i.e., government (Li et al., 2018). Therefore, it is necessary to combine government intervention theory with stakeholder theory to understand the role of the government as a stakeholder in the context of China. Doing so is also helpful in gaining more knowledge about how environmental policies affect CET.

3.4.2 Stakeholder theory and legitimacy and signalling theories

Pursuant to stakeholder theory, environmental information disclosure is one of the platforms through which companies can discharge their environmental accountability to their relevant stakeholder groups (Fernandez-Feijoo et al., 2014). Meanwhile, environmental information disclosure can be explained by legitimacy and signalling theories. Companies with good environmental performance may actively disclose relevant information to signal their superior quality, which means that environmental information disclosure has certain quality requirements (Tadros & Magnan, 2019). Providing accessible, clear, and reliable information is essential for companies to respond correctly to stakeholders' demands¹² (Akkermans et al., 2004; Bernstein, 2012; Briscoe & Murphy, 2012; Bushman et al., 2004; Eijffinger & Geraats, 2006; Granados et al., 2010; Kaptein, 2008; McGaughey, 2002; Nicolaou & McKnight, 2006; Philippe & Durand, 2011; Potosky, 2008; Vorauer & Claude, 1998; Walumbwa et al., 2011; Zhu, 2004).

As the international community has gradually formed a consensus on the severe environmental problems facing the world, it has become clear that various stakeholder groups have a higher need for environmental information (Silva et al., 2019). Meeting this need requires companies to disclose more environmental information, thus placing the pressure of legitimacy on companies (Alrazi et al.,

¹¹ In the case of state-owned companies, government intervention is often more direct through, for example command or control measures. For the private sector, market-based policy tools are more common, for example in the form of taxes (Lin et al., 2020).

¹² See section 4.3.1 in chapter 4 for more information about the three attributes (accessibility, clarity, and reliability) of the perceived environmental disclosure from the perspective of the information user.

2015). Although legitimacy and signalling theories have a relatively broader context than stakeholder theory, which focuses principally on the stakeholders of an organisation (Deegan, 2019), all these theories suggest that without transparency the platform may become a management tool derived from the company's response to the pressure of legitimacy from stakeholders (Arena et al., 2015; Cho & Patten, 2007).

When combining stakeholder theory with legitimacy and signalling theories, it can be assumed that transparency via environmental disclosure not only discharges accountability to various stakeholder groups, but also signals legitimacy and excellence to society (Gerab & Ching, 2017). In order to reduce the risk of companies' abusing environmental disclosure as a legitimating tool, a two-way communication model must be established (Bellucci & Manetti, 2018). This model means organisations can learn about the problems of their stakeholders immediately and deal with them promptly (Liu & Davey, 2014). In practice though such relationships are rare (Lane & Devin, 2018). However, from the perspective of research, it is helpful for the researcher to see the whole picture of CET. That is, both the signal sent by the information sender and the perceptions from the information user can be analysed.

3.4.3 Legitimacy and signalling theories and government intervention theory

Another important application of government intervention theory is to correct the market failure caused by information asymmetry (Huang et al., 2013). The concept of information asymmetry is also incorporated directly in legitimacy and signalling theories (Gerab & Ching, 2017). Legitimacy and signalling theories started with the idea of asymmetric information (a deviation from perfect information), which relates to the fact that, between the organisation and its relevant stakeholders, inequalities exist in the market (e.g., capital market) for acquiring complete information to make decisions (e.g., economic transactions, investment decisions, value assessments) (Connelly et al., 2011; Lions & Hodayoun, 2018; Spence, 1978).

Pursuant to legitimacy and signalling theories, the existence of the legitimacy gap puts companies at risk (Moloi & Marwala, 2020). Publicly signalling legitimacy to society offers an effective means through which to mitigate the threat (Cho & Patten, 2007). Considering that environmental information provides significant signals that relate to sustainable development and the legitimacy of an organisation, such information is increasingly demanded by various stakeholder groups in society (e.g., investors, creditors, and regulatory bodies) (Bini & Bellucci, 2019). Accordingly, there is a growing trend to disclose environmental information to society through annual reports and stand-alone reports (e.g., CSR reports, sustainability reports) or company websites (Del Baldo et al., 2020; Ghio, 2020; White, 2016).

Given that companies are in the favoured position of possessing environmental information, adverse selection and moral hazard are likely to occur in the absence of regulation to disclose it (Berthelot et al., 2003). For example, companies may choose to hide their environmental pollution in order to escape administrative penalty or may exaggerate their environmental protection behaviours through environmental disclosures to obtain qualifications or preferential policies (Laufer, 2003; Ramus & Montiel, 2005; Seele & Gatti, 2017). According to government intervention theory, environmental policies and regulatory measures can help reduce risks caused by information asymmetry (Droste et al., 2016).

Watts and Zimmerman (1978) explained why the government should regulate corporate information disclosure. They believed that the reasons are reflected in the inefficient or even ineffective information disclosure caused by the characteristics of public goods of accounting information and information asymmetry. Beets and Souther (1999) suggested that environmental reports without regulatory standards are less comparable and reliable than those that do contain these. In addition, studies on mandatory environmental information disclosure have verified the necessity of environmental accounting information regulation (Mobus, 2005; Stagliano & Freedman, 2002).

Overall, from the perspective of reducing information asymmetry, government intervention theory, legitimacy, and signalling theories all suggest an information disclosure mechanism in which companies can provide transparent environmental information (Archel et al., 2009). These theories start with the perspective of the

regulator and the regulated respectively; they are complementary theories in explaining CET practices of organisations.

3.5 Chapter Summary

From an interdisciplinary perspective, this chapter lays the theoretical foundation for CET by combining four theoretical traditions: government intervention theory, stakeholder theory, legitimacy theory, and signalling theory. These theories are widely applied in CET-related disciplines, including environmental economics, business ethics, and environmental accounting (Chen & Roberts, 2010; Endres, 2010; Jones, 2010; Pahuja, 2009; Phaneuf, 2017; Tricker, 2014; Weiss, 2014). Through a brief review of these disciplines, the relationship between theoretical traditions and CET is clearly presented.

First, unlike other theories, government intervention theory has rarely been used in the environment where the market mechanism is relatively developed (Mises, 2011). Although studies in economics have affirmed the role of government intervention in correcting market failures caused by environmental externalities and information asymmetry (Droste et al., 2016; Stiglitz, 2013), the intense criticism of its limitations has prevented scholars and policy-makers from applying the theory in research and practice (Ikeda, 2002). Nevertheless, in regions with relatively undeveloped market mechanisms (e.g., Mainland China), the theory has been repeatedly practised and improved (Shao et al., 2015; Wang et al., 2021). In practice, it has been proved to be effective in promoting policy implementation under the conditions of a state-led market economy (or state capitalism¹³) (Heilmann, 2018). However, it remains to be studied whether this theory can apply in improving the effectiveness of environmental policies and the environmental transparency of companies.

Second, stakeholder theory plays an important role in business ethics (Tricker, 2014). The environmental protection obligations of companies are also related to their business ethics (Newton, 2005; Tencati & Perrini, 2011). In this case, stakeholder theory fit in well with the research related to CET. Stakeholder theory

¹³ The term ‘state capitalism’ was previously used to depict the communist regimes of the former Soviet Union, China, Cuba, and North Korea. Today, it can be applied to many governments using state ownership to keep key industries in public hands (Lambin, 2014).

argues that organisations should discharge accountability to their relevant stakeholder groups (Harrison et al., 2019). It presents the concept of organisational accountability in the form of accounting, auditing, and reporting (Belal, 2002), whereas, for most stakeholders, the communication is not interactive.

Third, legitimacy and signalling theories, which further develop the stakeholder theory, suggest that organisations should not only comply with the societal expectations (or discharge their accountability), but should also ensure that they are perceived to be compliant with the societal expectations and norms of various stakeholder groups in society (or signal their organisational legitimacy to society) (Moloi & Marwala, 2020). It is worth noting that this incentive to gain or maintain legitimacy can be overused (Seele & Gatti, 2017).

Since these theories all have their respective limitations in explaining CET, it is necessary to link them together to form a foundation for CET. Moreover, the interrelated connections between these theories makes this linkage possible. Reviewing the relationship between these theories has also made the path to solving the research problems in this thesis more explicit. The theoretical analysis in this chapter thus lays a solid foundation for chapters 6, 7, and 8.

In the next chapter, a systematic review of a conceptual framework of CET is presented.

Chapter 4

Literature Review and the CET Model

4.1 Introduction

Transparency is not a new concept in literature and policy-making practice. Major crises like the Great Depression and the global financial crisis all prompted transparency reforms. For our generation, a significant global challenge is the environmental crisis. As the need to search for solutions to the environmental crisis reaches a global consensus, transparency via information disclosure sits increasingly at the heart of global environmental policy practices, termed IBAs here (Bowen et al., 2020; Davey, 1985). A recent example of an IBA is the formation of the International Sustainability Standards Board (ISSB) which was announced at COP26 (IFRS, 2021) This body aims to develop a comprehensive set of baseline sustainability standards for global use. Such a set of standards would not only help to harmonise and promote transparency of environmental disclosures across jurisdictions, but would also replace the use of existing voluntary standards.

Although the concept of transparency has increasingly featured in recent news headlines and environmental policy-making practices, it remains a relatively understudied phenomenon in academia (Schnackenberg & Tomlinson, 2016). Existing studies often confuse the concepts of environmental disclosure and environmental transparency. In fact, from the perspective of the user of the information, the concept of transparency is broader than the concept of information disclosure. In addition to disclosure in corporate reports, there are other channels available for making corporate environmental information transparent to the public, e.g., government websites, news media, etc. In this chapter, a systematic literature review regarding the conceptual framework for CET is conducted. The structure of this chapter is organised as follows.

Section 4.2 starts with the definition of CET and then shows its components. The three main components of CET are reviewed in detail in sections 4.3, 4.4, and 4.5 respectively. In addition, section 4.6 develops a CET model for the Chinese context. Finally, section 4.7 summarises the chapter.

4.2 Conceptual Framework for CET

The concept of transparency is frequently studied across a variety of research streams. These include: leadership (Walumbwa et al., 2007); negotiations (Vorauer & Claude, 1998); strategic alliances and management (Akkermans et al., 2004; Larsson et al., 1998; McGaughey, 2002); financial markets (Bloomfield & O'Hara, 1999; Eijffinger & Geraats, 2006; Flood et al., 1999; Jordan et al., 2000; Madhavan et al., 2005); organisational culture and governance (Bushman et al., 2004; Kaptein, 2008; Nicolaou & McKnight, 2006; Potosky, 2008; Prat, 2005); human resources (Berkelaar, 2017); workplace ethics (Kaptein, 2008); corporate social responsibility (Lizet et al., 2007); and information systems (Granados et al., 2010; Zhu, 2004). With the emergence of a significant body of knowledge on transparency, accounting researchers have begun to pay attention to this field and extend this concept to corporate transparency (Bushman et al., 2004), reporting transparency (Barth & Schipper, 2008), and environmental transparency (Yu et al., 2018), etc. Albeit important and valuable, prior studies tend to have an isolated focus on a specific aspect of CET or a specific notion of CET, which obstructs identification of interrelationships among components of CET. Accordingly, a broad assessment of CET as a system by reflecting on recent CET research is needed. The purpose of this review is not to summarise all the available knowledge contributed by CET researchers, but rather to propose a conceptual framework that recognises interrelationships among CET components and provides directions for this thesis.

4.2.1 The definition of transparency

Although there are myriad meanings and clear definitions for the term transparency in numerous contexts, it is particularly difficult to define the concept of transparency and how it can be achieved within the context of organisations. The Cambridge Dictionary defines transparency as “the characteristic of being easy to see through” and “a situation in which business and financial activities are done in an open way without secrets, so that people can trust that they are fair and honest”. Schnackenberg and Tomlinson (2016) synthesised a number of concepts from the literature and offered the following definition: “transparency is the perceived quality of intentionally shared information from a sender”.

However, the term is highly contested in practice, as individuals interpret it on the basis of their own ideological perspectives. In accounting research, transparency is commonly understood in reference to corporate transparency. According to Bushman et al. (2004), corporate transparency is “the widespread availability of company-specific information concerning publicly listed companies in the economy to those outside the company”. This definition notes that corporate transparency involves periodic disclosure of company-specific information on a voluntary or mandatory basis.

Transparency has also been associated with various overlapping notions including corporate governance, corporate social responsibility, and corporate environmentalism, which focus on principles such as information attribute, source, and quality (Beekes et al., 2016; Bushman & Smith, 2003; Hermalin, 2014; Patel et al., 2002). In this thesis, Bushman et al. (2004) definition is adopted in conjunction with Schnackenberg and Tomlinson (2016) studies of transparency. In this way, transparency is defined as a concept that comprises perceived disclosure, accountability, and quality dimensions and refers to the availability of company-specific information to those outside publicly listed companies.

Table 4.1 *Schnackenberg and Tomlinson (2016) ’s collections of transparency*

Research	Study Domain	Definition of Transparency
Akkermans, Bogerd, & van Doremalen (2004)	Strategic alliances	Sharing data regarding current order and production statuses as well as plans and forecasts with various supply chain partners
Bloomfield & O’Hara (1999)	Financial markets	The real-time, public dissemination of trade and quote information
Bushman, Piotroski, & Smith (2004)	Organisational governance	The availability of firm-specific information to those outside publicly listed companies
Eijffinger & Geraats (2006)	Monetary policy	The extent to which central banks disclose information that is related to the policy-making process
Flood, Huisman, Koedijk, & Mahieu (1999)	Financial markets	The ability of market participants to clearly see outstanding price quotes
Granados, Gupta, & Kauffman (2010)	Electronic markets	The availability and accessibility of market information to interested parties
Jordan, Peek, & Rosengren (2000)	Financial markets	The disclosure of timely and accurate information
Kaptein (2008)	Organisational culture	Ensuring visibility within the organisation to allow employees to properly modify or correct behaviours

Research	Study Domain	Definition of Transparency
Larsson, Bengtsson, Henriksson, & Sparks (1998)	Strategic alliances	Openness toward partners
Madhavan, Porter, & Weaver (2005)	Financial markets	The ability of market participants to observe information about the trading process
McGaughey (2002)	Strategic management	The extent to which members of a population (a) have identified or are aware of an intellectual asset's existence and (b) understand the intellectual asset's underlying principles
Nicolaou & McKnight (2006)	Organisational governance	The availability of adequate information to verify or assess the data exchange taking place
Pagano & Roell (1996)	Financial markets	The degree to which the size and direction of the current order flow are visible to the competing market makers involved in setting prices
Potosky (2008)	Organisational governance	The extent to which a communication medium facilitates a clear or unobstructed communication exchange
Prat (2005)	Organisational governance	The ability of the principal to observe how the agent behaves and the consequences of the agent's behaviour
Vorauer & Claude (1998)	Negotiations	The degree to which an individual's objectives are readily apparent to others
Walumbwa, Luthans, Avey, & Oke (2011)	Leadership	Leader behaviours that are aimed at promoting trust through disclosures that include openly sharing information and expressions of the leader's true thoughts and feelings
Zhu (2004)	Electronic markets	The degree of visibility and accessibility of information

Note. Reprinted from *Organizational Transparency: A New Perspective on Managing Trust in Organization-stakeholder Relationships* by Schnackenberg and Tomlinson (2016). Copyright 2016 by Journal of Management.

4.2.2 The definition of CET

Similarly, there is no single definition of CET and what it encompasses. CET focuses on company-level transparency for voluntary or mandatory disclosure of environmental information (Vaccaro & Patiño Echeverri, 2010). It has multiple interpretations, including its use as an umbrella term that covers existing approaches to assessing the quality of corporate environmental disclosure, a measurement and management concept for corporate environmentalism, or a stakeholder engagement process used to develop tools for measuring and managing

dimensions of CET and the links among them (Alrazi et al., 2015; Banerjee, 2002; Brammer & Pavelin, 2008).

These diverse interpretations suggest that, at its core, CET neither exists within any single domain of research nor operates within any one context of study. Rather, the emerging consensus is that CET can exist across contexts and domains of research. In addition, a review of the literature shows that most (but not all) relevant applications of CET exist at the company-level of analysis and specifically in relation to external stakeholders, such as investors, governments, and society (Bloomfield & O'Hara, 1999; Bushman et al., 2004; Flood et al., 1999). Accordingly, a useful definition of CET must be broad enough to enable researchers from a variety of backgrounds to incorporate it into their study designs. At the same time, it must be specific enough to meaningfully inform environmental policy practice.

For these reasons, different contexts of study, levels of analysis, or domains of research are considered in the sections that follow. A company-level conception of CET that draws examples from the literature is adopted to help uncover its core theoretical properties and to elaborate on the aspects of its structure. As the aim of this chapter is to provide a broad overview of CET, different interpretations are embraced. Therefore, CET is defined by the researcher as “an all-encompassing phase that incorporates the perceived environmental disclosure, corporate environmental accountability, and environmental information quality dimensions.”

4.2.3 Main components and subcomponents of CET

In light of the growing importance of IBAs, more researchers have started to deal with CET (Michael et al., 2011). Comprehensive reviews of the literature, including articles and books that take a broader overview approach (e.g., Gupta & Mason, 2014) reveal the use of similar terminology but in slightly different ways. Three of the major concepts that relate to CET that emerge from the reviews of the literature are: (1) perceived environmental disclosure (Bushman et al., 2004), (2) corporate environmental accountability (Gray et al., 1996), and (3) environmental information quality (Raiborn et al., 2011; Schnackenberg & Tomlinson, 2016). Even though these concepts are ubiquitous, no prior study relates these concepts to

each other in a systematic way. This synthesis of the literature delineates these three important concepts of CET, explains the linkages between the concepts, and depicts the concepts and linkages diagrammatically in a framework. This is labelled the conceptual framework of CET in this thesis.

Figure 4.1 *The conceptual framework for CET*

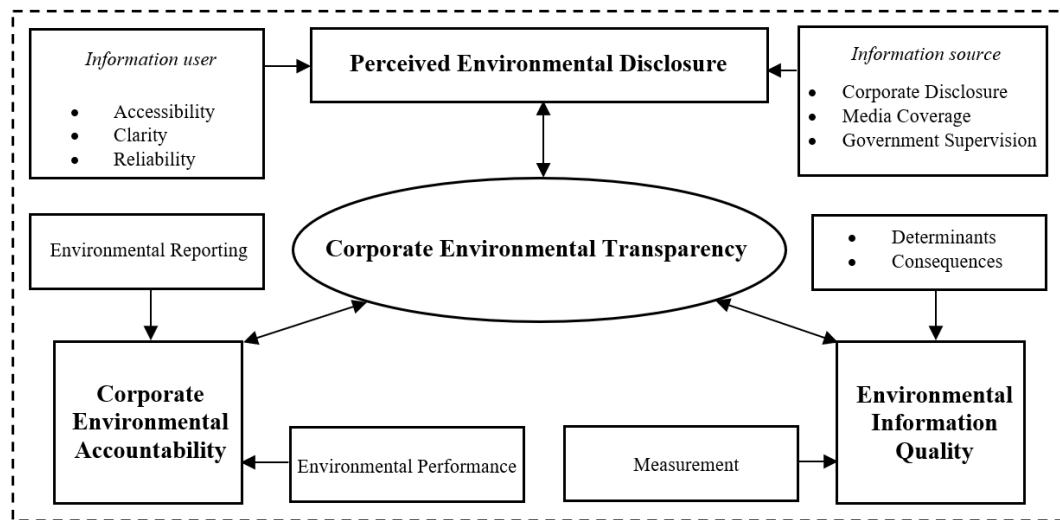


Figure 4.1 presents the conceptual framework for CET. The framework identifies three main components (perceived environmental disclosure, corporate environmental accountability, and environmental information quality) and recognises their subcomponents respectively.

4.2.3.1 Perceived environmental disclosure

The first main component of CET—perceived environmental disclosure—is reviewed from two different perspectives, namely the perspective of the information user (Cotter et al., 2011) and the perspective of the information source (Shane & Spicer, 1983). From the perspective of the information user, the most frequently mentioned key words are openness, accessibility, observability, availability, clarity, simplicity, reliability, and accuracy when perceived disclosure is discussed (Akkermans et al., 2004; Bernstein, 2012; Briscoe & Murphy, 2012; Bushman et al., 2004; Eijffinger & Geraats, 2006; Granados et al., 2010; Kaptein, 2008; McGaughey, 2002; Nicolaou & McKnight, 2006; Philippe & Durand, 2011; Potosky, 2008; Street & Meister, 2004; Vorauer & Claude, 1998; Walumbwa et al., 2011; Zhu, 2004).

Table 4.2 Schnackenberg and Tomlinson (2016) 's collections of CET attributes

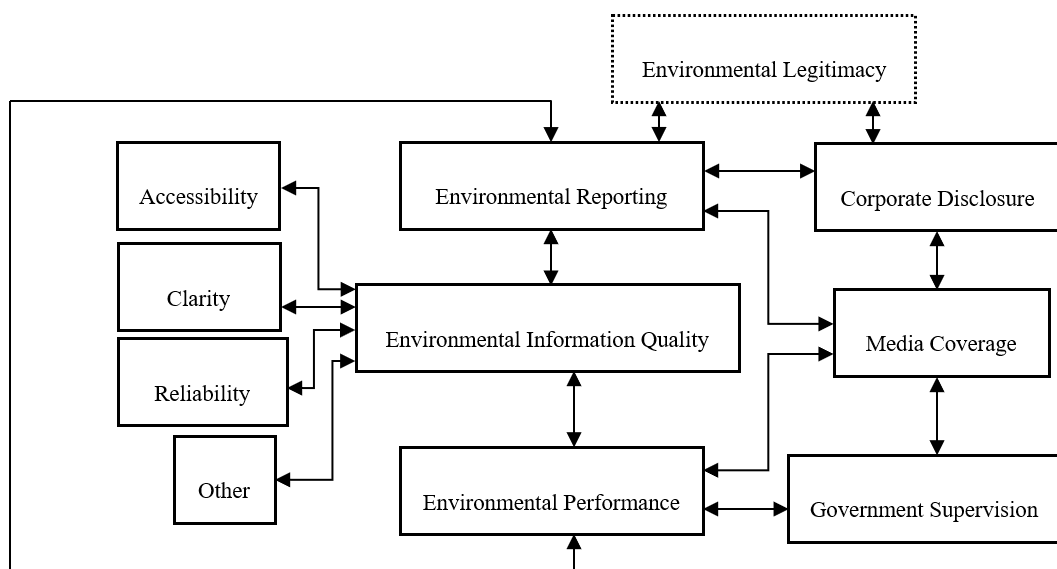
Research	Similar Conceptualisations Discussed		
	Accessibility	Clarity	Reliability
Akkermans, Bogerd, & van Doremalen (2004)	Disclosure, openness	Not considered	Reliability
Bernstein (2012)	Observability	Encryption (language that only selected others can interpret)	Accuracy
Briscoe & Murphy (2012)	Not considered	Clarity, simplicity	Not considered
Bushman, Piotroski, & Smith (2004)	Disclosure, availability, timeliness	Not considered	Validity (related to audited information)
Eijffinger & Geraats (2006)	Disclosure, openness	Not considered	Precision (of political and economic information)
Granados, Gupta & Kauffman (2010)	Disclosure, availability, accessibility	Simplicity	Distortion (related to the display of inaccurate information)
Kaptein (2008)	Visibility, observability	Clarity	Not considered
McGaughey (2002)	Disclosure, observability	Simplicity, understandability	Not considered
Nicolaou & McKnight (2006)	Availability, relevance, timeliness	Interpretability	Accuracy, reliability
Philippe & Durand (2011)	Disclosure, timeliness	Simplicity	Precision (of information related to the firm's environmental impact)
Potosky (2008)	Not considered	Clarity, simplicity	Not considered
Street & Meister (2004)	Accessibility	Understandability	Correctness
Vorauer & Claude (1998)	Accessibility	Not considered	Accuracy
Walumbwa, Luthans, Avey, & Oke (2011)	Disclosure, openness	Clarity	Not considered
Zhu (2004)	Visibility, accessibility	Not considered	Accuracy

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Based on a review of studies that discuss the underlying characteristics of the perceived disclosure from the perspective of the information user, Schnackenberg

and Tomlinson (2016) illustrated that common conceptualisations are subsumed within the perception of these three attributes (accessibility, clarity, and reliability) as shown in Table 4.2. Grouping these together leads the researcher to expect that each of these attributes is a distinct critical factor that explains a fundamental aspect of the perceived environmental disclosure and furthermore CET. Specifically, each contributes a unique perspective on the meaning of environmental information quality such that together they provide a parsimonious foundation upon which to study CET.

Figure 4.2 Relationships in the CET framework



In addition to the information user, there is another perspective through which to look at the perceived environmental disclosure. From the perspective of the information source, the concept of the perceived disclosure implies that information must be openly shared for it to be considered transparent (Schnackenberg & Tomlinson, 2016). This process of information disclosure can be done from within or outside the organisation. Yet disclosure is more than the open transfer of all available information. It also warrants a careful consideration of where the information comes from (Sun et al., 2019).

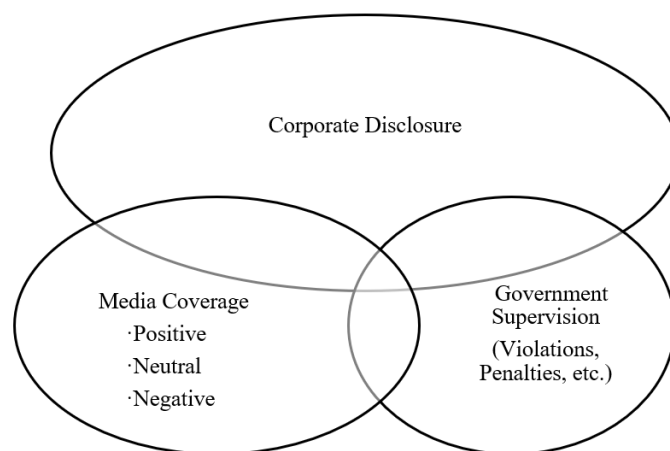
Considering the existing studies on environmental information (Brown & Deegan, 1998; Core, 2001; Haider, 2016; Md Zaini et al., 2018; Ostman & Parker, 2010; Sun et al., 2019) and the information channels available to the public, three

categories of corporate environmental information are adopted in this thesis according to their information sources:

- *Government supervision* covers violations of environmental laws or regulations, penalties for failing to meet mandatory environmental disclosure requirements, etc. issued by the regulatory authorities.
- *Media coverage* refers to positive, neutral, or negative corporate environmental information circulating in the market that is not published by companies nor authorities. It may come from formal news outlets or unknown provenance that has attracted media attention.
- *Corporate disclosure* refers to the environmental information disclosed by companies on the basis of meeting the voluntary or mandatory disclosure requirements.

Existing studies on the levels of CSR can help illustrate the relationships among the three categories. Carroll (2016) reviewed the well-known Carroll's Pyramid of CSR and pointed out that on the basis of achieving economic goals and complying with legal requirements, companies are expected by stakeholders to take more ethical responsibilities and finally give back to society. In other words, economic and legal responsibility constitute the foundation of CSR; the next level is to meet the social expectations of its ethical responsibility, while the highest level requires voluntary actions and a sense of good corporate citizenship (Masoud, 2017).

Figure 4.3 *Three tiers of CET*



Similarly, CET can also be interpreted at three different levels. First, the fundamental level of CET is to meet the needs of the government authorities for their regulatory supervision (Tan, 2014). Second, companies are expected by stakeholders to have higher environmental transparency under the media and public exposure (Hook et al., 2017; Tench et al., 2007; Zyglidopoulos et al., 2012). Last, the highest level of CET requires companies to actively disclose high-quality environmental information so as to signal their environmental legitimacy to the public (Ghio & Verona, 2020; Gupta & Mason, 2014; Martin, 2002). Figure 4.3 presents the relationships between the three tiers of CET. The scope of the three tiers is different. From government supervision to corporate disclosure, the corporate environmental information involved in it shows an increasing trend.

Since corporate disclosure involves the most extensive environmental information, there are abundant and sufficient studies on its accessibility, clarity, and reliability in existing literature (Granados et al., 2010; Kaptein, 2008; Milne & Adler, 1999; Potosky, 2008; Winkler, 2000; Zhu, 2004). Particularly, the reliability of corporate disclosure is rather controversial (Gu & Li, 2007; Stocken, 2000). Research based on the corporate disclosure index may yield inconsistent results compared with research from the perspective of the information user (Clarkson et al., 2011; Helfaya et al., 2018). In addition, existing literature on media coverage and government supervision focuses mostly on their relationship with corporate environmental disclosure (Bewley & Li, 2000; Brown & Deegan, 1998; Rupley et al., 2012). In fact, the analysis and comparison of both the internal and external environmental information of companies can better reflect the overall picture of environmental disclosure (Hahn & Kühnen, 2013). However, very little interest has been paid to this area.

Overall, as the first dimension of CET, the perceived environmental disclosure not only provides a way to understand the quality of environmental information from the users' perspective, but also helps to categorise different sources of corporate environmental information. The apparent convergence around corporate disclosure research masks gaps and inconsistencies in the literature that hinder systematic interpretation of CET. Hence, the following research questions related to the first dimension need to be addressed:

- In addition to disclosure in corporate reports, are there any other channels available for making corporate environmental information transparent to the public?
- How does the corporate environmental information from outside a company affect the environmental transparency of the company?
- As the information users, how do stakeholders perceive the accessibility, clarity, and reliability of corporate environmental information?
- How do these perceptions affect the environmental transparency of a company?

The second specific objective of this thesis is built on these research questions. Chapter 6 makes a detailed analysis to achieve this objective.

4.2.3.2 Corporate environmental accountability

The second dimension of CET is the corporate environmental accountability. Gray et al. (1996) define accountability as entailing two essential aspects, namely doing the right thing (performance) and giving an account of it (reporting). In light of the existing studies on social and environmental accountability (Baker & Schaltegger, 2015; Gray, 2005; Gray et al., 2015; Parker, 2005), environmental performance and environmental reporting are chosen as the two subcomponents of corporate environmental accountability in the CET framework of this thesis.

Environmental performance is an important concept in the framework. Improvements in environmental performance will, after all, lead to the goal realisation of environmental policies. However, without reporting on environmental performance, stakeholders may not be aware of the performance achieved. Environmental reporting therefore influences the level of stakeholder satisfaction and thus the environmental legitimacy of the organisation (Massa et al., 2015; Samkin, 2012).

Although environmental reporting serves as an important carrier for achieving objectives of IBAs, the issue as to whether companies' environmental disclosures are informative and reliable or elusive and opportunistic remains unresolved. Prior research attempts to answer the question by investigating the association between a company's environmental reporting and its environmental performance, suggesting

that it is indicative of a reporting bias (Berthelot et al., 2003). From such an association, a company's motivation to provide such disclosures is then inferred.

Evidence arising from these efforts offers two perspectives. On the one hand, some studies find that companies with high environmental performance report more information, in all likelihood because of the economic benefits derived from announcing positive news. These findings are viewed as being consistent with an economic signalling argument and are otherwise labelled as the voluntary environmental disclosure view (Clarkson et al., 2008). On the other hand, other studies find that low-performers use their disclosures as tools for impression management to legitimise their operations and mitigate any pressure to conform to societal norms. According to these findings, environmental reporting is deceptive, and even hypocritical, about the underlying environmental performance (Cho et al., 2015; Ingram & Frazier, 1980).

In this thesis, the researcher argues that these contrasting findings can be reconciled by gaining a better understanding of stakeholder perceptions of environmental disclosure. Such understanding is fundamental in assessing the quality of corporate environmental information. In fact, as the second dimension of CET, corporate environmental accountability is a bridge linking the first dimension (perceived environmental disclosure) and the last dimension (environmental information quality). An understanding of the second dimension can be achieved while answering the research questions on the first dimension and the third dimension.

Initially, external sources of corporate environmental information included in the first dimension provide channels for stakeholders to capture companies' environmental performance in a relatively objective way. To study the first dimension (perceived environmental disclosure), questions such as how stakeholders view the performance and to what extent it affects their trust in the companies must be answered.

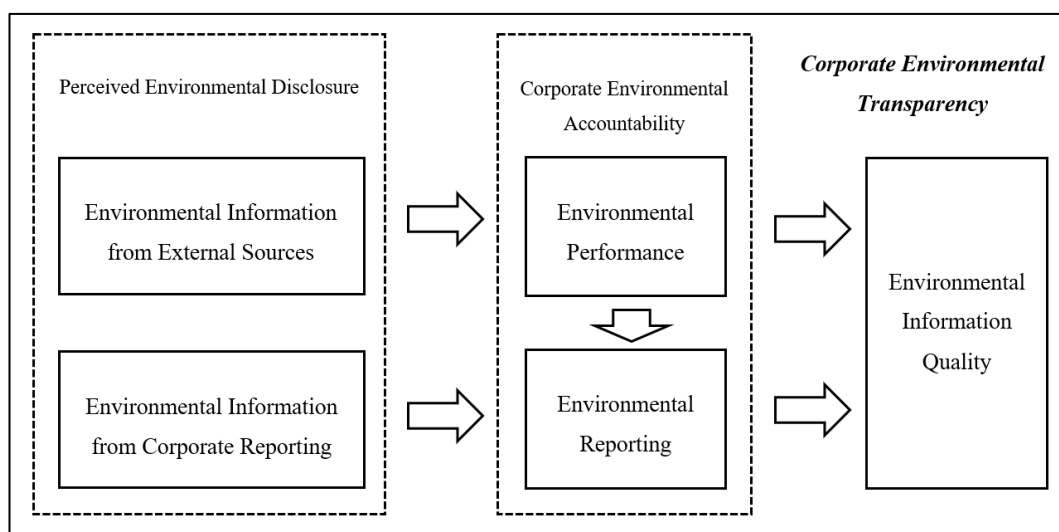
Additionally, large amounts of internal environmental information are released to the public in the form of corporate environmental reporting. Measuring the quality of this information is crucial to understanding CET. To measure the last dimension

(environmental information quality), two aspects of information must be taken into account:

- Corporate disclosure of environmental impact, efforts towards the reduction of such impact, and related financial elements
- External sources of corporate environmental information that can objectively reflect companies' environmental performance, including media coverage and government supervision information.

Overall, although the thesis does not set specific research objectives for the two subcomponents of the second dimension (corporate environmental accountability), it is incorrect to think that the existence of this dimension is unnecessary. On the contrary, without this dimension in the CET framework, it is impossible to see the whole picture of CET. As existing studies have explored the nature and definition of environmental performance and environmental reporting, the emerging consensus is that performance and reporting are the two components of accountability. It is inappropriate to classify them into the other two dimensions. Therefore, the second dimension (corporate environmental accountability) is listed separately in the analysis of the CET framework, while the exploration of it is included in the study of the first and last dimensions in subsequent chapters.

Figure 4.4 *Three dimensions of CET*



4.2.3.3 Environmental information quality

The last dimension of CET is the environmental information quality. It is also the core component of the CET framework. The emerging consensus is that transparency perceptions vary according to the perceived quality of information (Kundeliene & Leitoniene, 2015). The importance of information quality is highlighted either explicitly or implicitly across virtually all of the transparency studies reviewed. For example, transparency has been measured as the perceived quality of information an organisation shares with its employees (Rawlins, 2008), the perceived quality of information gathered by an organisation about its customers (Awad & Krishnan, 2006), and the perceived quality of information shared by an organisation with its external stakeholders (Bushman et al., 2004). These studies operationalise transparency in a variety of ways. Nevertheless, they carry with them a core belief that information quality is central to transparency.

In fact, environmental information quality has indeed attracted many scholars' attention in the area of environmental accounting. Accurately measuring the environmental information quality has been one of the key concerns for environmental accounting researchers since the 1970s (Buzby, 1974; Wiseman, 1982). Helfaya and Whittington (2019) classified the different approaches into two groups: (a) unidimensional measures (simple measures) and (b) multidimensional measures (compound measures).

The unidimensional measures focus on the quantity of environmental disclosure and the scope (width) of environmental items disclosed. The quantity measure refers to the amount of information disclosed by companies, taking into account the number of words, sentences, or units/pages with environmental information (Neu et al., 1998). Regarding the range of environmental information disclosed, the punctuation of each item is 0 point if there is no environmental information on that item/theme, or 1 point if the information provided, whether that information is narrative, physical, or financial (Guthrie et al., 2008). These are simple measures in which quantity can be captured by relative quantity or an unweighted disclosure index.

The multidimensional measures are computed in several steps to build a weighted index or obtain users' perceptions of the environmental information content. These measures usually involve the consideration of several dimensions. For example, Al-Tuwaijri et al. (2004) developed their quality index based on previous literature, combining the occurrence of the environmental items and the measures used to disclose it. van Staden and Hooks (2007) developed an index to assess the quality of the environmental disclosures based on a 5-point scale. Baalouch et al. (2019) computed a synthesis of the five qualitative attributes (relevance, neutrality, clarity, comparability and verifiability) indices using the simple arithmetic mean. In addition to the above measures from the preparer-based view, a model developed by Helfaya et al. (2018) was based on the findings of a questionnaire ascertaining the quality perceptions of 177 users of environmental reporting. The analysis of these 177 responses identified a three-dimensional user-based view of assessing reporting quality. This was therefore a less subjective model than one based solely on author perceptions, and it indicated that the relative importance to be applied to each of the quality's dimensions for the weighted quality model should be based on users' perceptions. Unfortunately, their study simply relied on the survey results of questionnaires and did not apply their results to further give a weighting on a quality index.

Another area into which scholars have put efforts is the determinants and consequences of the environmental information quality. Yet the lack of convergence around a unified measurement of the aspects of information quality that matter most to transparency has prohibited them from advancing a systematic theory of its determinants and consequences. Existing studies on antecedents are mostly at a relatively early stage, and their conclusions are mainly drawn from limited markets or specific industries. For example, company size, environmental sensitivity, and assurance have been found to be primarily associated with the environmental information quality by testing the evidence from the UK, Australia, and France (Baalouch et al., 2019; Brammer & Pavelin, 2008; Lee, 2017; Moroney et al., 2012). Findings on consequences has focused on the impact on financial performance in certain countries and regions (Aerts et al., 2008; Alipour et al., 2019; Clarkson et al., 2013; Plumlee et al., 2015; Roy & Ghosh, 2011).

Overall, most studies employ quantity of disclosure or unweighted disclosure indices based on the level of coverage of certain themes or topics. Despite the wide usage of these measures, there is no universally applicable standardisation, given the cross-country differences in IBAs. Moreover, such studies lack the benefit of appropriately weighting different sources of environmental disclosure and a combination of preparer- and user-based views (Beattie et al., 2004). Thus, some care is required when using these measures/indices as a measure of environmental information quality, as a higher quantity or number of disclosure themes is not necessarily a sign of higher information quality. Besides, although studies on the determinants and consequences of environmental information quality have yielded some results, evidence from emerging markets is still insufficient. In fact, these countries are where the major environmental issues are occurring, and the task of solving environmental problems is even more urgent. Therefore, the following two research questions related to the third dimension need to be addressed:

- How does CET affect a company's financial performance from the perspective of statistical analysis?
- What factors could influence a company's CET from the stakeholders' perspective?

These two research questions correspond to the third and fourth specific research objectives in this thesis respectively. Chapter 7 uses statistical analysis to achieve the third objective, while chapter 8 adopts thematic analysis to identify themes from stakeholder interview transcripts.

The three dimensions of CET have been briefly described above. Next, the following three sections provide a systematic literature review on each of the dimensions of CET, namely perceived environmental disclosure, corporate environmental accountability, and environmental information quality.

4.3 Perceived Environmental Disclosure

Perceived disclosure is defined as the perception that relevant information is received in a timely manner (e.g., Bloomfield & O'Hara, 1999; Williams, 2008). In the literature, a variety of studies advocate for the use of perceived disclosure as a

dimension of transparency (e.g., Bushman et al., 2004; Finel & Lord, 2002; Madhavan et al., 2005; Nicolaou & McKnight, 2006; Pagano & Röell, 1996; Pirson & Malhotra, 2011). CET is a further extension of the concept of transparency in the field of corporate environmentalism. Therefore, the use of perceived environmental disclosure as a dimension of CET is consistent with the literature.

4.3.1 The perspective of the information user

As noted previously, users' perceptions of three attributes (accessibility, clarity, and reliability) were summarised from a bunch of common conceptualisations. For users (stakeholders), the perceived environmental disclosure generally refers to the extent to which corporate environmental information is released rather than hidden. In other words, the intentionally shared information should be accessible, clear, and reliable to them.

4.3.1.1 Accessibility

The concept of accessibility implies that information must be accessible for its users (stakeholders) for it to be considered transparent. Pirson and Malhotra (2011) for example measured accessibility explicitly as stakeholders' perceptions that companies openly share all relevant information. Perotti and von Thadden (2005) suggested that perceived disclosures are built around stakeholders' ability to gather needed information about a company. These views are based on the premise that inaccessible information delimits the stakeholders' ability to gain a full picture of the organisation (Zhu, 2004). Besides, the use of technology, such as internet reporting, may increase the accessibility of a company's disclosure (Liu & Davey, 2014).

A number of theorists have discussed similar constructs as an important aspect of transparency using several synonyms. Granados et al. (2010) used the words availability and openness to describe fundamental aspects of transparency. Others used the words visibility (Kaptein, 2008) or observability (Bernstein, 2012) to describe transparency. Similarly, Bloomfield and O'Hara (1999) used the term real time to define transparency. All of these are similar to accessibility in the current conceptualisation. Whereas visibility, availability, openness, and observability refer to aspects of open information sharing, the term real time suggests timeliness.

4.3.1.2 Clarity

Clarity is defined as the perceived level of lucidity and comprehensibility of information received from a sender. In the literature, Winkler (2000) contended that organisations must present information more clearly for it to be considered transparent. Similarly, Street and Meister (2004) argued that organisational information must be understandable for it to be considered transparent. Daft and Lengel (1986) found that a major problem for managers is a lack of informational clarity rather than a lack of sheer data. The importance of clarity is based on the premise that information consisting of jargon, or specialised or technical terms cannot be considered transparent even if it is highly disclosed (Granados et al., 2010; Nicolaou & McKnight, 2006).

While most theorists explicitly name clarity as a significant component of transparency (e.g., Flood et al., 1999; Potosky, 2008), several researchers have used closely related terms to describe the construct. McGaughey (2002) used the term *understandability* to conceptualise clarity. In the context of information quality, Miller (1996) used the term *coherence* to describe the degree to which information avoids confusion and promotes understanding. Nicolaou and McKnight (2006) similarly used the term *interpretability* to refer to the perceived quality of information, and Briscoe and Murphy (2012) suggested that information must be simple enough to be easily comprehended. These terms are similar to the conceptualisation of clarity in this thesis. Specifically, clarity implies that received information will ‘hang together’ in a way that limits ambiguity.

4.3.1.3 Reliability

Reliability is defined as the perception that information is correct and reliable to the extent possible, given the relationship between sender and receiver. The importance of reliability stems from the perspective that information cannot be considered transparent if it is purposefully biased or unfoundedly contrived (Walumbwa et al., 2011). However, reliability does not imply that information must be completely correct. It would be impossible to require such a standard that necessarily apply to exchanges of imperfect information (e.g., Taylor & Van Every, 2000). Instead, reliability suggests that material claims should reflect precise qualifications about

their expected validity for information to be considered transparent. In the literature, Vorauer and Claude (1998) and others (e.g., Granados et al., 2006) argued that reliability is a pivotal component of transparency. In fact, Akhigbe and Martin (2006) suggested that inaccurate disclosures play a pivotal role in reducing corporate transparency and prompting corporate scandals. Within manufacturing companies, Bernstein (2012) found that reliable disclosure is a cornerstone of transparency.

A number of theorists have used related words to conceptualise reliability in their assessments of transparency. Philippe and Durand (2011) suggested that an organisation's claims related to its environmental footprint must be precise enough for external stakeholders to ascertain its actual ecological impact. Bushman et al. (2004) suggested that information must be valid for it to be considered transparent. Similarly, Williams (2005) and Nicolaou and McKnight (2006) suggested that organisational information must be seen as accurate for it to be considered transparent. These terms are similar to this thesis' conceptualisation of reliability.

In terms of gaining users' (stakeholders') perceptions, Williams (2008) suggested four specific processes associated with disclosure: design (e.g., stakeholder identification), communication (e.g., questionnaire survey), analysis (e.g., encoding of information), and interpretation (e.g., determination of relevant information). Based on the existing literature, a questionnaire-based experimental research design is both a practical and appropriate research tool to investigate stakeholders' perceptions of environmental disclosure (Helfaya et al., 2018). Milne and Adler (1999) indicated that without a full comparative analysis using content analysis the reliability of the perceived social and environmental disclosure remains unknown.

In sum, transparency appears to be a function of three theoretically viable and managerially relevant factors: accessibility, clarity, and reliability. Accessibility is increased as stakeholders perceive information as open and available; clarity is increased as stakeholders perceive information as more understandable; and reliability is increased as stakeholders perceive information as more reliable. Each of these factors contributes uniquely to overall levels of transparency by increasing stakeholder confidence in the quality of information received from the organisation.

4.3.2 The perspective of the information source

As mentioned previously, the information source provides another perspective through which the perceived environmental disclosure can be looked at. Shane and Spicer (1983) first distinguished environmental information produced outside the company from environmental information produced inside the company. Shen and Feng (2012) further classified these external exposures into two categories: media monitoring and government supervision. On this basis, three categories of corporate environmental information (government supervision, media coverage, and corporate disclosure) are adopted in this thesis according to their information sources.

Most of the existing literature focuses on the relationship between these three information sources. There is general consensus that companies with more news media coverage of their environmental risks and more environmental regulatory exposure are more likely than others to disclose environmental information (Aerts & Cormier, 2009; Bewley & Li, 2000; Brown & Deegan, 1998; Clarkson et al., 2008; Rupley et al., 2012). However, a higher quantity or number of disclosure themes is not necessarily a sign of higher information quality. To accurately measure environmental information quality, it is necessary to consider the corporate environmental information disclosed outside of the company.

4.3.2.1 Government supervision

According to the principle of environmental externality in government intervention theory, corporate environmental performance has the characteristics of public goods (Unerman et al., 2018). Therefore, environmental disclosure should be carried out in an orderly manner under the supervision of regulatory authorities so as to avoid inefficient or even ineffective disclosure caused by information asymmetry (Leftwich et al., 1981). Through the public exposure of corporate environmental violations and penalties, regulatory authorities can play a role in correcting companies' behaviours (Berrone et al., 2013; Chen et al., 2018). For instance, government environmental disclosure can promote corporate environmentalism by providing support for the government's decision-making on environmental governance, the activeness of environmental nongovernment

organisations, and the participation of the general public in environmental issues (Sun et al., 2019). Cormier and Gordon (2001) suggested that the quality of environmental information disclosed by companies can be improved by following the strict institutional and standard process of environmental information disclosure, which can only be achieved by the government.

The Fair Disclosure Act (2000) and the Sarbanes–Oxley Act (2002) have led to an explosion of research on the relationship between government regulation and disclosure. Heflin et al. (2003) indicated that companies' choice to voluntarily disclose environmental information was due to the implementation of the Fair Disclosure Act. Berthelot et al. (2003) found that corporate environmental disclosure increased steadily with stronger government supervision. Kothari et al. (2009) argued that the implementation of the Fair Disclosure Act greatly reduced the probability of reporting only good news while holding back the bad. Barth et al. (1997) found that the introduction of environment-related regulations by the Financial Accounting Standards Board and the SEC had a significant impact on environmental information disclosure. Alciatore and Dee (2006) studied the oil and gas industry and found that government supervision had a positive impact on mandatory environmental information disclosure.

4.3.2.2 Media coverage

Media coverage plays an important role in the process of understanding and judging companies as well as forming the public's opinions on companies' legitimacy (Brown & Deegan, 1998). According to the legitimacy theory, legitimacy can be regarded as public judgments on companies.

In his book, Lippmann (1922) put forward the idea that “as a window through which we can understand the wider world through direct experience, the news media determines our cognitive map of the world”. On the basis of this idea, McCombs and Shaw (1972) developed the concept of agenda setting to describe the way news media influence society. The core assumption in agenda setting is that an issue's importance in the news affects its importance to the public. This proposition has been widely accepted by communication researchers who believe that mass media plays a decisive role in guiding people's attention and discussion topics. Since

McCombs and Shaw first mooted this idea more than 300 empirical studies from countries such as the US, Germany, Spain, and Japan have confirmed that there is a high degree of consistency between media coverage and public perception and judgment of important issues (McCombs & Reynolds, 2002).

The concept of agenda setting argues that the effects of agenda setting are particularly strong with some issues, such as those that are more hidden or that individuals have less direct contact with and that people rely on the media as their primary (sometimes even the only) source of information (Carroll & McCombs, 2003). Environmental issues clearly have these characteristics. Researchers of legitimacy theory have proposed that further analysis of media coverage would be more conducive to understanding the process of legitimacy (Baum & Powell, 1995).

Existing studies on the perceived environmental disclosure also noted the role of media coverage (Aerts & Cormier, 2009; Aerts et al., 2008; Brown & Deegan, 1998; L. Li et al., 2017; Rupley et al., 2012; Tench et al., 2007; Vogler & Eisenegger, 2021). The majority found that greater media exposure of environmental issues will promote the disclosure of corporate environmental information. Brown and Deegan (1998) indicated that, for the majority of the industries studied, higher levels of media attention are significantly associated with higher levels of environmental disclosures in annual reports. Bewley and Li (2000) suggested that companies with more news media coverage of their environmental exposure, higher pollution propensity, and more regulatory penalties are more likely to disclose general environmental information. Aerts et al. (2008) considered that a company's media exposure is likely to proxy for these perceived environmental risks. The higher a company's environmental risks, the more it has to deal with environmental news exposure. They used the average number of articles concerning environmental issues contained in a database to measure the media exposure.

Negative or reactive coverage was a focus of extant studies. Rupley et al. (2012) found that institutional investors exert influence over managerial decisions on environmental reporting only in the face of negative environmental media. This finding is consistent with Shane and Spicer (1983) study, which found that security price movements are associated with the release of externally produced information about companies' performances in pollution control. Tench et al. (2007) pointed

out that media reports of CSR issues are largely negative in tone, despite being open to positive news coverage. Aerts and Cormier (2009) contended that environmental legitimacy is significantly and positively affected by the quality of the economic-based segments of annual report environmental disclosures and by reactive environmental press releases, but not by proactive press releases.

In contrast to prior contributions, Brammer and Pavelin (2008) argued that the media exposure of companies plays no role in stimulating voluntary environmental disclosures. Ostman and Parker (2010) found that their respondents held a negative evaluation of media personnel's performance on four criteria: lack of balance; biased political orientation; sensationalism; and a tendency to select so as to maximise their audience. A slim majority thought environmental media messengers told the truth.

4.3.2.3 Corporate disclosure

Corporate disclosure falls into two categories: mandatory and voluntary. On the one hand, mandatory disclosure consists of information disclosed in order to comply with the requirements of laws and regulations. On the other hand, voluntary disclosure is any information disclosed in addition to the mandatory disclosure. Corporate disclosure is defined by Meek et al. (1995) as “the choices on the part of company managements to provide accounting and other information deemed relevant to the decision needs of users of their annual and other reports”.

Most corporate disclosure studies have explicitly applied stakeholder theory and legitimacy theory. Clarkson et al. (2008) for example emphasised corporate environmental disclosure in terms of informing investors and other stakeholders, while Cormier and Magnan (1999) confirmed corporate reporting's potential role in managing the public's impression of corporate environmental performance. Indeed, Hooghiemstra (2000) argued corporate disclosure (of which environmental disclosure is a subset) is used as a communication tool aimed at influencing stakeholders' perceptions of the company's image and reputation. He further cited Elkington (1998) claim that many “companies engaging in corporate social and environmental reporting view their reports as public relations vehicles”. Deegan et al. (2000) argued more specifically that corporate disclosure is used to address

concerns about the legitimacy of the organisation. Deegan (2002) summarised a large body of research that examines this use of social and environmental disclosure as a legitimating tool for reducing exposures to what Patten (1991) and Walden and Schwartz (1997) referred to as social and political pressures. Thus, it is unclear whether corporations engage predominantly in environmental disclosure to offer reliable environmental information and to reduce information asymmetry with their stakeholders or if they may be doing so to enhance or maintain their legitimacy within the social and political spheres.

Furthermore, research into corporate disclosure practices in emerging countries remains low. Greater regulatory enforcement in emerging countries and an increase in stakeholders' comprehension about their rights and choices with regard to business activities can influence many companies to increase their corporate disclosures. Social responsibility and environmental information are the most popular categories of corporate disclosures, while risk and human capital/intellectual capital are the least popular categories. The majority of studies employed content analysis to examine the extent of corporate disclosure practices (Md Zaini et al., 2018).

4.3.3 Section summary

Overall, by reviewing the literature on the perceived environmental disclosure from two perspectives, some implications for this thesis can be found. First, there is general consensus that accessibility, clarity, and reliability are critical factors that explain fundamental aspects of the perceived environmental disclosure, and so CET. Second, from the perspective of information sources, existing studies focus on the relationship between government or media exposure and corporate environmental disclosure only. In fact, due to the existence of these associations it can be inferred that there is an offsetting effect when incorporating external exposures and corporate disclosures in a comprehensive assessment. An assessment that does not consider this offsetting effect does not truly measure the environmental information quality in a comprehensive and objective manner. Therefore, in order to gain an accurate and comprehensive understanding of CET, it is necessary to have government supervision and media coverage included in the measurement of the quality of environmental information.

4.4 Corporate Environmental Accountability

The accountability concept entails “the duty to provide an account (by no means necessarily a financial account) or reckoning of those actions for which one is held responsible”(Gray et al., 1996). Gray et al. (1996) further asserted that accountability renders two types of responsibility, namely responsibility for actions (performance) and responsibility to report (reporting).

Environmental accountability research has now clearly established itself as a significant stream of scholarship in the accounting research literature (Parker, 2005). However, there is no systematic definition of corporate environmental accountability in the literature. Nonetheless, the following contributions are worthy of note. O’Riordan (1989) described corporate environmental accountability as “a metaphor for environmentally responsible management practice, sanctioned by regular public reporting and by demonstrable responsiveness to the public interest”. Meanwhile, Burritt and Welch (1997) related corporate environmental accountability to

“the actions made on behalf of organisations and the impacts of resulting activities on ecological systems” and further asserted that the “environmental accountability mechanisms ... cannot function without information being provided to stakeholders about actual and potential environmental performance.”

Al-Tuwaijri et al. (2004) affirmed that companies must conduct business within the norms and expectations of society. Societies increasingly demand greater corporate environmental accountability through “heightened public scrutiny of both the company’s environmental performance and its public disclosure of that performance”. Finally, Bergeson (2006) used the concept of corporate environmental accountability in relation to the role of government agencies. Their oversight of companies encompasses “a broad range of mechanisms that are intended to make the environmental practices of organisations more transparent and subject to greater public scrutiny”.

As the above description of corporate environmental accountability indicates, companies must not only be environmentally responsible by managing their environmental impacts (either positive or negative), but must also report on these

impacts and any efforts undertaken in this regard to the public (Jones, 2010; Stent & Dowler, 2015). Thus, in this thesis corporate environmental accountability is defined as the extent to which a company acts responsibly towards the natural environment (environmental performance) and reports on its environmental performance externally to inform its stakeholders.

4.4.1 Environmental performance

Generating a definition of environmental performance is difficult. Studies in the field of ecology, environmental management, and sustainability have long faced the dilemma of how exactly to measure environmental performance, given the vast array of instruments available and the lack of an operational definition. After a critical review of 172 papers containing the variable environmental performance, Dragomir (2018) identified two broad categories of measurement: first, quantitative or survey data collected by the authors and second, quantitative data or scores and ratings from external sources. On this basis, he offered the following definition: “corporate environmental performance is a measure of environmental impact, resource consumption, and related financial elements, along with the efforts towards the reduction of such impact and the implementation of preventive measures”.

A few studies have tried to explore the consequences of environmental performance. For example, Hassel et al. (2005) found that environmental performance has a negative influence on the market value of companies. However, a full discussion of the rich body of literature around environmental performance requires consideration of the association between a company’s environmental performance and its environmental reporting. The mainstream view is that companies with high environmental performance report more information than do those with low environmental performance. At the same time, some claim that there is a negative or weak association between environmental performance and the level of information reporting.

Al-Tuwaijri et al. (2004) suggested ‘good’ environmental performance is significantly associated with both ‘good’ economic performance and with more extensive quantifiable environmental disclosures of specific pollution measures and

occurrences. Clarkson et al. (2008) found a positive association between environmental performance and the level of discretionary disclosures in environmental and social reports or related web disclosures. In other words, they believed that superior environmental performers are more forthcoming in truly discretionary disclosure channels, as predicted by economics-based voluntary disclosure theories. Based on empirical evidence from an advanced emerging market, Iatridis (2013) argued that environmental disclosure is positively linked to environmental performance. Plumlee et al. (2015) demonstrated that both the type and nature of the environmental disclosures is informative. Radu and Francoeur (2017) found that environmental performance and environmental innovation jointly determine environmental disclosure. In addition, a recent study showed that there is little evidence to suggest that companies with low environmental performance attempt to use their disclosures to legitimise their environmental operations (Tadros & Magnan, 2019).

On the contrary, Ingram and Frazier (1980) indicated that there is only a weak association between quantitative measures of environmental disclosure content and independent measures of environmental performance. Neu et al. (1998) also questioned whether such disclosures highlight positive environmental actions, obfuscate negative environmental effects, or both. Guidry and Patten's (2012) review of 13 recent environmental disclosure studies Guidry and Patten (2012) failed to find—with the exception of company size—any evidence suggesting any systemic associations. Drawing on Cho and Patten (2007) legitimacy-based study, they assessed whether including financial control variables changes the inferences on the relation between environmental performance and environmental disclosure and found that even with the controls, a negative association between performance and disclosure still exists. Overall, while they questioned the need for financial control variables in environmental disclosure research, they did encourage further exploration of the relations between performance and disclosure using more consistent measures and market variables. Clarkson et al. (2011) pointed out that concerns regarding the reliability of voluntary environmental disclosures in the Australian context remain valid and thereby potentially signal a need for both enhanced mandatory reporting

requirements and improved enforcement. In this regard, their study also informs regulatory policy on mandatory disclosures of environmental performance.

This thesis is not intended to resolve this debate; it is however willing to provide another perspective to help to reconcile the two views. By looking at the different sources of environmental disclosure from stakeholders' perspectives in the Chinese context, this study provides new evidence that can facilitate greater understanding of the influence that media coverage and government supervision have on the quality of corporate environmental information. In other words, whatever the motivation for a company to make greater or fewer environmental disclosures, it is helpful to include the information disclosed by external parties into the evaluation of a company's disclosure quality as a way to reflect the real environmental performance of companies. In addition, China is the major contributor to global environmental problems, as detailed in chapter 2. An accurate and comprehensive understanding of the environmental responses of the Chinese government and Chinese companies is therefore of global significance.

4.4.2 Environmental reporting

Another component in the corporate environmental accountability concept is environmental reporting. There are several definitions provided in the literature as to what constitutes environmental reporting (Atkins et al., 2015). T. Wilmshurst, D. and G. Frost, R. (2000) defined environmental reporting as "those disclosures that relate to the impact company activities have on the physical or natural environment in which they operate". Berthelot et al. (2003) defined environmental reporting as:

"the set of information items that relate to a company's past, current and future environmental management activities and performance. It also comprises information about the past, current and future financial implications resulting from a company's environmental management decisions or actions."

Thus, disclosures are considered as environmental information if they contain information on pollution, pollutants, sustainability, pollution prevention, environmental penalty, energy efficiency, emergency plans, and so on (Hackston & Milne, 1996; S. M. Williams, 1999; Williams & Ho, 1999).

The information can be provided in many forms (e.g., qualitative statements, quantitative facts or assertions, financial statement figures or footnotes) (Berthelot et al., 2003) that are targeted at external stakeholders (Burritt et al., 2002; Jones, 2010) and can be reported in annual reports, stand-alone reports, and company websites (Adams, 2002; Tilt, 2008). It is worth noting that environmental information can also be provided by external parties (i.e., the media, governments) as previously discussed in section 4.3.2. In this thesis, environmental reporting refers only to the environmental information provided (or reported) by companies.

As a primary manifestation of CET, environmental reporting informs stakeholders of the environmental operations and status of a company (Davey et al., 1995). Increased corporate risk associated with environmental issues has resulted in increased pressure from government agencies, media, investors, and other stakeholders for information about companies' environmental impact and performance. However, due to the wide and professional scope of environmental information and the rich types and forms of its disclosure, there is no relatively feasible unified reporting standard at present. Drawing on the experiences of companies employing quality measures and reporting, Raiborn et al. (2011) presented an environmental cost reporting model. Although its impact is limited, this model does provide managers and stakeholders with greater transparency on the environmental impact of business operations. Even with the emerging efforts to standardise environmental reporting, most notably the Global Reporting Initiative and the International Integrated Reporting Council, the disclosure of environmental information remains varied across companies.

Nevertheless, environmental reporting has become an increasingly relevant topic in business and academia. A great deal of research has focused on factors influencing the adoption, the extent, and the quality of environmental reporting. Early works, such as Davey (1985) and Davey and Coombes (1996) conducted an empirical investigation and stakeholder survey on environmental reporting. These studies suggested that industry sector, the amount of regulation, and stakeholder pressure are major influences on the degree of participation in environmental reporting. Their pioneering approaches laid the foundation for later research on CSR reporting and environmental reporting. Hahn and Kühnen (2013) provided a broad review of

178 articles dating from 1999 to 2011 from journals related to business, management, and accounting. They pointed out that the current research gaps lie in regulation, stakeholder perception, and reporting quality.

In addition, the existing literature on environmental reporting in China is limited. Liu and Anbumozhi (2009) found that the size and environmental sensitivity of Chinese companies are currently the major significant factors influencing their environmental reporting quality. Economic performance is not significantly related to environmental disclosure activities. Liu and Anbumozhi (2009) defined six items for evaluating the environmental information quality of their samples. Meng et al. (2014) suggested that environmental disclosure may not be a valid signal to differentiate good performers from poor performers in contemporary China. Lu and Abeysekera (2014a) argued that in China the CSR report provided no more stakeholder-relevant social and environmental disclosure than the annual report did. They suggested that corporate characteristics such as company size and industry classification are all statistically significant factors that influence the social and environmental reporting of the Chinese companies studied. Nevertheless, these explorations are still at a relatively preliminary stage, and the indicators they used to measure environmental reporting or information quality rely simply on annual reports and CSR reports. They do not incorporate broader environmental information into their assessment.

4.4.3 Section summary

Current research on corporate environmental accountability in China enables several basic contexts to be deduced. First, Chinese companies are providing the environmental information mainly to alleviate the concerns from the government (Sun et al., 2019). Second, annual reports and CSR reports cover the environmental information disclosed by Chinese companies. Third, the environmental awareness of social actors in China should be heavily promoted. Last, in line with the increase in the stakeholders' concerns over corporate environmental behaviour, Chinese companies may become more proactive in showing their environmental information. Therefore, given the complex nature of the rapidly changing environment in China, stakeholders' perceptions may be evolving over time and this development could explain the shifts in the environmental disclosure strategy of companies. It is also

worth tracing and evaluating Chinese companies' environmental information quality using a multisource lens, such as environmental reporting and external exposures.

4.5 Environmental Information Quality

Quality is a key concept in many fields of research such as quality of life; quality of food, water, and air; quality of service provision; and quality of accounting disclosure. In all fields, defining quality is judgement-based and potentially even a political position. For example, the International Accounting Standards Board states that their 2018 conceptual framework contributes to its mission to “develop standards that bring transparency to financial markets around the world”(IASB, 2018). One could assume therefore that the International Accounting Standards Board would define quality for financial reporting, if not implicitly for all reporting, as focused on the needs of the investors as primary stakeholders. Each stakeholder group, customers, employees, and so forth will have differing perceptions, aims, and information requirements which may be more or less consciously developed. Quality is concerned with fitness for purpose, and stakeholders with differing purposes are unlikely to be always of one mind regarding the working out of the concept in practice.

So, quality, in the environmental disclosure field, is a complex concept and has a multifaceted and subjective nature (Beattie et al., 2004; Beck et al., 2010; D'Amico et al., 2016; Hammond & Miles, 2004; Lokuwaduge & Heenetigala, 2017; Meng et al., 2014; Radu & Francoeur, 2017). One of the most important limitations encountered in environmental disclosure studies is the difficulty of measuring the quality of environmental information (Healy & Palepu, 2001).

4.5.1 Measurement

The earlier attempt to measure the quality of selected types of nonfinancial information can be traced back to 1970s. Buzby (1974) developed an index of disclosure based on the importance of the items to professional financial analysts. The index comprised 38 items of financial and nonfinancial information which might appear in an annual report. Using the disclosure index as a template, he

obtained financial and nonfinancial information quality data from 88 companies in the form of a questionnaire survey.

Later, Wiseman (1982) tested the relation between environmental disclosure in annual reports and environmental performance by developing an indexing approach quite similar to (Buzby, 1974). Wiseman (1982) measured the disclosure on 18 items grouped into four categories: economic factors, environmental litigation, pollution abatement, and other environmental matters. The rating is based on a score of one to three, three for an item described in monetary or quantitative terms, two when an item is described specifically, and one for an item discussed in general. Researchers used to refer to this measure as the Wiseman Index (Cormier & Magnan, 1999; Freedman & Wasley, 1990). The Wiseman index took both the breadth (number of different topics discussed) and depth (specificity of information provided) in account, making it a reasonable measure of management's willingness to provide environmental information in general.

There are some advantages in using the Wiseman Index to assess a company's environmental information quality. First, the rating scheme and the subsequent construction of a company-specific environmental disclosure score allows information of various types to be integrated into a single comparable figure. Second, an environmental disclosure score computed with the Wiseman Index is comprehensive since it relies on a reading and a coding of a company's annual and environmental reports, including financial statements' footnotes. Last, in contrast to other disclosure studies that rely on word counts to measure the environmental information quality (Neu et al., 1998), the use of the Wiseman Index allows for researches' judgments to be embedded in rating the 'value' of the disclosure made by a company. While this process is more subjective, it ensures that irrelevant or redundant generalities are not considered to be strategic environmental disclosure.

Based on the Wiseman Index, Cormier et al. (2005) developed a 39-item index that grouped the items into six categories: environmental expenditures and risks, laws and regulations, pollution abatement, sustainable development, land remediation and contamination (including spills), and environmental management.

Departing from Wiseman (1982) measurement, Neu et al. (1998) introduced the method used in previous studies of examining social responsibility disclosures in annual reports. The number of words included in the annual report on the company's environmental activities was used to measure the level of environmental information quality. This measure assumes that the length of annual reports and the amount of verbiage contained in them is randomly distributed across companies. To a certain extent, it does however provide a quantitative measure of the amount of text devoted to the issue of environmentally responsible organisational activity. Its downside is that it cannot objectively reflect the real environmental information quality of a company, as managers can easily provide a small amount of information in a large amount of text.

Considering the information requirements associated with an environmentally focused accounting information system, Brown et al. (2005) identified three representative strategic environmental orientations (legitimation, competitiveness, and enlightened management) from the strategy literature and developed an environmental information matrix. The proposed matrix provides a tool for identifying the information collected, stored, analysed, and reported in environmentally attuned accounting information systems. This is a beneficial exploration of measurement of environmental information quality from the perspective of strategic decision-makers.

Based on the prior literature, van Staden and Hooks (2007) developed an index to assess the quality of the environmental disclosures; this is based on a 5-point scale as follows: score 0 = no disclosure to this item, score 1 = general narrative disclosure to this item, score 2 = detailed narrative disclosure to this item, score 3 = quantitative disclosure to this item, and score 4 = benchmarking disclosure to this item. Thus, the total quality score for each company is the sum of total items disclosed * their quality scores (0, 1, 2, 3, or 4). Guthrie et al. (2008) collected environmental disclosure items from the corporate annual reports and corporate websites. Each occurrence of an item was coded by the disclosure type (monetary, nonmonetary or declarative), the number of incidences, and the frequency of occurrences.

Clarkson et al. (2008) improved on the prior literature by focusing on purely discretionary environmental disclosures and by developing a content analysis index based on the Global Reporting Initiative sustainability reporting guidelines to assess the extent of discretionary disclosures in environmental and social responsibility reports. This index contains 95 line items and better captures corporate disclosures related to its commitment to protect the environment than do the indices employed by prior studies. Given this index is widely cited (Clarkson et al., 2013; Clarkson et al., 2011; Iatridis, 2013; Moroney et al., 2012), it is also known as the Clarkson Index.

4.5.2 Determinants and consequences

Although there has not been a widely accepted measure of environmental information quality, some scholars have explored the determinants and consequences of environmental information quality based on existing quality models.

4.5.2.1 Determinants

Cormier and Magnan (1999) suggested that information costs and a company's financial condition are key determinants of environmental disclosure quality. Company size, the regulatory regime governing corporate disclosure, and industry also contribute to explaining environmental disclosure. Cormier et al. (2005) indicated that risk, ownership, fixed assets age, company size, as well as routine determine the quality of environmental disclosure by German companies in a given year. Brammer and Pavelin (2008) found high-quality environmental disclosure to be primarily associated with larger companies and those in sectors most closely related to environmental concerns. Moroney et al. (2012) argued that the quality of environmental disclosures scores were significantly higher for assured companies than for unassured companies. Iatridis (2013) pointed out that company attributes, such as large size, the need for capital, profitability, and capital spending, are positively associated with environmental disclosure quality.

Table 4.3 *Determinants of environmental information quality*

Sample	Author(s)	Determinants
Canada	Cormier & Magnan (1999)	Information cost; financial condition; company size; environmental sensitivity; regulatory regime
Germany	Cormier et al. (2005)	Risk; ownership; fixed assets age; company size; routine
UK	Brammer & Pavelin (2008)	Company size; environmental sensitivity
Australia	Moroney et al. (2012)	Assurance
Malaysia	Iatridis (2013)	Company size; capital requirement; profitability; capital spending
23 Countries	Giannarakis et al. (2016)	Environmental performance; national risk premium
Australia	Lee (2017)	Company size
France	Baalouch et al. (2019)	Corporate strategy; assurance; gender diversity in boards; environmental performance

Giannarakis et al. (2016) suggested that the environmental performance in terms of emission reduction initiatives and the country's risk premium affects the quality of environmental disclosures in a positive way, while the results regarding the stock analyst recommendation are controversial. Lee (2017) found that the size of companies influences both the quantity and the quality of corporate environmental disclosure. Baalouch et al. (2019) indicated that a company's strategy and vision (environmental audit), diversity in boards (gender diversity), and environmental performance play significant roles in explaining variations in quality of environmental disclosure.

Overall, it should be acknowledged that the empirical findings discussed above should be generalised with caution, for the following reasons. First, samples vary from study to study in terms of both size and industry composition. Second, samples in most studies were composed of large companies. Third, there are differences in country contexts, time coverage and explanatory variables, all of which could make generalisations of the findings difficult or impossible. However, some insights can still be drawn regarding the influencing factors of environmental information quality arising from three categories: the external context, the internal context, and

organisational characteristics. These factors need to be further substantiated from the perspective of stakeholders.

4.5.2.2 Consequences

There are few studies on the consequences of environmental information quality. Existing research has mainly associated environmental information quality with financial performance and shown three different results: a positive link, a negative link, and no significant relationship (Horváthová, 2010).

First, findings of a positive link mean that the quality of corporate environmental information (i.e., CET) will send a positive signal about the company to the capital market, thereby promoting the improvement of corporate financial performance. At the same time, this improvement enables the company to have stronger economic strength to cope with environmental problems. For instance, Belkaoui (1976) drew positive conclusions by comparing 50 companies that disclose environmental information and those that do not disclose environmental information. Aerts et al. (2008) argued that enhanced environmental disclosure quality translates into more precise earnings forecasts by analysts and so benefit corporate financial performance at end of the day. Iatridis (2013) believed that high-quality environmental disclosers display effective corporate governance and would tend to face less difficulties in accessing capital markets. Plumlee et al. (2015) suggested that environmental information quality is positively associated with financial performance through both the cash flow and the cost of equity components. In addition, studies have shown that a high level of environmental information quality implies greater information transparency, which can improve company strategy, reduce company risk, and ultimately improve financial performance (Cai et al., 2016).

Second, the finding of a negative link means that companies with a high level of environmental information quality have worse corporate financial performance, and CET does not send a positive signal to the market. The environmental protection activities of companies will generate environmental protection expenditures, which will increase the production costs of the companies and reduce the income accordingly (Hassel et al., 2005). For example, Bird et al. (2007) showed a negative

correlation between the excess returns of companies and the environmental information quality, which lags 1 year behind. In addition, strict environmental regulations increase the production and operation costs of companies, and proactive efforts to improve the quality of environmental information reduce corporate financial performance of listed energy companies (Filbeck & Gorman, 2004). Lioui and Sharma (2012) showed that environmental information quality has a negative relationship with corporate financial performance because investors consider environmental measures to be potential costs or fines.

Other studies have suggested that there is no significant relationship between the two. For example, Zhu and Qiao (2008) argued that companies' initiative to improve the quality of their environmental information does not lead to an increase in the level of profitability and financial leverage. Alexopoulos et al. (2018) showed that changing environmental methods can improve environmental information quality but does not always improve future financial conditions.

Table 4.4 *Consequences of environmental information quality*

Sample	Author(s)	Consequences	Association
US	Belkaoui (1976)	Stock price; financial performance	Positive
EU, North America	Aerts et al. (2008)	Analysts' forecasts; financial performance	Positive
US	Plumlee et al. (2015)	Financial performance	Positive
US	Cai et al. (2016)	Company risk; financial performance	Positive
Sweden	Hassel et al. (2005)	Market value; financial performance	Negative
US	Bird et al. (2007)	Market value; financial performance	Negative
US	Filbeck & Gorman (2004)	Financial performance	Negative
US	Lioui & Sharma (2012)	Corporate financial performance	Negative
China	Zhu & Qiao (2008)	Corporate profitability	Insignificant
Greece	Alexopoulos et al. (2018)	Financial performance	Insignificant

Overall, the review of consequences suggests both that the empirical method used matters for the nexus and that the likelihood of finding a negative link between environmental information quality and financial performance significantly increases when using correlation coefficients instead of econometric analysis. The review indicates that the portfolio studies tend to report a negative link between environmental information quality and financial performance, which likely reflects the omitted factors in portfolio studies. Some studies also point to the importance of appropriate time coverage to establish a positive link between environmental information quality and financial performance. Existing results highlight the benefit of parsing broader measures (i.e., CET) when examining complex relationships. Thus, further statistical analysis on the relationship between CET and corporate financial performance is valuable.

4.5.3 Section summary

First, in most cases (about 80% of corporate environmental disclosure research), the quality is measured using a simple model that includes only one or two dimensions. The amount of disclosure is just one quality dimension. In addition, volumetric approaches, which count words, sentences, or pages, are based upon the assumption that the volume of disclosure reflects its importance to the stakeholders and so can be used as a measure of reporting quality (Helfaya et al., 2018). Indeed, a host of scholars noted that it is often incorrectly assumed that the importance of a disclosure can meaningfully stand for the amount disclosed (Cho et al., 2010; D'Amico et al., 2016; Gray et al., 1995a; Unerman, 2000). Although unweighted disclosure indices (the most frequent metric in the historic literature) use more than one measure of quantity to assess the quality of environmental information, this metric is also problematic and has been criticised on its fundamental assumption that all disclosed and measured items are equally important. These approaches are also focused only on how much is disclosed as a proxy for quality.

Second, prior studies rely heavily on the environmental information disclosed by companies to capture the quality of the information disclosed. In addition to disclosure in corporate reports, other channels are available for making corporate environmental information transparent to the public (e.g., government websites, news media) (Guo et al., 2021). These disclosures are either for the regulatory need

(Sun et al., 2019) or agenda setting (Carroll & McCombs, 2003) without potential damage of information reliability by the corporate need to legitimise activities. In fact, environmental information disclosed by external parties may earn more trust from stakeholders. It is therefore necessary to have government supervision information and media coverage information included in the measurement of the environmental information quality. The upside to this inclusion is that it can dispel the doubts that more media or regulatory exposures on environmental issues will promote a company's environmental disclosure (Aerts et al., 2008; Bewley & Li, 2000), while a higher quantity or number of disclosure themes is not necessarily a sign of higher information quality (Helfaya & Whittington, 2019).

Moreover, prior studies tend to directly impose their own measures on the disclosure data rather than consulting users/stakeholders first. Hammond and Miles (2004) argued that quality assessment of CSR reporting relies on the ability of stakeholders to demand such information and evaluate its reliability in a robust fashion in relation to actual performance. This argument implies that researchers cannot assess quality without a detailed understanding of users'/stakeholders' needs. Unfortunately, prior studies largely ignore the inclusion of stakeholder perceptions of environmental disclosure as weight factors into the measurement scope.

Thus, as quality is subjective and context-dependent, a weighted comprehensive model (compound model) to assess environmental information quality is needed. This thesis seeks to bridge this gap by developing an overall CET framework and undertaking a questionnaire survey to investigate how stakeholders perceive the attributes of environmental information quality (accessibility, clarity, and reliability) from different sources (corporate disclosure, media coverage, and government supervision) and the relative importance they place on those factors. Thereby, it develops a weighted comprehensive quality model in the Chinese context.

4.6 CET Model

Based on a systematic literature review and critical discussion of the three main components of CET in sections 4.3, 4.4, and 4.5, the initial model of environmental information quality is presented as follows.

$$EIQ_i = \lambda_1 Corporate_i + \lambda_2 Government_i + \lambda_3 Media_i$$

This model addresses some of the deficiencies in existing research discussed in the previous sections. In addition to corporate disclosures, environmental information from government and media sources is also included in the model. The model also incorporates stakeholders' perceptions as weight factors. According to the conceptual framework of CET constructed in this thesis, environmental information quality is the core component of CET. Based on the initial model of environmental information quality, a CET model suitable for the Chinese context can be developed. The CET model must consider the characteristics of Chinese listed companies and stakeholders as well as the country's regulatory regime. Therefore, the variables in the CET model are defined as follows in Table 4.5.

Table 4.5 *Definitions of variables in the CET model*

Variable	Definition
CET_i	A proxy for CET
EDI_i	Environmental disclosure index
$SEAPI_i$	Significant environmental administrative penalty index
$ENHI_i$	Environment news headline index
λ	Weighting factors (stakeholders' perceptions)

The measure of each variable in the CET model can be traced back to the extant literature. First, *EDI* represents the Environmental Disclosure Index, a widely used proxy for corporate environmental disclosure in accounting literature (Clarkson et al., 2008; Wiseman, 1982). Some studies have treated it as a proxy for environmental information quality. Unlike these studies, in the CET model in this thesis, *EDI* is only one of the variables that respond to environmental information quality.

Second, *SEAPI* stands for the Significant Environmental Administrative Penalty Index. This index is a proxy for government supervision in the context of China's environmental policies (i.e., CCRs) as described in chapter 2. It is a common

variable in studies related to government environmental disclosure in China (Shen & Feng, 2012; Sun et al., 2019).

Third, *ENHI* refers to the Environment News Headline Index and is measured by the Janis-Fadner (J-F) coefficient of imbalance. There are various methods of measuring media coverage in existing studies, but one method is particularly well-suited to the content analysis approach. The J-F coefficient of imbalance is a scoring approach proposed by Janis and Fadner (1943) for content analysis. It was first introduced by Deephouse (1996) in the study of corporate legitimacy. Since then, Bansal and Clelland (2004), Clarkson et al. (2008), Aerts and Cormier (2009), and others have used the J-F coefficient of imbalance to measure media coverage of companies.

Last, λ represents stakeholders' perceptions of environmental information from the above three sources. Helfaya et al. (2018) argued that understanding the basic parameters within which users perceive quality is a fundamental necessity in developing any model for assessing environmental information quality. Following Helfaya et al. (2018), Tello et al. (2016), and O'Dwyer et al. (2005), this research incorporates users'/stakeholders' perceptions into the CET model as weighting factors. The formula for each variable in the CET model in this thesis is shown in Table 4.6.

Table 4.6 *Formulas of variables in the CET model*

Variable	Formula	Variable Description	Study
EDI_i	$\frac{x_i - \min(x)}{\max(x) - \min(x)}$	x_i = Environmental disclosure score	Wiseman (1982), Clarkson et al. (2008)
$SEAPI_i$	$1 - \frac{a_i - b_i - \min(a)}{\max(a) - \min(a)}$	a_i = Penalty frequency b_i = Disclosure frequency	Shen & Feng (2012), Sun et al. (2019)
$ENHI_i$	$\begin{cases} (e^2 - ec)/t^2, & \text{if } e > c \\ (ec - c^2)/t^2, & \text{if } e < c \\ 0, & \text{if } e = c \end{cases}$	e = No. of favourable news headlines c = No. of unfavourable news headlines t = No. of all news headlines	Bansal & Clelland (2004), Clarkson et al. (2008), Aerts & Cormier (2009)
λ_i	$\sum_{i=1}^3 \lambda_i = 1$	λ_i = weightings from stakeholders' scores	O'Dwyer et al. (2005), Tello et al. (2016), Helfaya et al. (2018)

To sum up, this thesis develops a CET model based on a systematic review of existing CET literature. The model is applied to listed companies in the Chinese context. The application of this model helps the researcher enhance the understanding of the environmental information transparency of Chinese listed companies. The model is shown as follows:

$$CET_i = \lambda_1 EDI_i + \lambda_2 SEAPI_i + \lambda_3 ENHI_i$$

Table 4.7 below provides a summary of prior CET studies regarding purposes, sample, research instruments, and findings.

Table 4.7 Summary of prior CET studies

Author(s)	Country	Purpose	Sample	Instrument	Main finding
Component A: Perceived Environmental Disclosure					
Davey & Coombes (1996)	New Zealand	To investigate how much accountants are involved in environmental accounting, their attitudes to the issues and their level of (non) activity, and corporate response to environmental accounting	200 companies	Survey	Industry sector is a major influence on the degree of participation in environmental accounting. The amount of regulation affecting the sector, consumer preferences, and demand are further constraints and pressures. Parent company requirements also appear to affect the participation in environmental accounting practices of New Zealand organisations and the awareness of relevant issues on the part of their accountants.
Milne & Adler (1999)	US	To gain new insights into the reliability of social and environmental disclosures content analysis	49 ARs	Content analysis	Without a full comparative analysis using content analysis the accuracy of the perceived social and environmental disclosure remains unknown.
Helfaya et al. (2018)	UK	To gain users' perceptions of corporate environmental reporting	177 respondents	Survey	Quantity was not perceived as the most significant element in determining quality.
Shane & Spicer (1983)	US	To investigate whether security price movements are associated with the release of externally produced information about companies' performances in the pollution control area information	72 companies	Media index & hypothesis test	The observed price movements are consistent with changes in investors' perceptions of the probability distributions of future cash flows of the sample companies at the times of release of the CEP studies.
Bewley & Li (2000)	Canada	To examine the extent to which voluntary disclosure theory can explain corporate disclosure of general and financial environmental information	188 companies (1993)	Wiseman index & hypothesis test	Companies with more news media coverage of their environmental exposure, higher pollution propensity, and more political exposure are more likely to disclose general environmental information.
Tench et al. (2007)	UK	To develop understanding of corporate social responsibility (CSR) and the media	72 respondents	Survey & interview	Despite being open to positive news coverage, media reports of CSR issues are largely negative in tone and the tension inherent to the corporate social irresponsibility (CSI) and CSR dualism is alluded to.
Aerts & Cormier (2009)	Canada, US	To explore the impact of annual report environmental disclosures and environmental press releases as legitimization tools	158 companies (2002)	Wiseman index & hypothesis test	Environmental legitimacy is significantly and positively affected by the quality of the economic-based segments of annual report environmental disclosures and by reactive environmental press releases.

Author(s)	Country	Purpose	Sample	Instrument	Main finding
Ostman & Parker (2010)	US	To find out which mass media sources of environmental information are used most frequently by a public and what is a public's perception of the quality of environmental content provided by journalists and newscasters	336 respondents	Survey	Newspapers and television emerged as the most frequently used media, but other media were preferred for believable information.
Rupley et al. (2012)	US	To examine the relation between media coverage and the quality of voluntary environmental disclosure	127 companies (2000–2005)	Hypothesis test	Institutional investors exert influence over managerial decisions on environmental reporting only in the face of negative environmental media.
Haider (2015)	Sweden	To study environmental information as it circulates in social media, specifically in personal blogs and microblogs	46 blogs (2011-2012)	Thematic analysis & comparative analysis	Environmental information in social networks contributes to shaping the way in which information on environmentally friendly living is articulated, shaped, and filled with meaning.
Sun et al. (2019)	China	To empirically examine how government environmental disclosure shapes corporate environmentalism in the context of China	13,284 observations (2008-2015)	Pollution information transparency index (PITI) & hypothesis test	Government environmental disclosure can promote corporate environmentalism.
Component B: Corporate Environmental Accountability					
Ingram & Frazier (1980)	US	To examine the relationship between measures of the companies' environmental performances and the environmental disclosures contained in the companies' annual reports	50 companies (1970-1974)	Disclosure index (20 items) & hypothesis test	There is only a weak association between quantitative measures of environmental disclosure content and independent measures of environmental performance.
Neu et al. (1998)	Canada	To find out the influence of external pressure on environmental disclosures in annual reports, the characteristics of environmental disclosure and the association between environmental disclosures and actual performance	330 observations (1982-1991)	Word count & hypothesis test	They question whether such disclosures highlight positive environmental actions, obfuscate negative environmental effects, or both.
Cormier & Gordon (2001)	Canada	To examine social and environmental disclosures in annual reports and how these disclosures differentiate between publicly owned and privately owned companies	3 companies (1985-1996)	Wiseman index & hypothesis test	Ownership status and size, which are likely to affect legitimacy, influence the amount of social and environmental disclosure.
Al-Tuwaijri et al. (2004)	US	To provide an integrated analysis of the interrelations among environmental disclosure, environmental performance, and economic performance	198 companies (1994)	Disclosure index (4 items) & hypothesis test	"Good" environmental performance is significantly associated with "good" economic performance, and also with more extensive quantifiable environmental disclosures of specific pollution measures and occurrences.

Author(s)	Country	Purpose	Sample	Instrument	Main finding
Clarkson et al. (2008)	US	To provide further evidence on the relationship between corporate environmental performance and the level of environmental disclosures	191 companies (2003)	Clarkson index (6 categories) & hypothesis test	There is a positive association between environmental performance and the level of discretionary disclosures in environmental and social reports or related web disclosures.
Rizk et al. (2008)	Egypt	To survey the corporate social and environmental reporting (CSR) practices of Egyptian corporate entities	60 ARs (2002)	Disclosure index (34 items)	Findings of this research lend support to the significance of ownership structure on the reporting decision.
Liu & Anbumozhi (2009)	China	To identify the determinant factors affecting the disclosure level of corporate environmental information on the basis of stakeholder theory, and gives an empirical observation on Chinese listed companies	175 observations (2006)	Disclosure index (6 items) & hypothesis test	Company's environmental sensitivity and size are currently the major significant factors influencing their environmental disclosure efforts. The economic performance is not significantly related to the environmental disclosure activities.
Cho et al. (2010)	US	To investigate whether there are self-serving biases present in the language and verbal tone used in corporations' environmental disclosures	190 ARs (2002)	Content analysis	The language and verbal tone used in corporate environmental disclosures, in addition to their amount and thematic content, should be considered when investigating the relation between corporate disclosure and performance.
Clarkson et al. (2011)	Australia	To examine how the environmental information voluntarily disclosed by a sample of Australian companies relates to their underlying environmental performance	51 companies (2001-2005)	Clarkson index (6 categories) & hypothesis test	There is a positive relation between environmental performance as measured by the level of emissions and environmental disclosure for the sample companies.
Hassel et al. (2011)	Sweden	To investigate the value relevance of environmental performance ratings for the market values of companies listed on Stockholm stock exchange	337 observations (1998-2000)	Performance index & hypothesis test	Environmental performance has a negative influence on the market value of companies.
Meng et al. (2014)	China	To examine how corporate environmental performance affects not only the level of detail of a company's environmental disclosures, but also what information is disclosed	533 companies (2009-2010)	Disclosure index (10 items) & hypothesis test	Environmental disclosure may not be a valid signal to differentiate good performers from poor performers in contemporary China.
Radu & Francoeur (2017)	US	To re-examine the association between environmental disclosure and environmental performance by considering environmental innovation as a key determinant of environmental disclosure	210 companies (2011)	Disclosure index (6 categories) & hypothesis test	Environmental performance and environmental innovation jointly determine environmental disclosure.
Tadros & Magnan (2019)	US	To re-examine the association between environmental disclosure and environmental performance	78 companies (1997-2010)	Disclosure index (63 items) & hypothesis test	There is little evidence to suggest that companies with low environmental performance attempt to use their disclosures to legitimise their environmental operations.

Author(s)	Country	Purpose	Sample	Instrument	Main finding
Component C: Environmental Information Quality					
Buzby (1974)	US	To measure the relative importance and/or the extent of disclosure of selected types of financial and nonfinancial information in annual reports	88 companies (1970-1971)	Disclosure index (38 items) & survey	A list has been constructed of 38 items or types of financial and nonfinancial information which might appear in an annual report.
Wiseman (1984)	US	To evaluate the quality and accuracy of environmental disclosures made in corporate annual reports	26 companies (1972, 1974, 1976)	Wiseman index (18 items)	The study provides a detailed measure of environmental disclosure contents.
Hammond & Miles (2004)	UK	To examines quality evaluation systems of UK corporate environmental and social reporting	64 respondents	Interview	High quality environmental reporting appears to be relatively easy to assess, but poor or mediocre quality environmental reporting is difficult to evaluate in any robust fashion.
Brown et al. (2005)	US	To present an initial step in designing accounting information system that respond to the needs of organisations attempting to be environmentally conscious	N/A	Comparative analysis	An information matrix for identifying alternative management strategies for framing and responding to environmental issues was developed.
van Staden & Hooks (2007)	New Zealand	To determine if there is an association between companies that have been identified as environmentally responsive according to an independent ranking and the quality and extent of their disclosures about their environmental impacts	32 companies (2002)	Disclosure index (32 items) & hypothesis test	The quality and extent of disclosure is positively related to responsiveness.
Guthrie et al. (2008)	Australia	To assesses corporate environmental reporting against intra-industry issues, as well as more universal reporting requirements, the latter derived from widely accepted and utilised reporting frameworks in the literature	19 companies (2004)	Unweighted index	The sample companies reported more on industry-specific issues than on general social and environmental issues.
Beck et al. (2010)	Germany, UK	To provides a measure of environmental information quality, diversity, content and volume	28 companies (2000-2004)	Disclosure index (12 categories) & content analysis	Disclosure quality remained relatively low and environmental reporting appeared to be intended more as a means of cultivating a positive company image rather than as a crucial aid to investment decision-making.
Cormier & Magnan (1999)	Canada	To identify determinants of corporate environmental reporting by Canadian companies subject to water	212 observations (1986-1993)	Wiseman index (18	Information costs and a company's financial condition are key determinants of environmental disclosure. Company size, the regulatory regime governing corporate disclosure,

Author(s)	Country	Purpose	Sample	Instrument	Main finding
		pollution compliance regulations during the 1986–1993 period		items) & hypothesis test	and industry also contribute to explaining environmental disclosure.
Cormier et al. (2005)	Germany	To identify determinants of corporate environmental disclosure using multi-theoretical lenses that rely on economic incentives, public pressures and institutional theory	304 observations (1992-1998)	Disclosure index (39 items) & hypothesis test	Risk, ownership, fixed assets age, company size as well as routine determine the level of environmental disclosure by German companies in a given year.
Brammer & Pavelin (2008)	UK	To examine how the decisions companies face regarding each facet of quality are determined by company and industry characteristics	447 companies (2000)	Disclosure index (5 items) & hypothesis test	High quality environmental disclosure is to be primarily associated with larger companies and those in sectors most closely related to environmental concerns.
Moroney et al. (2012)	Australia	To examine whether the quality of voluntary environmental disclosures is enhanced when assured	148 observations (2003-2007)	Clarkson index (6 categories) & hypothesis test	The quality of voluntary environmental disclosures scores significantly higher for assured companies than unassured companies.
Iatridis (2013)	Malaysia	To investigate the relation between environmental disclosure quality and corporate governance, and also examine the extent to which effective environmental disclosures are value relevant and how they influence investor perceptions	529 companies (2005-2011)	Clarkson index (6 categories) & hypothesis test	Company attributes, such as large size, the need for capital, profitability, and capital spending are positively associated with environmental disclosure quality. High quality environmental disclosers display effective corporate governance and tend to face less difficulties in accessing capital markets.
Giannarakis et al. (2016)	23 Countries	To identify the factors that influence the quality of environmental information	92 companies (2009-2013)	Disclosure index & hypothesis test	The environmental performance in terms of emission reduction initiatives and the country's risk premium affects in a positive way the quality of environmental disclosures while the results regarding the stock analyst recommendation are controversial.
Lee (2017)	Australia	To investigate the relationship between the quantity and the quality of environmental disclosure reports	55 companies (2014)	Disclosure index (61 items) & hypothesis test	The size of companies influences both the quantity and the quality of corporate environmental disclosure.
Baalouch et al. (2019)	France	To examine the impact of various factors on the quality of environmental disclosure	570 observations (2009-2014)	Disclosure index (40 items) & hypothesis test	A company's strategy and vision (environmental audit), diversity in boards (gender diversity) and environmental performance play significant roles in explaining variations in quality of environmental disclosure.

Author(s)	Country	Purpose	Sample	Instrument	Main finding
Belkaoui (1976)	US	To examine the reaction of capital markets to pollution control and other social policy expenditures	50 Companies (1970)	Hypothesis test	Environmental disclosure apparently has a substantial but temporary negative effect on stock prices centred around the date of disclosure.
Gozali et al. (2002)	Australia	To evaluate the economic consequences of environmental information disclosures	500 companies (1998-2000)	Simple measure & hypothesis test	Companies with positive environmental disclosure perform significantly better in the market than companies that disclose negative environmental information.
Filbeck & Gorman (2004)	US	To investigate the relationship between environmental information quality and financial performance in electric utilities	24 companies (1996-1998)	IRRC Compliance Index & hypothesis test	There is evidence of a negative relationship between financial return and a more proactive measure of environmental information quality.
Hassel et al. (2005)	Sweden	To find out how environmental information quality is reflected in the market value of listed Swedish companies	337 observations (1998-2000)	Hypothesis test	Environmental information quality represents only increased costs, resulting in decreased earnings and lower market values.
Bird et al. (2007)	US	To examine the extent to which a conflict exists by examining the relationship between a company's environmental information quality and market value	500 companies (1991-2003)	KLD database & hypothesis test	The market is not influenced by the environmental information quality only, but also by the totality of these activities and that the facets that they value do vary over time.
Aerts et al. (2008)	EU, North America	To analyse the information dynamics between corporate environmental disclosure, financial markets (as proxied by financial analysts' earnings forecasts) and public pressures (as proxied by a company's media exposure)	892 companies (2002)	Disclosure index (39 items) & hypothesis test	Enhanced environmental disclosure translates into more precise earnings forecasts by analysts. Such effect is reduced for companies with extensive analysis following and in environmentally sensitive industries.
Zhu & Qiao (2008)	China	To examine the relationship between the profitability and level of corporate environmental information quality	248 companies (2006)	Disclosure index & hypothesis test	There is no correlation between corporate profitability and level of corporate environmental information quality, and the companies with high profitability do not choose to disclose more environmental information, which denotes that 'signal display' cannot explain the environmental disclosure in China's capital market very well.

Author(s)	Country	Purpose	Sample	Instrument	Main finding
Roy & Ghosh (2011)	Seven Asian countries	To investigate the two-way association between economic performance and quality of discretionary disclosure of sustainable environmental practices	69 sustainability reports (2004-200)	Disclosure index (27 items) & hypothesis test	Sustainable environmental practices and the discretionary disclosures of the same has negative or very low positive as well as insignificant association with the economic performance of the company.
Lioui & Sharma (2012)	U.S.	To assess the impact of environmental information quality on corporate financial performance measured by ROA and Tobin's Q	17,456 observations (1991-2007)	KLD database & hypothesis test	The relationship between firms' returns on assets and environmental information quality is negative and statistically significant.
Clarkson et al. (2013)	U.S.	To address the question of whether voluntary environmental disclosures are incrementally informative over current environmental performance measures available to the public	195 observations (2003, 2006)	Clarkson index (6 categories) & hypothesis test	There is a signalling role for environmental disclosures and financial performance prediction as the means by which voluntary environmental disclosures enhance company value.
Plumlee et al. (2015)	US	To re-examine the relationship between the quality of a company's voluntary environmental disclosures and company value by exploring the relationship between the components of company value (expected future cash flows and cost of equity) and voluntary environmental disclosure quality	474 observations (2000-2005)	Disclosure index (62 items) & hypothesis test	Voluntary environmental quality is associated with company value through both the cash flow and the cost of equity components, consistent with our expectations.
Cai et al. (2016)	US	To examine the relation between corporate environmental disclosure quality and risk in U.S. public firms	23,000 observations (1991-2012)	KLD database & hypothesis test	For U.S. industries as a whole, corporate environmental engagement inversely affects firm risk and financial performance after controlling for various firm characteristics.
Alexopoulos et al. (2018)	Greece	To examine the relationship between environmental information quality and financial performance	931 observations (2001-2007)	Hypothesis test	Their findings provide evidence that governmental and corporate actions are necessary in order to lead to a more sustainable corporate performance in the long run.
Alipour et al. (2019)	Iran	To examine the association between corporate environmental disclosure quality and earnings quality	107 companies (2011-2016)	Disclosure index (12 items) & hypothesis test	There is a significant positive relationship between corporate environmental disclosure quality and earnings quality.

4.7 Chapter Summary

The purpose of this chapter is to structure and synthesise the findings of prior CET studies and to develop a conceptual framework that reflects CET as a system. A systematic literature review based on different study contexts, levels of analysis, and domains of research is conducted. A conceptual framework for CET is derived from the research focuses and findings of the studies reviewed. The framework recognises interrelationships within and among three main components: perceived environmental disclosure, corporate environmental accountability, environmental information quality.

By reviewing the existing literature on these components, this chapter reveals important knowledge gaps in CET literature and proposes research motivations for chapters 6 to 8. First, while there are inconsistencies in the literature on the relationship between external exposures and corporate disclosures, few studies consider eliminating the possible impact of external exposure on corporate disclosure when measuring the environmental information quality. Second, existing literature is inadequate in acquiring stakeholders' perceptions of environmental disclosure as weight factors into the quality measurement scope. Last, research into corporate environmental disclosure practices in emerging countries, especially China, remains low.

Since quality is subjective and context-dependent, a weighted comprehensive model (compound model) is needed to assess CET in China. After the systematic review of existing literature, this chapter builds on the initial model of environmental information quality and establishes a CET model applicable to Chinese listed companies.

In the next chapter, the research methodology and methods applied in this research are described in detail.

Chapter 5

Research Methodology and Methods

5.1 Introduction

In posing and answering research questions, a researcher must apply a systematic research methodology and choose appropriate methods (Neuman, 2013). Methodology in a scientific study plays a key role in making sense of the specific choices of research methods. Research methods are the actual techniques and procedures of investigation covering aspects, such as the types of questions to be addressed, sampling, data collection, data analysis, and the reporting of results (Easterby-Smith et al., 2021; Robson & McCartan, 2016) and are determined by the chosen methodology.

As can be seen from the systematic literature review of CET in chapter 4, the knowledge gaps in the existing literature relate to both quantitative and qualitative investigation methods, such as quantitative investigations into the relationship between CET and corporate financial performance and qualitative investigations into stakeholders' perceptions of CET. These gaps require the researcher to have both a subjective and objective mindset and to apply mixed approaches to solving complex research problems. Therefore, the pragmatism paradigm that favours mixed methods is more appropriate than others to the research questions of this thesis. Content analysis, questionnaire surveys, statistical analysis, interviews, and thematic analysis are chosen to achieve specific objectives in this thesis. The chapter is structured as follows.

Section 5.2 starts with a discussion of the mainstream research paradigms in accounting, followed by a review of the research purposes of this thesis. The pragmatism paradigm and a mixed method research design were selected. Section 5.3 and section 5.4 demonstrate the specific research-method decisions in the quantitative investigation and the qualitative investigation respectively. The specific strategies for sample selection, data, and data analysis are also justified. Section 5.5 summarises the chapter.

5.2 Research Methodology

Taylor et al. (2016) defined methodology as “the process, principles and procedures by which scholars approach problems and seek answers”. Methodology is a branch of knowledge that deals with the general principles or axioms related to the generation of new knowledge (Gaffikin, 2008; House, 1994; Ryan et al., 2002). Neuman (2013) distinguished methodology from methods by explaining that “methodology is broader than methods and envelops methods, which often relies on the research paradigm adopted by the researcher”.

A research paradigm is “a general philosophical orientation about the world and the nature of research that a researcher brings to a study”(Creswell, 2018). It encompasses two dimensions: “(a) philosophical, basic assumptions about the world; and (b) technical, the methods adopted when conducting research”(McGregor & Murnane, 2010). Scholarship, both in the natural and social sciences, is explicitly or implicitly informed by research paradigms when they are intended to generate new knowledge (Creswell & Plano-Clark, 2017).

A research community can be bonded together by a shared paradigm, which can be identified not only through the chosen research questions, but also through a research study’s methodological choices within a discipline, because these include a set of meta-theoretical assumptions commonly agreed by the community (Burrell & Morgan, 2019). Kuhn and Hacking (2012) defined a paradigm as “the existence of commonly shared goals, values and norms that demarcate the members of the community from other scientific and non-scientific communities”.

In relation to the research paradigm choices in this thesis, the researcher started by recalling the commonly accepted research paradigms within the specific research discipline (i.e., accounting). Positivism and constructivism have been the dominant research paradigms in accounting for several decades (Ryan et al., 2002). Meanwhile, pragmatism, as a relatively new paradigm, has “recently made a large impact on the methodological literature in the social sciences”(Morgan, 2014) in general, and in social and environmental accounting research specifically (Baker & Schaltegger, 2015). A detailed comparison of the main research paradigms in accounting research is provided in Table 5.1.

Table 5.1 *Assumptions of main paradigms in accounting research*

Philosophical Assumptions		Positivism (Typical situation)	Constructivism (Typical situation)	Pragmatism (Typical situation)
Ontological: The nature of reality		<ul style="list-style-type: none"> Objective Single Apart from the researcher 	<ul style="list-style-type: none"> Subjective Multiple As seen by research participants 	Not committed to any one system of philosophical assumptions; researchers have freedom of choice; the world is not an absolute unity; truth is not based on a duality between reality independent of the mind or within the mind; the external world is both independent of the mind and anchored in it.
Epistemological: The relationship of researcher to that being researched		<ul style="list-style-type: none"> Independent 	<ul style="list-style-type: none"> Inseparable 	
Axiological: The nature of values		<ul style="list-style-type: none"> Value-free Unbiased 	<ul style="list-style-type: none"> Value-laden Biased 	
Methodological	The process of research	<ul style="list-style-type: none"> Quantitative Confirmatory or top-down Emphasis on prior hypothesis (or theory) Deductive Generalisable findings 	<ul style="list-style-type: none"> Qualitative Exploratory or bottom-up Emphasis on grounded theory Inductive Particular or specialised findings 	<ul style="list-style-type: none"> Mixed processes Confirmatory plus exploratory Mixed theories Inductive-deductive research cycle Mixed findings
	Type of data collected	<ul style="list-style-type: none"> Numerical 	<ul style="list-style-type: none"> Narrative 	<ul style="list-style-type: none"> Numerical plus narrative
	Type of data analysis	<ul style="list-style-type: none"> Identify statistical relationships 	<ul style="list-style-type: none"> Identify patterns, features, themes 	<ul style="list-style-type: none"> Integration of thematic and statistical strategies
	Type of design (Examples)	Experimental studies; cross sectional studies; longitudinal studies	Case studies; participative enquiry; narrative research; phenomenology; grounded theory; ethnography	Sequential explanatory design; sequential exploratory design; sequential transformative design; concurrent triangulation design; concurrent embedded design; concurrent transformative design
	Methods (Examples)	Content analysis; survey; statistical analysis	Interviews; thematic analysis; document analysis; comparative analysis	Mixed methods

5.2.1 Research paradigms: The subjective-objective debate

A research paradigm can be classified by the chosen ontology, epistemology, axiology, and methodology (Mkansi & Acheampong, 2012; Saunders et al., 2019). Ontological assumptions focus on “the way a researcher views the world and what they consider to be ‘real’”(Bisman, 2010). They are concerned with the model of reality through claims or assumptions in relation to the nature of reality (Saunders et al., 2019; Sekaran & Bougie, 2020). Epistemology derives from ontology and proposes assumptions on the most appropriate ways of investigating the nature of the world; thus, it concerns “how people acquire and accept knowledge about the world”(Blackburn, 2016). Axiology is the philosophical stance of value. Axiological assumptions are concerned with the nature and role of values.

The positivism paradigm is concerned with “the positive application of knowledge to assist human progress”(Somekh & Lewin, 2011). This paradigm assumes that people can only be certain that knowledge is true when that knowledge is created using the scientific method (McGregor & Murnane, 2010). Positivism gained popularity in the early 1800s (McGregor & Murnane, 2010) and was the dominant paradigm for conducting research until the middle of the 20th century (Riley, 2007).

The constructivism paradigm, on the other hand, is supported by the belief that reality is socially constructed, and that the world is relative and multiple. Here, the researcher cannot separate from the researched, and the research itself is thus value bound (Collis & Hussey, 2014; Creswell, 2018; Schwandt, 1998). In contrast to the positivism paradigm, the constructivism paradigm emphasises inductive reasoning which involves interactive researcher and participant dialogue. This approach attempts to find the hidden meaning within certain contextually specific situations (e.g., people’s thoughts, reactions, and feelings) through deep reflection with the participants, and the result is normally presented in a descriptive form that is rich and complex (Cavana et al., 2001).

Based on these contrasts, the positivism and constructivism paradigms are often viewed as opposite to and incompatible with each other, which leads to the so-called subjective-objective debate in which researchers from two distinct paradigm camps reject each other’s paradigm (Gage, 1989; Howe, 1992; Tashakkori & Teddlie,

1998). As the debates continued, several social researchers (e.g., Brewer & Hunter, 1989; Datta, 1994; House, 1994) introduced the concept of pragmatism and argued that qualitative and quantitative methods can be compatible and that it is possible to employ multiple methods in a single research project.

The concept of pragmatism recognises the external reality, and it accepts both objective and subjective views depending on the researched phenomenon (Tashakkori & Teddlie, 1998). Similar to the constructivism paradigm, pragmatism also suggests that values play a large role in interpreting results; thus, a research study cannot be value-free (or free from bias). On the basis of these assumptions, the pragmatism paradigm asserts that researchers are not restricted by ontological and epistemological issues when deciding on the methods (quantitative or qualitative) that best address their research questions (Brierley, 2017). Pragmatism researchers therefore focus on “what works” rather than on reality and the nature of knowledge. They often mix both qualitative and quantitative approaches in a single study to provide the best understanding of a research problem, as well as to best produce the desirable outcomes (Creswell, 2018; Creswell & Tashakkori, 2007; Grafton et al., 2011; Tashakkori & Teddlie, 1998). Thus, the research processes in the mixed methods methodology tend to involve the collection and interpretation of both quantitative and qualitative data.

5.2.2 Research purposes

Bisman (2010) advocated that “A useful starting point in examining research philosophies is the consideration of research purposes”. Gill and Johnson (2010) argued that the methodological choices in a study should be driven by, and appropriate to, the research questions. The nature of the problem determines the philosophical assumptions; thus, it is necessary to review the purpose of this research.

As described in chapter 1, the aim of this research is not only to develop a measure of CET and apply it to assess the environmental transparency of Chinese listed companies, but also to investigate how CET affects corporate financial performance. In addition, particular attention will be paid to the driving forces behind CET of Chinese listed companies from the perspective of stakeholders.

Specifically, one main purpose of this research is to assess the CET of Chinese listed companies. Three types of information variables are calculated separately and weighted in light of the CET model. In addition, the research seeks to reach conclusions which, if generalised, could interpret the relationship between CET and corporate financial performance in the Chinese context. To fulfil this purpose, hypotheses development and hypotheses testing are required.

Another major purpose of the research is to record, interpret, and explore stakeholders' perceptions in relation to potential factors, whether inside or outside the companies, that they believe could significantly influence Chinese listed companies' environmental transparency. The research also seeks for in-depth explanations which are contextually related to the significant associations indicated by the first stage of the quantitative investigation. To achieve this purpose, interviews and induction of interview transcriptions are necessary.

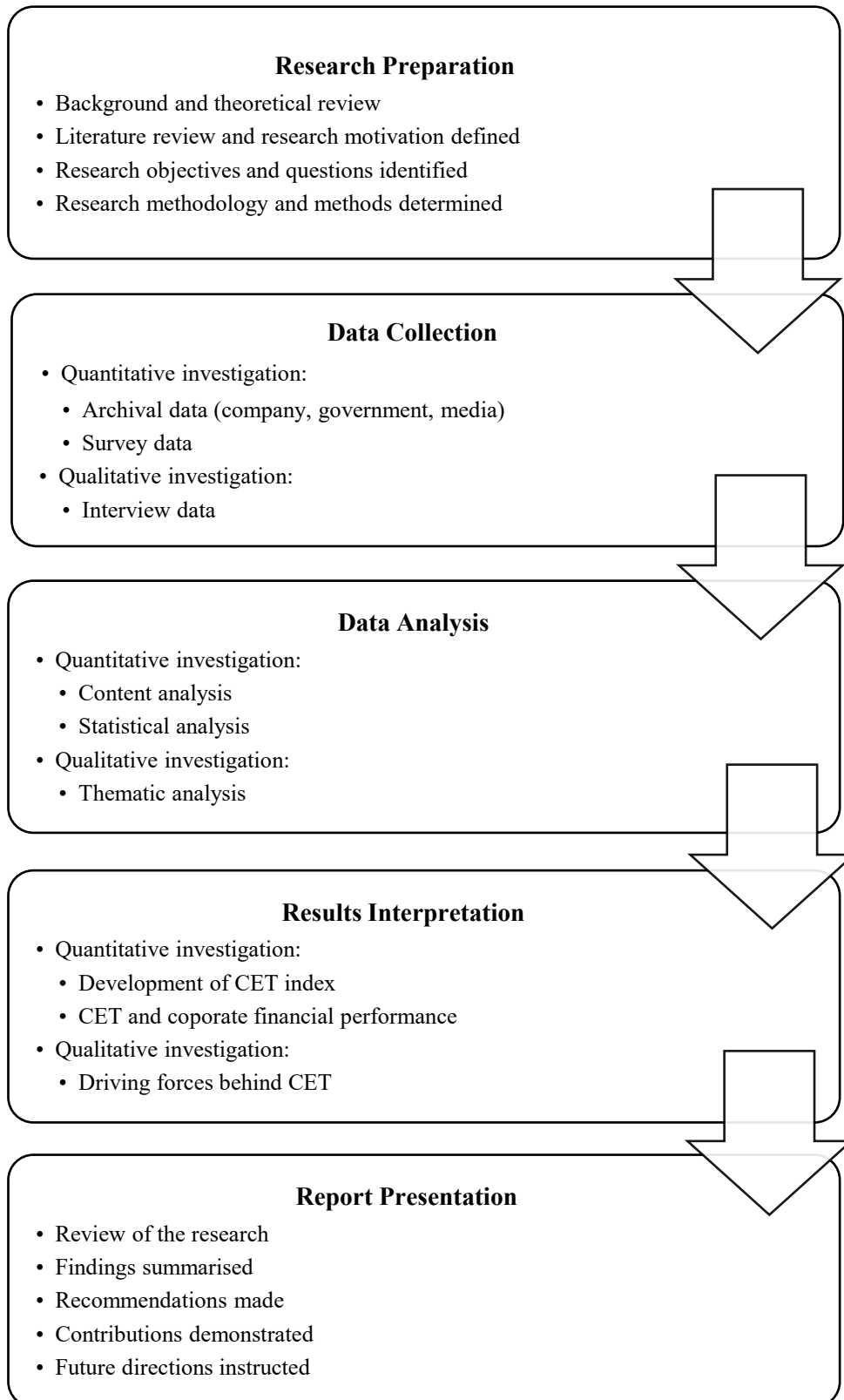
5.2.3 Methodological choices

The research purposes demonstrate the need for this thesis to look not only for empirical outcomes, such as correlations, but also for explanations for in-depth understanding of causal mechanisms. It is from this point of view that this research should take a 'pragmatic' stance which, in turn, leads to a pragmatism paradigm. Furthermore, the existence of logical connections between the ontological, epistemological, and methodological premises that underpin pragmatism mean that the metaphysical obstacles undermining mixed methods research can be circumvented (Grafton et al., 2011), implying that the methodological choice of this research should be mixed research methods.

Pragmatism, as has been discussed, is regarded as providing philosophical and theoretical elements of mixed methods investigation design which lend mixed research argumentative coherence and validity (Morgan, 2014). It has been argued that coherent studies are more likely to result because pragmatists "recognise the existence of logical connections between the ontological, epistemological, and methodological premises that underpin their work"(Baker & Schaltegger, 2015). Therefore, inspired by the philosophical stance of pragmatism, a mixed methods research design which combines both quantitative and qualitative research methods

was selected to produce scientifically based knowledge (Neuman, 2013) about the investigated phenomena in this research. A flowchart of the research design is shown in Figure 5.1.

Figure 5.1 *The flowchart of research design*



5.3 Quantitative Investigation Methods

The quantitative part of the research is aimed at fulfilling the second and third research objectives, while helping to achieve the last one. Three specific methods, content analysis, questionnaire survey, and statistical analysis were adopted in this thesis to collect, process, and analyse quantitative data. In addition to the sample selection and data collection, four other phases came before the statistical analysis.

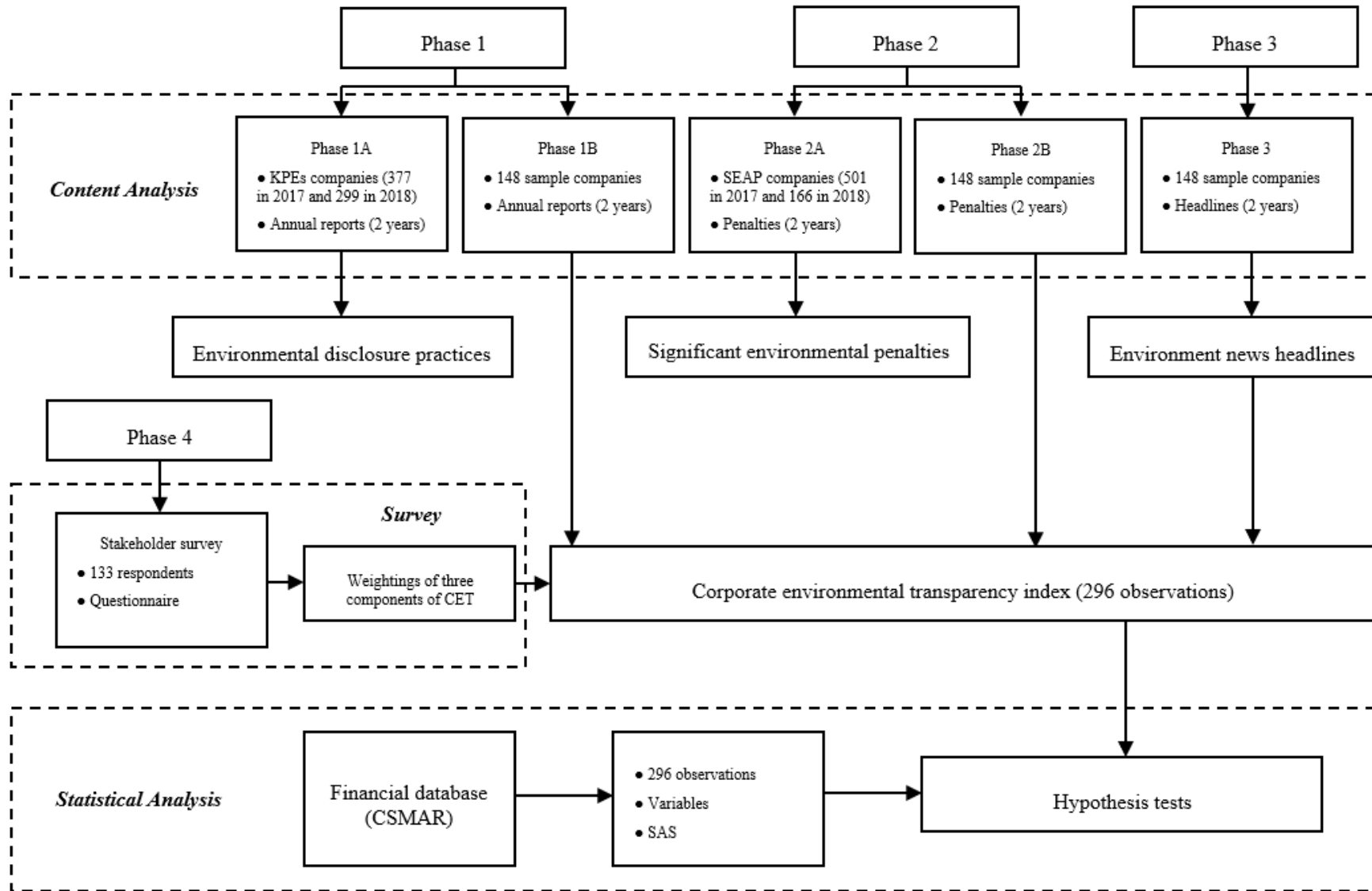
First, the thesis selected suitable A-share listed companies to be observed before the quantitative investigation began. 377 such companies were identified for the year 2017 and 299 for 2018. Together these cover the entire sample of A-share listed companies that were mandated to disclose environmental information in each of the 2 years. A detailed content analysis of these companies thus provides a full picture of the environmental disclosure practices of Chinese listed companies. Of these companies, 148 appeared in both years. Therefore, it was those 148 companies that were further selected to form the research sample for the statistical analysis.

Second, the content analysis in this thesis consists of three phases, each corresponding to one source of environmental information about the sample companies. Phase one analysed corporate environmental disclosures. Phase two analysed government environmental penalties, while phase three analysed media environment news headlines. Through the three phases of content analysis, the sample companies' environmental disclosure practices, as well as the regulatory and public pressure they face, were presented in the form of quantitative data. These data formed the basis of the CET index and were used for further hypothesis testing.

Third, the questionnaire survey in this thesis refers mainly to phase four. Phase four collected stakeholders' perceptions of three different sources of environmental information. These perceptions were then adopted as weighting factors for the development of CET index in China.

Last, the CET index was constructed after these four phases had been completed. The results of these four phases are described in detail in chapter 6. On this basis, chapter 7 applied a statistical analysis method to test the relationship between the CET index and corporate financial performance. Overall, the process of quantitative investigation is outlined in Figure 5.2.

Figure 5.2 *The quantitative investigation process*



5.3.1 Sample selection and data collection

5.3.1.1 Sample selection

The starting point for the selection of a research sample for this study was to look at all 3,596 A-share listed companies that were listed on the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE) in 2018. The research focuses on A-share listed companies for two reasons. First, most of A-share listed companies are large companies. Second, A-share listed companies are legally obliged to file annual reports and social responsibility reports (if necessary), a factor which helped the researcher to access the annual reports and social responsibility reports of these listed companies.

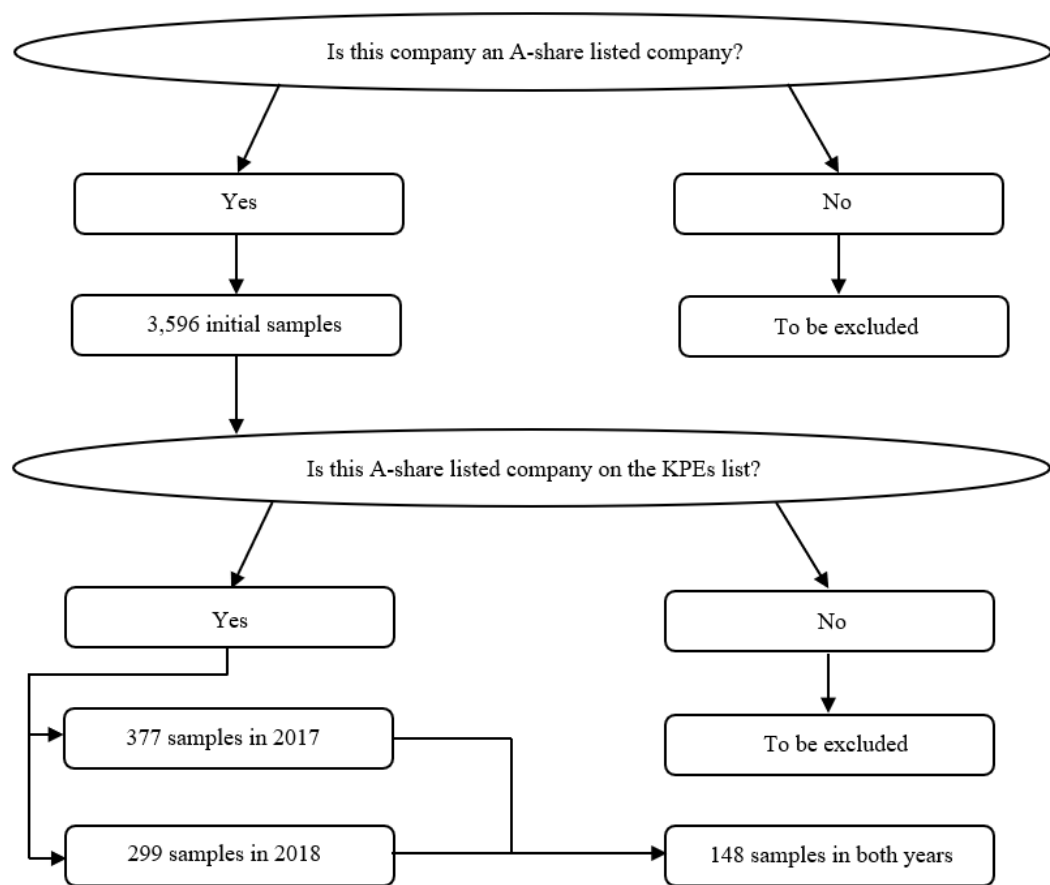
In addition, this thesis focuses on companies subject to environmental policies, which means the research sample should also comprise the main targets of supervision by environmental policies. In December 2017, environmental authorities in China formulated and implemented the Regulations on the Administration of the List of Key Pollutant-discharging Entities. According to this regulation, the KPEs list is dynamically managed by environmental authorities. There were 32,732 companies on the KPEs list by the end of 2017 and 43,019 companies by the end of 2018. For the first time, A-share listed companies on the KPEs list were required to disclose environmental information mandatorily. The CSRC revised two reporting standards¹⁴ accordingly, and made detailed provisions regarding the format and items of environmental information disclosure by A-share listed companies. Therefore, to accurately identify the real targets of this research, it was necessary to find out which A-share listed companies were on the KPEs list.

Two criteria were applied to determine the research sample. First, sample companies must be A-share listed companies. Second, sample companies must be on the KPEs list. On the basis of the selection process shown in Figure 5.3, 377 companies and 299 companies were identified for the years 2017 and 2018 respectively. These companies constitute the entire sample of Chinese listed companies that were subject to mandatory environmental disclosure requirements

¹⁴ See section 2.4.3, chapter 2 for specific articles on mandatory requirement of disclosure of environmental information for A-share listed companies on the KPEs list.

in 2017 and 2018. To achieve the third objective of this thesis, namely the statistical analysis related to the CET, having a 2-year panel dataset was necessary. After comparing the 377 companies in 2017 with the 299 companies in 2018, the researcher found that 148 companies met both criteria in both of those years. Thus, the research sample for CET assessment and further statistical analysis in this research was 148 A-share listed companies (See Appendix A).

Figure 5.3 *The process of sample selection*



The sample selection for the research, which is limited to the KPEs listed companies, rested on the following two reasons.

First, mandatory environmental disclosure regulations and format requirements for KPEs provide not only comparable standards, but also windows for understanding the impact of environmental policies on corporate environmental disclosure practices. For A-share companies not on the KPEs list, although they are encouraged by policy-makers to voluntarily disclose environmental information, their environmental disclosures are random, as there are no mandatory requirements.

As a result, these disclosures could not be assessed under comparable criteria; had they been, it would have seriously affected the accuracy of the assessment of their environmental disclosure practices. Therefore, they were excluded from the sample of this research.

Secondly, as discussed in chapter 3 in connection with legitimacy theory, environmental disclosure can be seen as a key strategy for companies to gain or maintain their legitimacy, which means that IBAs¹⁵ might be overused by companies. Since A-share companies on the KPEs list are all in the same regulatory situation these companies are required to disclose their environmental information on a mandatory basis. As a result, these companies are more prone to hide their poor environmental practices through taking a ‘free-riding’¹⁶ approach. As a result, environmental policies may fail. Therefore, the CET of these companies is worthy of more attention, and the study of them is more valuable with regard to making recommendations for policy-makers. By limiting the research focus to the KPEs listed companies, the researcher could concentrate on investigating the actual and genuine corporate transparency of environmental information, while excluding the disturbances which might arise from fragmented and random environmental disclosures in some A-share listed companies.

5.3.1.2 Annual report as an appropriate source of company data

Although the sample companies for 2017 and 2018 were selected, knowing which types of corporate reports were reliable sources of company data for this research remained unclear. As discussed in chapter 2, A-share listed companies disclose environmental information mainly through their annual reports and social responsibility reports. Although very few companies also disclose via stand-alone environmental reports, the researcher examined all types of reports.

First, most studies have considered annual reports to be the main media for environmental reporting (Harte & Owen, 1991; Patten, 2002; Tilt, 2001; Wiseman, 1982). Wiseman (1982) explained that the annual report has been selected as the

¹⁵ IBAs refers to information-based environmental policies. The common ground of such policies is that they all seek to improve environmental practices of organisations through the mechanism of information disclosure so as to achieve the goal of environmental improvement.

¹⁶ See section 3.3.1.3, chapter 3 for a detailed explanation of the ‘free-rider problem’.

source for corporate environmental disclosure because it is “widely recognised as the principal means for corporate communication of activities and intentions to shareholders and is the primary source of environmental reporting by corporations” . Chapter 2 mentioned that A-share listed companies on the KPEs list are mandatorily obliged to disclose environmental information through their annual reports. Thus, a pilot investigation was conducted in July 2018. Three A-share listed companies on the KPEs list were selected at random, and the researcher downloaded their 2017 annual reports. The results of the investigation showed that all three companies complied with the regulations of the CSRC and made their disclosures in the appropriate format. Therefore, the annual report is preliminarily identified as an appropriate source of company data.

Second, academic attention has also been paid to separate reports on environmental information (Tilt, 2008). From the discussion in chapter 2, it should be acknowledged that in terms of quantity, A-share listed companies have made great progress in disclosing CSR reports in recent years. In 2017, a total of 792 A-share listed companies disclosed stand-alone CSR reports, while 19 disclosed stand-alone environmental reports. However, there are still serious problems with these stand-alone reports, for instance irregular contents and formats and inconsistent forms of disclosure. With this issue in mind, the researcher investigated them more extensively. In August 2018, 20 A-share listed companies’ CSR reports and all 19 environmental reports were downloaded by the researcher from their respective company websites.

After careful investigation and comparison, the results were as follows. (1) There are no standard formats or reporting criteria for stand-alone CSR reports and stand-alone environmental reports. Seven companies claimed that they follow the SSE’s and SZSE’s guidelines on CSR reports based on their own rules and understanding. Two companies suggested that their CSR reports are prepared with reference to the global reporting initiative guidelines even though there were also significant differences between these two companies in the format of the reports. None of the 19 companies that disclosed a stand-alone environmental report gave any indication of the reporting standards they followed. (2) Environmental information is not the focus of stand-alone CSR reports. Only five companies have a separate

environmental section in their CSR reports, but their focus is not on pollution discharge information. These CSR reports all contain a great deal of descriptive and ineffective information about how the company values environmental protection. On this basis, the researcher compared the 792 companies' names with the KPEs list and found that only 99 companies were on the list. Consequently, A-share listed companies that disclose CSR reports are not the focus of regulation by environmental authorities. (3) Stand-alone environmental reports do not provide more environmental information than annual reports. For the 19 A-share companies that disclose stand-alone environmental reports, 8 were on the KPEs list. After reviewing the full text, the researcher found that the following statement exists in all eight environmental reports.

“The 2017 Annual Environmental Report covers the same scope of content as the Company’s 2017 Annual Report.”

In summary, based on the above investigation, stand-alone CSR reports and stand-alone environmental reports were excluded from the collection of company data. Annual reports for 2017 disclosed by the 337 companies and 2018 annual reports disclosed by the 299 companies were finalised as an appropriate source of company data.

5.3.1.3 Data collection

As mentioned at the beginning of this section, there were three phases of content analysis. Each phase analysed its specific data from one particular source. The three different sources of data are company data, government data, and media data respectively. Thus, the data collection process is also described according to each of these three sources.

Company data collection

The data collection for 2017 annual reports began in Hamilton in September 2018 and lasted from September through to November 2018. Similarly, the data collection for the 2018 annual reports followed the same timeline from September to November in 2019, as A-share listed companies usually disclose their annual reports in the following year. The researcher was aware that A-share listed companies would submit their annual reports to the SSE and SZSE database and

that normally A-share listed companies would be likely to publish their annual reports on their websites. The existence of the SSE and SZSE database was expected to facilitate the accessibility of the annual reports. The data collection was performed via the following procedures. First, the researcher searched for the websites of the sample companies to try to find their annual reports; if the annual report was not available there, then the researcher turned to the SSE and SZSE database and sent emails to them to ask for an electronic copy of the annual report of the specific company.

The 2017 annual reports of the 337 KPEs listed companies were collected by December 2018. The 2018 annual reports of the 299 KPEs listed companies were collected by December 2019. The collections of the annual reports of these KPEs listed companies made it possible to critically measure and accurately evaluate the environmental disclosure practice of Chinese listed companies, thus providing one of the bases for a comprehensive CET measurement. The researcher believed that the sample composition would lead to representative empirical findings which would be generalisable. Section 5.3.2.1 details how content analysis was used to turn the company data into an EDI.

Government data collection

The preparation for government data collection began in Hamilton in June 2020. The method used in this study was to compile information on significant environmental administrative penalties for A-share listed companies in 2017 and 2018 based on the database of the Ministry of Ecology and Environment (MEE). The MEE database is maintained by its subordinate Environmental Enforcement Bureau ¹⁷ (Ministry of Ecology and Environment, 2018).

In accordance with the characteristics of the MEE database, the researcher downloaded all the environmental administrative penalty information for A-share listed companies in 2017 and 2018. Four thousand and seventy-one penalties were recorded in the MEE's statistical database against A-share listed companies and

¹⁷ The main responsibilities of the Environmental Enforcement Bureau include (1) Be responsible for environmental supervision and enforcement; (2) Supervise the implementation of environmental policies, plans, regulations and standards. (3) Investigate and handle significant environmental violations. (4) Manage and maintain the enforcement information system and its database.

their subsidiaries, involving a total of 885 A-share listed companies and fines totalling RMB 503.87 million (USD 76.41 million¹⁸). Of these 885 A-share listed companies, 463 were listed on the SZSE and 422 were listed on the SSE. Forty-four out of 885 companies received 10 or more environmental administrative penalties (including general and significant administrative penalties). The company with the highest number of penalties was China State Construction Engineering Corporation Ltd. (stock code 601668), which was penalised 203 times in 2017.

Since the Securities Law and the Measures for the Administration of Information Disclosure by Listed Companies have mandatory requirements for A-share listed companies to disclose information on significant administrative penalties in their annual reports, such penalty information is particularly worthy of the focus of this research. According to the discussion of signalling theory in chapter 3, the disclosure of this type of information would send a very negative signal to the market. From the perspective of the self-interests of the listed companies, this type of information would not be voluntarily disclosed without a mandatory requirement. Although the disclosure of pollutant discharge information is often taken superficially as an unfavourable signal, in practice companies often justify their legitimacy by claiming that they met the appropriate pollutant discharge standards. However, the disclosure of information on significant environmental administrative penalties, on the other hand, will be obvious evidence that the company has violated social norms, posing a direct threat to its legitimacy. Therefore, the significant environmental administrative penalty is undoubtedly an ideal source of government data to test the transparency of corporate environmental information.

Whereas the significant administrative penalty is clearly defined by laws in China, there are no nationwide criteria for determining the significant environmental administrative penalty as a specific type of the significant administrative penalty. However, general selection criteria can be formed based on the existing regulations on significant administrative penalties and the criteria for determining significant environmental administrative penalties developed by some provinces (e.g., Shanxi Province). Section 5.3.2.2 details how general selection criteria are developed and

¹⁸ The figure is based on the average RMB/USD exchange rate of 6.5942 in December 2017.

how to use content analysis to identify significant environmental administrative penalties from the initial 4,071 penalties.

Media data collection

The preparation for media data collection also began in Hamilton in June 2020. The goal of the media data collection was to look at all environment news headlines related to the 148 sample companies for CET assessment in 2017 and 2018. In order to achieve this goal, several steps had to be completed.

First, all news headlines relating to A-share listed companies in 2017 and 2018 needed to be collected. This step was done by the researcher through the CSMAR's news subdatabase. The CSMAR's news subdatabase contains information on business and economics in China and overseas, with a focus on news reports and data from over a thousand Chinese newspapers and periodicals and professional information provided by some of their partners. The number of news headlines related to 3,596 A-share listed companies in the database was 52,983 in 2017 and 82,825 in 2018.

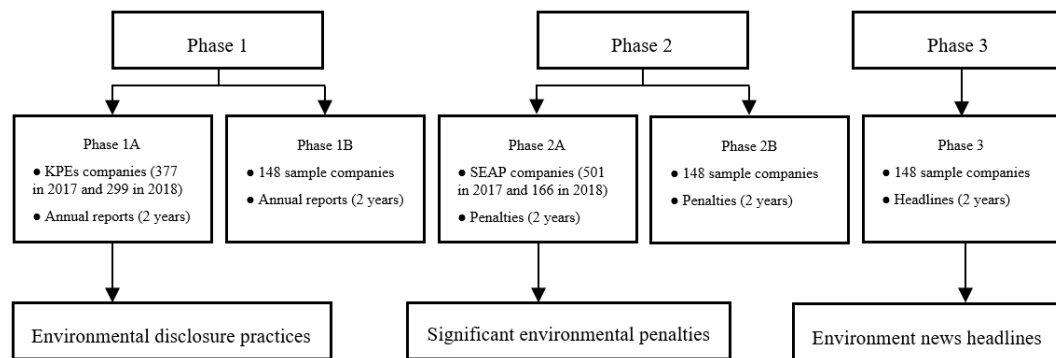
Second, all news headlines relevant to the 148 sample companies needed to be selected. Given that each sample company has a unique stock code, the researcher was able to make use of the stock code as a reference to select the news headlines data that contained the stock code of the sample companies and exclude those that did not. The researcher implemented this step using the VLOOKUP function in Microsoft Excel. To ensure the reliability of the results, the researcher invited a professional who oversees the Microsoft Office workshop at the University of Waikato to carry out a validation. The results of data processed by the professional were consistent with the researcher's results. The number of news headlines related to the 148 selected sample companies was 2,320 in 2017 and 3,379 in 2018.

Last, environment-related headlines needed to be identified from the news headlines data of the 148 sample companies. A content analysis approach was required to complete this step. Section 5.3.2.3 details the classification and selection criteria for the three different types of environment news headlines and how to convert the media data into an ENHI using content analysis and the J-F coefficient of imbalance.

5.3.2 Content analysis

Content analysis in this research consisted of three phases in which the data from each of the three different sources noted in the previous section were analysed. The first phase aimed to present a full picture of the mandatory environmental disclosure practices of Chinese listed companies in 2017 and 2018. Similarly, the second phase was designed to provide a panoramic view of significant environmental administrative penalties for Chinese listed companies in 2017 and 2018. There were two datasets in phases 1 and 2. The first two phases analysed the overall situation of A-share listed companies first and then focused on a sample of 148 companies available for statistical analysis. The third phase dealt only with the 148 samples. Figure 5.4 shows the process for the three phases of content analysis.

Figure 5.4 *The content analysis process*



5.3.2.1 Phase 1: Corporate environmental disclosure practices

Krippendorff (2018) defined content analysis as a “method of codifying the text (or content) of a piece of writing into various groups or categories depending on selected criteria”. In corporate environmental disclosure research, content analysis can take various forms with distinct levels of complexity (Gray et al., 1995b). It has been suggested by Cho (2009) that content analysis could place and codify “the text of a narrative into different categories based on selected criteria”. From this perspective, Nazli Nik Ahmad and Sulaiman (2004) explained that at least two stages of content analysis exist.

The initial stage is to construct a categorisation of schemes for environmental disclosures, namely rules of coding. This coding could either be developed by the

researcher (on the basis of the previous literature), or the researcher could take advantage of generally accepted standards or initiatives such as the global reporting initiative—for example Clarkson et al. (2008)—or the UNEP/SustainAbility 1994 index in de Villiers and van Staden (2006). No matter what approach the initial stage of content analysis adopts, it is important that “definitions employed in the rules of coding are negotiated to achieve ‘shared meanings’ which create the same referents in all the associated researchers”(Gray et al., 1995b). Day and Woodward (2004) further demonstrated that “shared meaning is similarly important for those who are reading the results of the research”. It is therefore necessary to define categories of schemes which are sufficiently robust to clearly differentiate various categories of items.

The next stage was to use various methods to measure environmental disclosures, namely rules of scoring. Chapter 4 provides an overview of the various measuring instruments proposed in prior studies to try to objectively explore the true level of environmental information disclosure of various areas/items, each of which has its own merits and drawbacks. Together, the two stages of content analysis resulted in a measuring instrument in the form of a disclosure scoring system which could observe changes in quantity, so as to identify and measure the extent of environmental disclosure (Huang & Kung, 2010).

Rules of coding

In the first stage, as demonstrated by Nazli Nik Ahmad and Sulaiman (2004), the researcher must construct a categorisation of schemes for company data which must achieve shared meanings among not only all associated researchers, but also between the researcher and potential readers (Day & Woodward, 2004). Given the company data for this research are the annual reports of A-share companies on the KPEs list in 2017 and 2018, a review of China’s IBAs (information-based environmental policies) in chapter 2 suggested that the CSRC had revised two annual reporting standards in December 2017, detailing provisions on the format and items of environmental information disclosure by A-share listed companies.

From the perspective of policy-makers, to ensure the universal application of the standards, definitions employed in the CSRC’s annual reporting standards must be

authoritative, practical, clear, and unambiguous. The direct use of these standards enabled the researcher and readers to analyse the company data in this research with almost the same perceptions and understanding and, most importantly, enabled the process and results of the content analysis to be replicable. As a result, the ‘shared meanings’ can be achieved between the researcher and all potential readers. Additionally, as the environmental disclosure requirements from the CSRC’s annual reporting standards are mandatory for A-share listed companies on the KPEs list, there is no doubt that they are ‘generally accepted standards’, as mentioned above.

In light of this, CSRC’s annual reporting standards for environmental disclosure in 2017¹⁹ was adopted by the researcher as the ideal categorisation of schemes for developing EDI. According to the categorisation of schemes in this research, there are 12 items for corporate environmental disclosure, which are categorised under four themes, namely pollutant discharge information, pollution prevention information, environmental compliance information, and company policies and procedures. The list of the 12 items is shown in Table 5.2.

Table 5.2 *The list of EDI items*

Pollutant discharge information
Item 1. Name of major pollutants and specific pollutants
Item 2. Way of discharge
Item 3. Amount of discharge outlets
Item 4. Distribution of discharge outlets
Item 5. Concentration of discharge and total discharge volume
Item 6. Excess discharge
Item 7. Execution standards for pollutant discharge
Item 8. Permitted total discharge volume
Pollution prevention information

¹⁹ The policy of Standards for the Contents and Formats of Information Disclosure by Companies Offering Securities to the Public No. 2-Contents and Formats of Annual Reports (2017 Revision) was issued by the CSRC on 26 December 2017 and applies to 2017 and 2018 reports. Retrieved from <http://www.csrc.gov.cn/pub/newsite/flb/flfg/bmgf/xxpl/xxplnr/201805/P020180520760024848296.pdf>

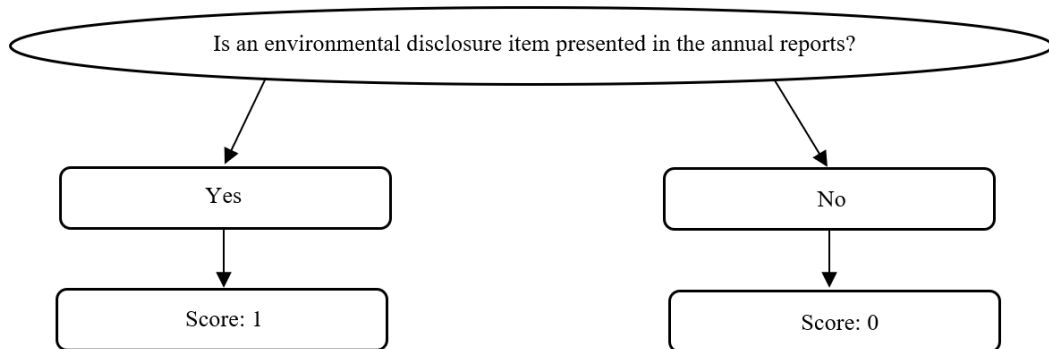
Item 9. Construction and operation of pollution prevention facilities
Environmental compliance information
Item 10. EIA of construction projects and PDP
Company policies and procedures
Item 11. Emergency plans for unexpected environmental incidents
Item 12. Environmental self-monitoring programmes

Rules of scoring

At the second stage described by (Nazli Nik Ahmad & Sulaiman, 2004), the researcher constructed a scoring system to attribute scores to distinct items of environmental information disclosed by a specific company through its annual report. As reviewed earlier in chapter 4, most environmental disclosure studies used scoring systems to assess not only the extent, but also the quality of environmental disclosures. The 2-point scale (0-1) was mostly applied to measure the extent, while the multipoint scale (0-2, or 3, or 4, or 5, or...) was commonly adopted for the assessment of the quality. This research however argues critically that as typical company data, companies' environmental disclosures are only suitable for measuring their extent, while the assessment of their quality involves more data than the company data itself (i.e., the environmental administrative penalties announced by the government, the environmental news reported by the media, and the information users' perceptions of the above information including corporate disclosures). Also, the multipoint scale is almost inevitably free from the subjective judgement of the individual scorer, assuming that there is no automatic computer scoring involved. The presence of such subjective judgements often prevents the process and results of content analysis from being replicated by other researchers.

In order to minimise the influence of the researcher's personal subjective judgment on the evaluation of environmental disclosures of the KPEs listed companies in this research, a 2-point scale was adopted to measure the extent of environmental disclosures of the KPEs listed companies, eventually forming EDI. In the 2-point scale scoring system, '0' is assigned when a disclosure item in the list is not disclosed at all, and '1' is assigned when the item is disclosed. Figure 5.5 shows the process of measuring the extent of environmental disclosures.

Figure 5.5 *The scoring process for EDI*



In addition, another reason for using the 2-point scale in this research was that the items identified in the first stage are particularly applicable to the KPEs listed companies. The KPEs listed companies are key polluters of special concern to environmental authorities and must comply with the disclosure requirements of the 12 items listed above. If a KPEs listed company does not disclose an item, it is not that the item does not apply to them. Therefore, the total scores calculated by the 2-point scale provided an objective picture of the extent of environmental disclosures by the KPEs listed companies.

It should be acknowledged that when utilising the scale scoring system, the researcher needed to examine in detail the environmental disclosures in the annual report of each KPEs listed company, a process which involved a substantial amount of textual data in the Chinese language. Although the researcher is a native Chinese speaker and follows the rule of “coding for meaning rather than looking for exact words”(Schneider & Samkin, 2008), it is necessary to detail the scoring rules for each item so that the process can be replicated by any potential readers (See Appendix B).

Figure 5.6 *2017 annual report of Jinhui Liquor Co., Ltd. (stock code 603919)*

(三) 环境信息情况

1. 属于环境保护部门公布的重点排污单位的公司及其重要子公司的环保情况说明
适用 不适用

公司作为白酒生产企业，主要污染物包括废水、废气和固体废弃物。根据甘肃省环境保护厅 2017 年 5 月 8 日发布的《关于印发 2017 年国家重点监控企业名单的通知》（甘环监测发[2017]33 号），新增公司为废水国家重点监控企业。

主要污染物	特征污染物	排放方式	排放口数量	排放口分布情况	排放浓度	年度排放总量 (吨)	核定的排放总量 (吨)	超标排放情况	执行的排放标准
废水	COD	处理达标后排放	1	公司三区东南角	24mg/L	8.0744	16	未超标	《发酵酒精和白酒工业水污染物排放标准》(GB27631-2011)
	氨氮				0.24mg/L	0.0843	0.16	未超标	
废气	烟尘	处理达标后排放	2	公司二区锅炉房 烟气排放口 公司三区锅炉房 烟气排放口	二区: 21mg/m ³	二区: 2.215	14.5	未超标	《锅炉大气污染物排放标准》(GB13271-2014)
	二氧化硫				三区: 8.1mg/m ³	三区: 0.842			
	氮氧化物				二区: 95mg/m ³	二区: 10.599	61.6	未超标	
					三区: 61.6mg/m ³	三区: 3.479			
		二区: 81mg/m ³	二区: 7.500	65.8	未超标				
		三区: 94.7mg/m ³	三区: 1.61						

公司的固体废弃物包括酒糟、炉渣、废渣和生活垃圾等，其中酒糟、炉渣、废渣用于生产，生活垃圾由环卫部门清运，废旧包装材料进行回收再利用，生活垃圾由环卫部门集中处理。

(2) 防治污染设施的建设和运行情况

① 废水治理设施

公司建设了日处理能力为 2000 吨的污水处理站，按照“雨污分流”要求将生产废水、生活废水、工艺废水分类收集，分类进入污水处理站进行处理。污水处理站设有生产废水处理系统、工艺废水处理系统，高浓度生产废水经 UASB+CASS+消毒工艺进行处理，生活污水直接经 CASS+消毒工艺进行处理，工业废水经 UASB+CASS+消毒工艺处理。处理后的废水达到《发酵酒精和白酒工业水污染物排放标准》(GB27631-2011)的要求，大部分用于厂区绿化灌溉、路面清洗。污水处理站排放口安装在线监测设备，和陇南市环境保护局监控平台联网运行，每 10 分钟上传一次 COD、氨氮监测数值和外排水瞬时流量数据。污水处理站实行 24 小时轮岗工作制，运行情况良好，各项指标均能够持续稳定达标排放。

② 废气治理设施

公司安装了高效节能型的蒸汽锅炉、燃煤锅炉，并安装了除尘器、脱硫塔，采用先进工艺进行除尘、脱硫和烟气净化。公司原粮粉碎车间安装了高效除尘装置，分别采用 LNGM 和 TBLMy 系列脉冲布袋除尘设备以及 TBLM 高压扁袋除尘器，将各类废气分类收集，分别处理后达标排放，除尘效率达到 99%。

(3) 突发环境事件应急预案

公司根据《国家突发环境事件应急预案》、《甘肃省突发环境事件应急预案》、《甘肃省企业事业单位突发环境事件应急预案编制大纲》、《甘肃省环境保护厅关于转发企业事业单位突发环境事件应急预案备案办法》、《企业事业单位突发环境事件风险评估指南(试行)》等规定编制了《金徽酒股份有限公司突发环境事件应急预案》，并委托甘肃绿康环保技术有限公司编制，该预案通过了陇南环境保护局组织的专家评审和备案登记，公司每年定期组织各部门、车间进行学习、演练。

(4) 环境自行监测方案

目前，公司已根据环保部《关于印发国家重点监控企业自行监测及信息公开办法(试行)的通知》(环发[2013]81号)、《排污单位自行监测技术指南 总则》(HJ 819-2017)和《发酵酒精和白酒工业水污染物排放标准》(GB 27631-2011)等规章制度和国家标准，编制了自行监测方案，并委托甘肃欣和环境检测有限公司进行第三方检测，每月月底将检测结果在甘肃省重点监控企业自行监测信息发布平台公布。

To be more specific, taking the annual report of Jinhui Liquor Co., Ltd. (stock code 603919) as an example as shown in Figure 5.6., 11 out of the 12 items have been published by the company according to the rules in Appendix B. Thus, a score of ‘1’ was assigned to 11 items, while a score of ‘0’ was assigned to 1 item. Similar to other content analysis studies, two scorers were involved in conducting a pretest of the scoring process in this research. Like the researcher, the other scorer is a Chinese PhD candidate²⁰ at the University of Waikato. Five companies were randomly selected from the KPEs listed companies and their 2017 annual reports were scored by the two scorers using the criteria in Appendix B. The results showed no

²⁰ The criteria for selecting another scorer are first that the person had to be a native Chinese speaker and secondly had to have knowledge of and experience in applying content analysis to company textual data.

difference between the two scorers, as exhibited in Table 5.3, confirming the replicability of the content analysis.

Table 5.3 *The pretest of the scoring process*

Stock code	Scorer A	Scorer B
000423	11	11
002099	12	12
600190	9	9
601231	10	10
603823	3	3

The scoring process began in January 2020. It took the researcher 3 months to finish the entire scoring procedure relating to the content analysis of the 377 annual reports in 2017 and the 299 annual reports in 2018, and then another 2 months to double-check the scoring results in order to ensure their accuracy. The EDI for the KPEs listed companies were calculated after the completion of the scoring procedure in June 2020. To boost the objectivity of the final results, the researcher went through the content analysis twice and identified any inconsistent scores between the two content analyses sweeps. In the rare cases where there were inconsistent results, they were rescaled by the researcher and found to be human error. The researcher believes that the results of the content analysis are trustworthy, reflect the true picture of the environmental disclosure practice of A-share listed companies with a high level of objectivity, and provide a solid basis for the assessment of CET in chapter 6.

Section 6.2.1 presents the environmental disclosure practices of the 377 KPEs listed companies in 2017 and the 299 KPEs listed companies in 2018 from multiple perspectives. Section 6.4.3 develops a CET index of the 148 sample companies for statistical analysis.

5.3.2.2 Phase 2: Significant environmental administrative penalties

Content analysis is also regarded as a method “of enquiry into the symbolic meaning of messages”(Krippendorff, 2018). In phase two, the content analysis

method was used to identify the significant environmental administrative penalties from the initial 4,071 penalties and to gain quantified descriptions of the government data. The results of this process can be taken as a measurement of the poor environmental performance of A-share listed companies and a test of the transparency of their environmental disclosures; meanwhile, through codifying the government data, the symbolic meanings of the texts are manifested.

Rules of coding

A set of coding rules was established to address the issue of identifying significant environmental administrative penalties for A-share listed companies. Among the regulations for filing significant administrative penalties at the provincial level, only the Measures for Filing Significant Administrative Penalty Decisions in Shanxi Province contains a clear definition of the significant environmental administrative penalty. The definition contains four qualitative criteria and one monetary criterion, as shown below. According to this definition, any environmental administrative penalty is considered significant if it meets one or more of the five criteria.

- (1) Informing the right to request a hearing in the environmental administrative penalty decisions.
- (2) Ordering for suspension of production or business.
- (3) Rescission of business permit or license.
- (4) Administrative detention of any principal responsible person.
- (5) Imposing a large fine. Large fines for environmental administrative penalties are fines of RMB 300,000 and above imposed by the environmental protection authorities.

After reviewing the definition of significant administrative penalties in the Securities Law and the Measures for the Administration of Information Disclosure by Listed Companies, the researcher found that the first four qualitative criteria noted above are common and authoritative nationwide, as they are also the provisions for determining significant administrative penalties. Only the fifth monetary criterion differs from region to region. This situation is common in China;

a notable example is that the Environmental Protection Tax Law only sets a range for the tax rate within which each province determines its own applicable tax rate.

Although no specific provisions are given for the monetary criterion for significant environmental administrative penalties in provinces other than Shanxi, all provinces have their own monetary criterion for significant administrative penalties. Environmental administrative penalties, as a typical administrative penalty, are also subject to the provincial regulations for significant administrative penalties. Accordingly, the researcher collected the monetary criterion for significant administrative penalties imposed by each region in China (See Appendix C).

By combining the four qualitative criteria set by Shanxi Province with the monetary criteria determined by each region, the criteria for determining significant environmental administrative penalties can be derived. Table 5.4 shows the five criteria. An environmental administrative penalty that meets any one or more of these criteria should be considered significant. These criteria helped the researcher identify significant environmental administrative penalties from the initial 4,071 penalties.

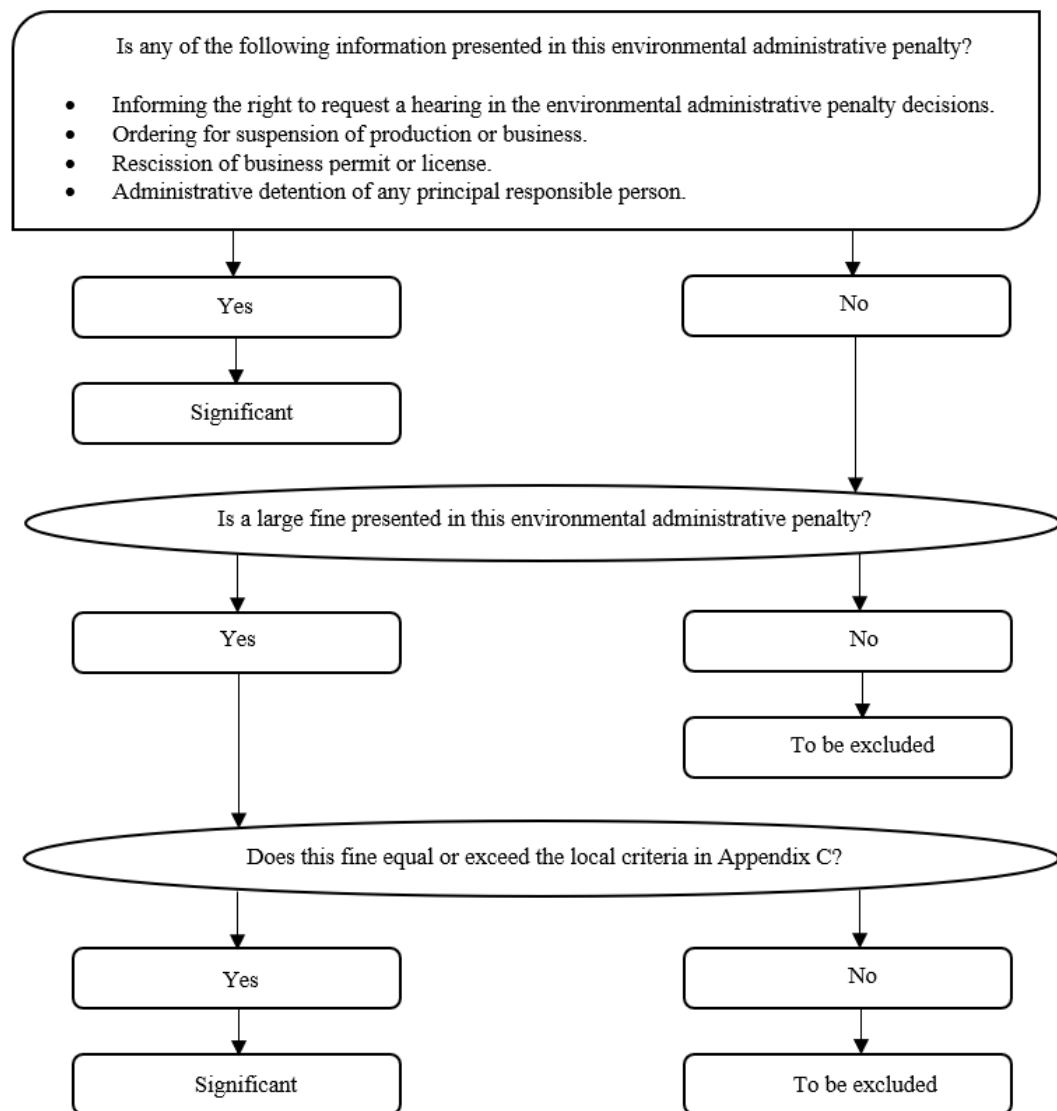
Table 5.4 *The list of criteria for SEAP*

Significant Environmental Administrative Penalty
Criterion 1. Informing the right to request a hearing in the environmental administrative penalty decisions
Criterion 2. Ordering for suspension of production or business
Criterion 3. Rescission of business permit or licence
Criterion 4. Administrative detention of any principal responsible person
Criterion 5. Imposing a large fine. See Appendix C for the monetary criteria for large fines in each region.

The identification of significant environmental administrative penalties is critical to this research for the following reasons: first, there are mandatory disclosure requirements under the Securities Law and the CSRC's regulations for A-share listed companies to disclose significant administrative penalties. Consequently, the researcher was able to verify the extent to which the mandatory disclosure requirements are followed by reviewing the annual reports of the A-share listed

companies involved. While it can be expected that the involved companies cannot overlap exactly with the company data of the sample companies, a thorough test of all involved companies would be of great significance to policy-makers. Secondly, comparing the list of the involved companies with the 148 sample companies enabled the researcher to derive valid government data relating to the sample companies. The government data is one of the important bases for the CET assessment of the sample companies. Therefore, this research conducted a content analysis of 4,071 penalties based on the criteria stated in Table 5.4, and the analysis process is shown in Figure 5.7.

Figure 5.7 *The coding for SEAP process*



Collection of regional provisions on significant administrative penalties began in July 2020. It took the researcher 2 months to complete the coding procedure of the initial 4,071 penalties. In the end, 1,121 significant penalties in 2017 and 444 in 2018 were identified, involving 501 and 166 A-share listed companies respectively. The total amount of fines involved was RMB 289.79 million (USD 43.95 million²¹) in 2017 and RMB 126.27 million (USD 18.34 million²²). All the significant environmental penalties imposed on the 501 A-share listed companies in 2017 and the 166 A-share listed companies in 2018 were analysed. The analysis is discussed in detail in section 6.2.2, chapter 6.

To verify whether the A-share listed companies have disclosed significant environmental administrative penalties in accordance with the regulations, it was necessary for the researcher to investigate their annual reports. To ensure that these annual reports would not be collected twice nor identify the government data of the 148 sample companies for the CET assessment, the researcher applied the VLOOKUP function in Microsoft Excel to compare the stock code between the KPEs listed companies and the companies subject to significant environmental administrative penalties in 2017 and 2018. The results showed that 94 annual reports in 2017 and 28 annual reports in 2018 had already been collected, which means that there are still 407 annual reports for 2017 and 138 annual reports for 2018 that were not been collected by the researcher.

Since the researcher had established contacts with SSE and SZSE staff during the company data collection phase, the time consumed in collecting the 407 annual reports for 2017 and 138 annual reports for 2018 was significantly less than it had been the first time. After several effective email communications, the researcher was able to obtain the electronic files of these annual reports within 1 month. These annual reports provided the basis for the analysis of combined government and company data in chapter 6, as detailed in section 6.2.2. As for the panel dataset (i.e., 148 sample companies), their penalty frequency and disclosure frequency were normalised to form one of the quantitative databases for the development of CET index in section 6.4.1, chapter 6.

²¹ The figure is based on the average RMB/USD exchange rate of 6.5942 in December 2017.

²² The figure is based on the average RMB/USD exchange rate of 6.8853 in December 2018.

5.3.2.3 Phase 3: Environment news headlines

As with sections 5.4.2.1 and 5.4.2.2, content analysis was adopted to process the media data. The objective of phase three was to identify environment news headlines related to the 148 sample companies for the 2 years 2017 and 2018 from the news headlines data collected in the previous section and to group these headlines into three different categories according to coding rules. On this basis, the media data was quantified into an ENHI via the J-F coefficient of imbalance. The ENHI was ultimately used for the CET assessment.

Rules of coding

During the data collection stage, the researcher collected 2,320 news headlines related to 148 sample companies in 2017 and 3,379 news headlines related to 148 sample companies in 2018. These news headlines could cover any topic related to the sample companies. In this research however environment news headlines are of greater interest to the researcher. Therefore, to ensure that all environment news headlines were identified, three different types of coding rules were established. Any news headlines related to the environment of a sample company can be categorised into one of the three types shown in Table 5.5.

Table 5.5 *The list of types for ENH*

Environment News Headlines			
Types	Codes	Coding Rules	Examples
A	Favourable environmental news	News headlines that confirm a company's commitment to environmental protection or highlight positive environmental practices	Increased investment in environmental protection, corporate investment in environmental protection facilities, etc.
B	Unfavourable environmental news	News headlines that reveal a company's problems with environmental protection; the information often tarnishes its image.	Substandard EIA reviews, excess pollution discharge over the standards, etc.
C	Neutral environmental news	Environmental-related news headlines that cannot be coded as Type A and B	Under environmental assessment or inspection by environmental protection authorities but the results have not yet been announced, new environmental regulations or requirements issued for the company's industry, etc.

Another benefit of identifying the three different types of environment news headlines for each sample company was that doing so facilitated the quantitative data for the subsequent CET assessment and statistical analysis. As noted in chapter 4, media coverage is an important reference for the transparency of listed companies in terms of their environmental performance. As regards the media coverage, unfavourable environmental coverage plays a more prominent role in exerting legitimacy pressure on listed companies than other types of coverage. The analysis of three different types of environment news headlines of 148 sample companies was able to partly reveal what kind of public pressure Chinese listed companies face in relation to the environment.

Figure 5.8 *The process of coding for ENH*

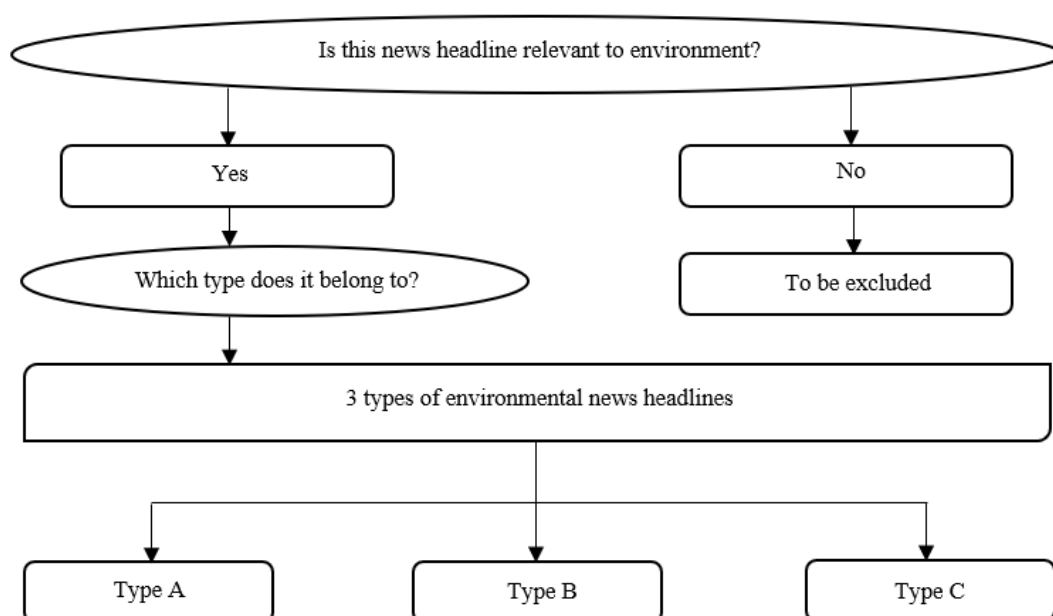


Figure 5.8 shows the process of coding environment news headlines for 148 sample companies. The coding process began in October 2020. To ensure that no environment news headlines were missed, the researcher repeated the coding process in November 2020. The results showed that the total number of environment news headlines obtained from the two coding processes was consistent. However, a few environment news headlines were coded into different types during the two coding processes.

As the number of inconsistent types of environment news headlines was less than 1% of the total, the researcher believed that the two coding results were both reliable.

Nevertheless, the researcher invited a Chinese PhD candidate at the University of Waikato to recode inconsistent types of environment news headlines according to the coding rules in Table 5.5; the recoded results were consistent with the researcher's second coding results. Therefore, the researcher decided to use the second coding results as the final results. The final results are presented in detail section 6.2.3, chapter 6.

Rules of scoring

The J-F coefficient of imbalance was adopted as the scoring rules of media data. This approach has commonly been used in previous studies (Junita & Yulianto, 2017; L. Li et al., 2017; Vergne, 2010) to quantitatively measure the propensity of media coverage. The statistics on the number of the three types of environment news headlines for each sample company exactly match the quantitative data needed for the calculation of the J-F coefficient.

The J-F coefficient of imbalance is a scoring approach proposed by Janis and Fadner (1943) for content analysis. It was first introduced by Deephouse (1996) in the study of corporate legitimacy. Since then, Bansal and Clelland (2004), Clarkson et al. (2008), Aerts and Cormier (2009), and others have used the J-F coefficient to measure the pressure for corporate legitimacy as a result of public opinion monitoring. The J-F coefficient is bounded by negative 1.0 to positive 1.0 with higher values representing higher legitimacy. The formula is calculated as follows:

$$ENHI_i = \begin{cases} (e^2 - ec)/t^2, & \text{if } e > c \\ (ec - c^2)/t^2, & \text{if } e < c \\ 0, & \text{if } e = c \end{cases}$$

where 'e' equals the number of Type A; 'c' equals the number of Type B, and 't' equals the sum of the number of the three types (Type A, B, and C).

5.3.2.4 Summary of the three phases of content analysis

Overall, phase one and phase two helped the researcher to gain a full picture of Chinese listed companies' environmental disclosure practices and the environmental administrative penalties imposed on them respectively. In addition, to make the statistical analysis possible, textual evidence from three different

sources (company, government, and media) for the 148 sample companies were quantified in all three phases. This analytical process provided a comprehensive basis for evaluating the CET of sample companies and further statistical analysis.

However, although evidence from company, government, and media was identified as significant drivers of CET on the basis of the literature review in chapter 4, they do not influence CET equally. As indicated in the discussion of stakeholder theory in chapter 3, users of corporate information, government information, and media information (i.e., stakeholders of listed companies' environmental practices) are critical in judging the attributes (accessibility, clarity, and reliability) of environmental information related to listed companies. These users' perceptions of corporate information, government information, and media information can help the researcher establish a relatively objective way of evaluating the importance of such information. In other words, by gathering stakeholders' perceptions a weighting system could be constructed to complete the final step (i.e., phase four) of the CET assessment. The next section describes how using a questionnaire survey enabled the researcher to gather stakeholders' perceptions.

5.3.3 Questionnaire survey

On the basis of the content analysis, the researcher chose a questionnaire survey as an operational tool through which to quantify stakeholder perceptions into a weighting system. This method is widely used as one of the common tools in mainstream study of corporate environmental disclosure (Cormier et al., 2004; de Villiers & van Staden, 2012; Deegan & Gordon, 1996; Lu & Abeysekera, 2014b; Solomon & Lewis, 2002). The benefit of applying this method was that it could increase the research's understanding of the knowledge, attitudes, perceptions, interests, and experiences of the respondents (Presser et al., 2004). Questionnaire survey is considered an appropriate technique when "the researcher has direct or indirect access to the respondents (Oppenheim, 1992), and their views are essential to the research"(Krosnick, 2018).

Questionnaire survey can be very helpful in generating critical information required for specific research purposes (Kindley et al., 2016). However, one key concern with questionnaire surveys is that they may contain measurement errors (Alwin,

2007). These errors can be random or systematic. Random errors are caused by unintended mistakes made by respondents, interviewers, and/or coders. Systematic error can occur if there is a systematic reaction of the respondents to the scale used to formulate the survey question. Thus, the exact formulation of a survey question and its scale is crucial, since these affect the level of measurement error (Saris & Gallhofer, 2007).

5.3.3.1 Questionnaire design

The design of the questionnaire began in February 2019 and was finalised in May 2019. When designing a questionnaire, conciseness and relevance are key principles. All questions must be set in a way that is easy to understand and directly relate to the purpose to be achieved. Thus, according to the three phases of content analysis, the main part of the questionnaire was divided into three modules, each corresponding to one source of environmental information (i.e., company, government, and media). Each module consists of five closed questions; the first two follow a dichotomous approach and the last three use a 10-point rating scale. The last three questions are proxies for each of the three attributes of environmental information reviewed in chapter 4 (i.e., accessibility, clarity, and reliability). In addition, to address the limitation of the lack of detail in the closed questions, the questionnaire also included four open questions on CET. At the end, five questions were set to obtain demographic information. Appendix G lists the questions used in the questionnaire. All questions were reviewed by the Waikato Management School Human Research Ethics Committee. Ethical approval was granted to the researcher in May 2019 (See Appendix D).

5.3.3.2 Stakeholder selection

The selection of representative stakeholders has been a major challenge for scholars of corporate environmental disclosure (Crane & Ruebottom, 2011). Although these stakeholders may share some common elements, such as having close ties to corporate reporting, accounting, auditing, and finance, they are often spread across a variety of industries and entities, such as state-owned companies, private companies, government agencies, etc. This factor often requires the researcher to have an extensive network of contacts across a wide range of industries, as the

researcher needs to have direct or indirect contact with stakeholders in order to conduct surveys or interviews. In addition, due to limited survey time, it is particularly difficult to bring all stakeholders together in one place to complete the investigations within a short period of time.

A common practice is to select MBA students as a proxy for real stakeholders, since most of these students are or will be in managerial positions across various industries. Their status means that to some extent their perceptions are influential. Fukukawa et al. (2007), Blanco et al. (2017), Shafer (2006), Bhattacharyya (2016), and Bhattacharyya and Rahman (2020) chose this group as a sample of stakeholders for their social and environmental disclosure studies. However, a weakness that cannot be overlooked of that choice is that some of the students are only potential stakeholders who are not yet engaged in relevant work. There may be a gap between their perceptions and those of those who actually do these jobs. In view of this, the researcher decided not to use this common method to build a stakeholder group, but to use a sample of relevant senior executives with practical experience in various industries as the stakeholder group in this study. In order to achieve this end, the researcher set the following criteria to select stakeholders.

First, the stakeholders must have a professional background and be engaged in stewardship across various industries. Their different professional backgrounds represent different stakeholder groups that have a variety of professional voices. It was also expected that the selected stakeholders could provide critical insights from their professional perspectives.

Secondly, the stakeholders must be familiar with corporate reporting. This criterion requires that these stakeholders should have some financial background and be able to read and understand corporate annual reports as well as follow government and media releases about the business. An ideal group would be senior financial executives from a variety of industries.

Thirdly, stakeholders' Chinese language skills should be at least as good as those of native Chinese speakers. The company data, government data, and media data in this research are all in Chinese, so it is reasonable to expect that only skilled Chinese speakers will be able to express valuable opinions on these three data.

Finally, these stakeholders must voluntarily agree to participate in this research with an understanding of the purpose of the research. This research was granted ethical approval by Waikato Management School Human Research Ethics Committee (See Appendix D). Each participant was also provided with a participant information sheet (See Appendix E) and asked to sign a consent form (See Appendix F) to indicate their willingness to participate in the research project.

On the basis of these criteria, a national training centre for senior financial executives in China was identified as an ideal place to build a stakeholder group for this research. The training centre is also an institution of postgraduate education in China. This institution is called the Beijing National Accounting Institute²³ (BNAI). Based in Beijing, this institution provides senior financial executive training services for all sectors of the country, including listed companies, state-owned companies, and government agencies. June is usually the month in which the largest number of training programmes is held at BNAI each year. According to the training plan announced by BNAI in May 2019, a total of five high-end training programmes were to be held in June, with an estimated total of 195 participants. The titles for the five training programmes are: Strategic Performance Management, Intelligent Finance Transformation, Big Data and Financial Analytics, Finance Leadership in the Digital Age, and Towards a Sustainable Low Carbon Economy. According to the BNAI, the target groups for these programmes included:

- (1) Senior executives of large businesses, such as chairmen, chief executive officers, senior executives, and chief financial officers.
- (2) Senior practitioners of banks, investment, securities, and other financial institutions.
- (3) Senior partners of accounting companies, management consulting companies and other intermediaries engaged in strategic management consulting business.
- (4) Senior officials in administrative and public institutions, political party, and government organs at all levels.
- (5) Chief accountants, treasurers and heads of finance and accounting departments of administrative and public institutions at all levels.
- (6) Professors or associate professors engaged in accounting, finance or economics research and practical teaching in universities.

After carefully comparing the criteria for stakeholder selection in this research with the prospective participants on the BNAI's programme, the researcher found that

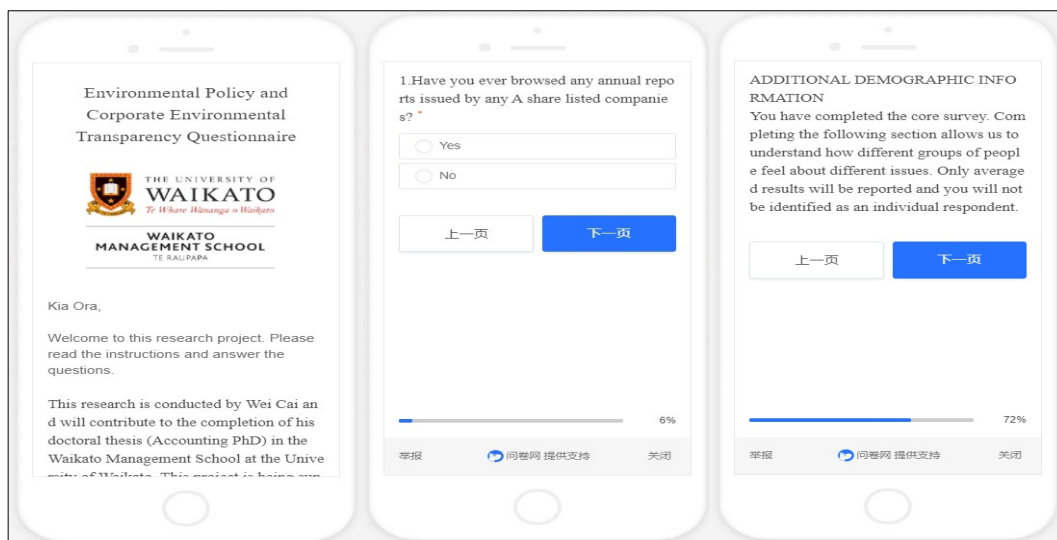
²³ For more information about this institution, please refer to www.nai.edu.cn.

there was a high degree of overlap in the characteristics of the two groups. Therefore, the researcher decided to conduct field research at BNAI from 6th to 23rd June 2019 via a questionnaire survey (See chapter 6 for the results of questionnaires) and interviews (See chapter 8 for the results of interviews). All 195 participants in the high-end training programme at BNAI in June were selected as the target population of this research. The following section details the implementation of the questionnaire survey.

5.3.3.3 Phase 4: Questionnaire implementation

The implementation of the questionnaire was based on a paperless initiative. Therefore, the questionnaires were not sent to the target population in any paper-based forms; rather, a social networking app ‘WeChat’²⁴ and emails were employed. The paperless questionnaire survey in this research was conducted using an electronic questionnaire service provider, Wenjuan.com²⁵. The electronic questionnaires were distributed in two rounds: the first round via WeChat and the second round via email a week later. Figure 5.9 shows an English version of the electronic questionnaire and how it appears in WeChat. In practice, the one sent to participants is same as the one shown in Appendix G, except language.

Figure 5.9 *The electronic questionnaire in WeChat*

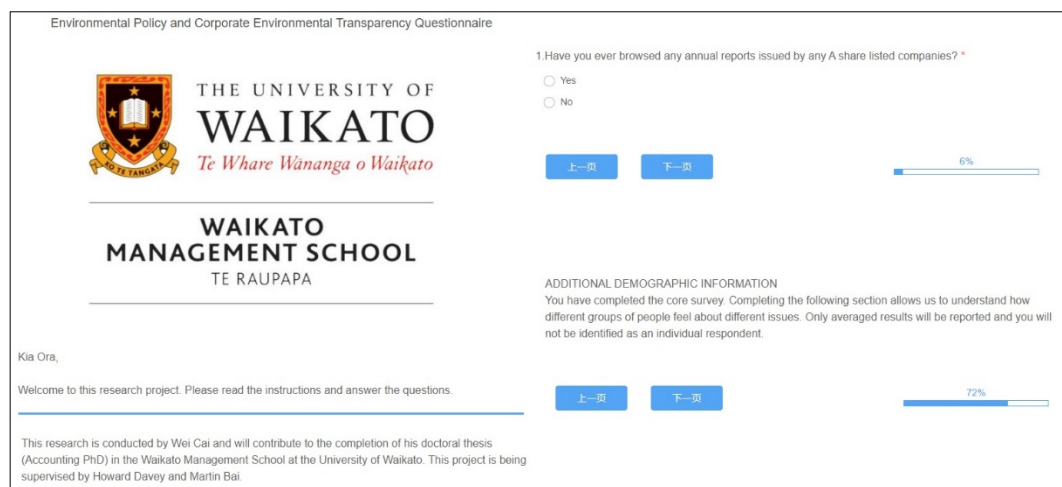


²⁴ WeChat has a 93% market share in mainland China, according to market research firm On Device. As of March 2018, WeChat has over 1 billion active users worldwide and is the most active social networking app in mainland China.

²⁵ For more information about this provider, please refer to www.wenjuan.com.

To facilitate announcements, BNAI sets up a WeChat group for each training programme. Generally, only the service staff and all the participants of the programme can be members of the group. However, thanks to the researcher’s fieldwork at BNAI and the agreement from the director of the training department, the researcher was also able to join the WeChat groups of the five training programmes in June. Therefore, the researcher sent the first round of the electronic questionnaire to the target population through these five WeChat groups. Figure 5.10 shows how the electronic questionnaire appeared in emails.

Figure 5.10 *The electronic questionnaire in email*



As an alternative measure, in the second round, all the electronic questionnaires were sent to the 195 participants via email 1 week after the first round. While this alternative measure was effective in avoiding sample omissions due to participants’ not paying attention to WeChat group notifications, it could have triggered a duplication of responses. To avoid this problem, the research included a clear reminder in the subject of the emails saying: “if you have already answered the questionnaire in the first round through WeChat, please ignore this email.”

In the end, after the two rounds of questionnaires, 133 valid responses were collected by the researcher with a response rate of 68.21%. The next question was whether the valid sample size obtained by the researcher was representative. If questionnaires are not collected using sound sampling techniques, often the results can be nonrepresentative of the population, as a good sample is critical to getting representative results based on questionnaires (Moser & Kalton, 2016). To address

this issue, the researcher examined the criteria and results from a statistical point of view as follows.

First, most statisticians agree that the minimum sample size to get any kind of meaningful result is 100. If the targeted population is less than 100 then the researcher needs to survey them all. In this research, the targeted population was 195 trainees. Therefore, the collection of 133 response meets this requirement.

Second, a good maximum sample size is usually around 10% of the targeted population, if this does not exceed 1,000. For example, in a targeted population of 3,000, 10% would be 300. In a population of 200,000, 10% would be 20,000. This exceeds 1000, so in this case the maximum would be 1,000, because even in a population of 200,000, sampling 1,000 people will normally give a fairly accurate result. Sampling more than 1,000 people will not add much to the accuracy, given the extra time and money it would cost. In this research, 10% of the targeted population is approximately 20. Thus, this requirement could easily be met.

Last, the sample size needed for a prevalence study²⁶ depends on how precisely the researcher wants to measure the prevalence. Precision is the amount of error in a measurement. The bigger the sample, the less error there is likely to be on the researcher's part in measuring the prevalence and therefore the better the chance that the prevalence in the sample will be close to the real prevalence in the population. The researcher can calculate the margin of uncertainty around the findings of the study using confidence intervals. A confidence interval gives the researcher a maximum and minimum plausible estimate for the true value the researcher was trying to measure. Table 5.6 shows the calculated sample sizes required for different confidence intervals in different population scenarios.

Table 5.6 *Conroy (2016)'s calculations of sample sizes*

²⁶ In social science, a prevalence study is a type of observational study that analyses data from a population, or a representative subset, at a specific point in time—that is, cross-sectional data. Prevalence is the technical term for the proportion of people who have some feature. In this research, as the targeted population, the 195 trainees at the National Accounting Institute in Beijing in June 2019 had these characteristics.

Acceptable margin of error	Size of population					
	Large	5000	2500	1000	500	200
±20%	24	24	24	23	23	22
±15%	43	42	42	41	39	35
±10%	96	94	93	88	81	65
±7.5%	171	165	160	146	127	92
±5%	384	357	333	278	217	132
±3%	1067	880	748	516	341	169

Note. Reprinted from *The RCSI Sample Size Handbook: A Rough Guide* by R. M. Conroy. Copyright 2016 by RCSI.

To ensure that the results of the questionnaire survey are representative as well as accurate, the researcher decided to control the confidence interval at the 5% level. Thus, with a population of 200, the sample size should reach 132, as shown in Figure 5-17. The target population for this research was 195 and the actual sample was 133. Therefore, the error in the results of the analysis based on this sample does not exceed 5%. This margin of error is acceptable.

It should be noted that for a prevalence to be measured accurately, the study sample should be a valid sample. That is, it should not contain any significant source of bias. A demographic analysis of the 133 samples found no significant source of bias in the sample. Their responses could therefore be further analysed, and the results can be used to construct a weighting system for the assessment of CET of the sample companies in section 6.3, chapter 6.

5.3.4 Statistical analysis

The third objective of this thesis was to develop and test hypotheses regarding the relationship between CET and corporate financial performance. To achieve this aim, statistical analysis was expected to be appropriate. The statistical analysis method used in this research was multiple regression. Multiple regression constitutes a group of techniques which can be used to explore “the relationship between one continuous dependent variable and a number on independent variables or predictors (usually continuous)”(Slinker & Glantz, 2008). Based on the existing literature,

Pallant (2020) concluded that multiple regressions would be appropriate for the following research questions:

- How well is a set of variables able to predict a particular outcome?
- Which variable in a set of variables is the best predictor of an outcome?
- Is a particular predictor variable still able to predict an outcome when the effects of other variables are controlled for?

The three questions above are consistent with the third research objective of this thesis. Utilising multiple regressions, the researcher could statistically control for the effect of additional variables on the dependent variable, while also testing the predictive powers arising from other independent variables in the multiple regression model and the model itself.

To investigate the relationship between CET and the financial performance of sample companies, the research first controlled for some external variables whose predicting powers the prior literature had agreed upon. By controlling for the influencing powers of these variables, such as market value, market-to-book ratio and market return, deeper understanding could be achieved in relation to the influencing power of the model.

5.3.4.1 Model and variables

The main regression model was established to test the impact of CET on the corporate financial performance as shown below

$$ROA_i = \beta_0 + \beta_1 CET + \beta_2 MV + \beta_3 MBR + \beta_4 MKRET + \varepsilon_i$$

where ROA represents the return on assets, CET represents the corporate environmental transparency, MV represents the market value—size of the company, MBR represents the market-to-book ratio, and MKRET represents the market return. β_0 is the intercept; β_1 - β_4 is the regression coefficient, and ε_i is the error term.

Table 5.7 *Research variables*

Variable	Definition	Property
ROA	The return on assets	Dependent variable

Variable	Definition	Property
CET	Corporate environmental transparency	Independent variable
MV	Market value	Controlling variable
MBR	Market-to-book ratio	Controlling variable
MKRET	Market return	Controlling variable

Detailed descriptions of the dependent and independent variables are presented in section 7.4.1 of chapter 7 and in section 7.4.2 of chapter 7 respectively. Section 7.4.3 in chapter 7 details the selection process of the three control variables.

5.3.4.2 Model operationalisation

The values of most of the variables (except CET) in the regression model were calculated based on the sample companies' financial data. This financial data was collected from the CSMAR's financial subdatabase. This database provides data on China's stock markets and the financial statements of A-share listed companies. The results from chapter 6 were used as the independent variable. The multiple regression model in this research was calculated using the Statistical Analysis System (SAS) software. Hypothesis development and testing were introduced and are described in chapter 7.

5.4 Qualitative Investigation Methods

The qualitative part of the research aimed to fulfil the fourth research objective, while attempting to seek in-depth explanations which are contextually related to the findings indicated by the quantitative investigation. Two specific methods, namely interviews and thematic analysis were applied to collect qualitative data on stakeholders' perceptions and to examine themes or patterns of meaning within the qualitative data. The qualitative investigation in this thesis was divided into three main stages: interview preparation, interview implementation, and thematic analysis.

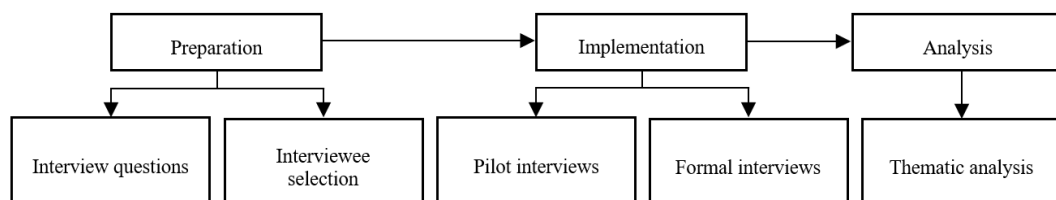
The first stage included the design of the interview questions and the selection of interviewees primarily. The interview questions were designed partially with reference to the results of the open questions in the stakeholder questionnaire survey.

The results of these questionnaires not only presented stakeholders' initial perceptions of the CET situation in China, but also revealed potential areas that needed to be understood in greater depth. The interviewees were also selected from amongst the respondents of the questionnaire survey. One advantage of this approach was its ability to ensure consistency in the interviewees' understanding of the research topic.

In the second stage, pilot interviews were conducted prior to the formal interviews. In this way, it was possible to exclude not only the unknown factors that might appear in the formal interviews in advance, but also to gain from the pilot interviews experience that could ensure that the format, content, and timing of the formal interviews were manageable.

The final stage was the analysis of the interview data. The researcher used thematic analysis to examine themes or patterns within the interview data. The results are presented in detail in chapter 8. Overall, the process of the qualitative investigation is outlined in Figure 5.11.

Figure 5.11 *The of qualitative investigation*



5.4.1 Interview preparation

Interviews are the most widely used method for collecting straightforward factual information. A researcher can then use this information as evidence when trying to understand complex and controversial facts. Neuman (2013) argued that the interview is “a short-term, secondary social interaction between two strangers with the explicit purpose of one person’s obtaining specific information from the other”. Semistructured interviews provide interviewees with a clear list of issues to be addressed and questions to be answered, leading to valuable insights into the issues concerned.

Semistructured interviews are open in style, as they often use a less standardised set of open-ended questions than used in structured interviews, which allows respondents some flexibility. This style of interview is more likely to allow interviewees to present genuine views in relation to various social settings (Easterby-Smith et al., 2021; Neuman, 2013). Therefore, semistructured interviews were applied in this research as an appropriate data collection method for the qualitative inquiry into driving forces behind Chinese listed companies' CET.

Through a stakeholder survey, the researcher conducted a preliminary investigation into the potential determinants of CET in Chinese listed companies. However, the preliminary investigation could not provide explanations and in-depth understanding, both of which are context-related, regarding the significant/nonsignificant relationships that were not indicated by the questionnaire survey. Thus, a need for further data collection and investigation to fill this gap was identified. Having direct interactions with respondents regarded as stakeholders of Chinese listed companies' environmental practice would enable the researcher to access valuable insights into the internal and external factors influencing the organisations' environmental transparency.

5.4.1.1 Interview questions

Wengraf (2001) pointed out that semistructured interviews are

“designed to have a number of interviewer questions prepared in advance but such prepared questions are designed to be sufficiently open that the subsequent questions of the interviewer cannot be planned in advance but must be improvised in a careful and theorized way.”

The openness involved in semistructured interviews means that the scope of the conversation should be limited (Neuman, 2013). Therefore, it is particularly important that the research questions can guide the direction of the topic.

In this research, the initial design of the interview questions began at the same time as the questionnaire was being design in February 2019. However, the design of the questionnaire was completed before the researcher went to BNAI in June 2019 to conduct the field research. At that time, the design of the interview questions was still in outline form in terms of the direction of the questions. This approach was taken because, on the one hand the questions designed by the researcher had to

receive an ethics approval before the implementation of the interviews; on the other hand, it was possible that the interview questions might need to be fine-tuned in light of the responses to the open questions in the questionnaire.

As expected, the final design of the interview questions did not deviate from that originally envisaged, meaning that all interview questions remained within the range of the ethics approval. More importantly, as the questionnaire results became available during the field research, the researcher was able to fine-tune the interview questions in time to achieve the best possible interview results.

Overall, the interview questions in this thesis were mainly formulated in line with the fourth research objective and further refined based on the preliminary findings of the stakeholder survey. All the interview questions were reviewed by Waikato Management School Human Research Ethics Committee. An ethics approval was granted to the researcher in May 2019 (See Appendix D). Appendix H lists all the interview questions used in this research.

5.4.1.2 Interviewee selection

Although interview as a research method can be very useful in investigations where the respondents' views are thought to be important and useful, one obstacle that should be noted is the potential for limited access to appropriate interviewees (Babbie, 2020). Section 5.3.3.2 described in detail the criteria of how stakeholders were selected during the questionnaire phase. The target population was established at that phase and consisted of a total of 195 participants in BNAI's high-end training programmes. Thus, to ensure the rigour and consistency of the findings of this research, the target population of the questionnaire survey was also selected as the potential target population of interviewees.

In the two rounds of questionnaire survey, the researcher not only sent out questionnaires, but asked the 195 target population via five WeChat groups and emails if they would be willing to be interviewed. Ultimately just 29 people expressed their interest in participating in a face-to-face interview. This result is consistent with the collectivism cultural feature in China (Greenleaf, 2003). Collectivism has an important place in Chinese culture and individuals tend to rely heavily on organisations (Hofstede, 2010). When the questionnaire was distributed

to the target population as an organisational activity, the willingness to respond was relatively strong (68.21% participation). However, when persons within the target population were directly asked if they would be willing to be interviewed individually, the willingness to respond was relatively low (14.87% participation), even though the researcher had stated that interviewees' identifying information would be confidential.

After further consultation on the positions and industries of these 29 potential interviewees, the researcher found that they were all senior executives in their respective organisations, mainly in six industries of different nature. As the BNAI limited the researcher to two interviews per day to ensure there was no impact on their training classes, the researcher had to further screen the 29 potential interviewees to ensure that the interviews could be completed in the limited time available. An important principle in the selection of interviewees is to ensure that the interviewees are broadly representative. Therefore, the researcher selected two respondents for each of the six different industries, and these two individuals were also differentiated in terms of their positions, with one working in financial management and one in general management. Adopting this approach ensured the diversity of interviewees and increased the efficiency of the interview process.

All 12 respondents were assured that their responses would be treated with absolute confidentiality and anonymity throughout the research process. Although anonymity and confidentiality are closely connected, they are not synonymous. Anonymity involves the protection of participants' identities to avoid their being linked to the personal data collected (Wallace, 1999), whereas confidentiality is an active attempt to remove any elements that might reveal the identities of participants from the records and reports of the study (Kaiser, 2012). Essentially, the anonymity and confidentiality of the interviewees were considered highly important ethical research considerations during the research. Both the interviewees' personal identities and the identities of their organisations were therefore protected from publication in this research. In this research, respondents were named using their organisation codes (e.g., Organisation A for respondent A). The interviewees' organisation codes, industries, and positions are listed in Table 5.8.

Table 5.8 *Organisation codes and interviewee profiles*

Organisation Codes	Industries	Positions
A	Banking	Director of department of securities
B	Banking	Chief financial officer
C	Manufacturing	Chief executive officer
D	Manufacturing	Vice-president of finance
E	Administrative and public institutions	Director of finance bureau
F	Administrative and public institutions	Chief accountant
G	Accounting firms	Partner in consulting department
H	Accounting firms	Partner in audit department
I	Construction	Chief operated officer
J	Construction	Chief financial officer
K	University	Accounting professor
L	University	Accounting professor

5.4.2 Interview implementation

5.4.2.1 Pilot interviews

Two pilot interviews, both of which were face-to-face interviews, were undertaken by the researcher with respondents A and B. These two interviews were recorded on a digital voice recorder, and interview notes were also taken. These two pilot interviews helped the researcher to improve the interviewing techniques and to finalise the list of questions.

The two interviewees for the pilot interviews came from two different banks. One interviewee, who is the director of the bank's department of securities, was a member of the bank's board of directors. Another interviewee was the chief financial officer of another bank. The two interviews were carried out on the morning of 13th June 2019 and lasted 26 minutes and 17 minutes respectively.

Table 5.9 *Profiles of pilot interviews*

Interviewees	Type of Interview	Location of Interview	Length	Date
Director of department of securities	Face-to-face interview	Beijing	Approximately 26 mins	13/06/2019
Chief financial officer	Face-to-face interview	Beijing	Approximately 17 mins	13/06/2019

A number of insights emerged from the pilot interviews: (1) There was no need to inform the interviewees of the specific interview questions in advance, because doing so would have allowed them to prepare their responses and leave room for the interview data to be contaminated. (2) It would be helpful to have an interview outline at hand which would ensure that the whole interview always stayed on track. (3) It is better to avoid asking questions that are too specific. It would be better to start with questions that are general and broad. (4) The interviewer should guide the direction of the interview and give positive responses to the interviewees in order to encourage them to speak in detail and in depth. (5) The interviewer should try to ensure that the interviewees feel free to offer whatever thoughts they want to provide. (6) Prior to the interview, the researcher should gain an impression of the interviewee's organisation and its industry, such as the position of the interviewed organisation in its industry, the nature of the organisation, and its performance in environmental practice. It would be helpful to start by acknowledging the organisation's performance in terms of its environmental practice. (7) Notes should be taken on the main points while recording with a digital voice recorder. (8) After each interview, the interviewer should always look back and reflect and try to identify the places where improvement is necessary.

5.4.2.2 Formal interviews

All 12 semistructured interviews were undertaken between 13th June 2019 and 20th June 2019 in the form of face-to-face interviews. Semistructured interviews are regarded as lending the interviewer "sufficient flexibility to adapt to different respondents... probing techniques can be used to encourage the respondents to provide details for relevant responses"(Galletta, 2013). In performing the semistructured interviews, the researcher normally started with topics relating to the interviewed organisations' environmental accomplishments to help the

interviewees to be at ease and gradually accustom them to answering the interview questions. Positive responses can encourage interactions between interviewees and the interviewer, so these were always provided. The interviews ranged from 17 minutes to 34 minutes, and all were recorded on a digital voice recorder.

Table 5.10 *Profiles of formal interviews*

Organisation Code	Type of Interview	Location of Interview	Length	Date
A	Face-to-face interview	Beijing	Approximately 26 mins	13/06/2019
B	Face-to-face interview	Beijing	Approximately 17 mins	13/06/2019
C	Face-to-face interview	Beijing	Approximately 25 mins	14/06/2019
D	Face-to-face interview	Beijing	Approximately 22 mins	14/06/2019
E	Face-to-face interview	Beijing	Approximately 34 mins	17/06/2019
F	Face-to-face interview	Beijing	Approximately 23 mins	17/06/2019
G	Face-to-face interview	Beijing	Approximately 27 mins	18/06/2019
H	Face-to-face interview	Beijing	Approximately 25 mins	18/06/2019
I	Face-to-face interview	Beijing	Approximately 26 mins	19/06/2019
J	Face-to-face interview	Beijing	Approximately 23 mins	19/06/2019
K	Face-to-face interview	Beijing	Approximately 30 mins	20/06/2019
L	Face-to-face interview	Beijing	Approximately 29 mins	20/06/2019

5.4.3 Thematic analysis

Through communicating directly with respondents, the researcher gathered a large amount of interview data and information from the interviews, and so the use of an appropriate tool for the analysis of these two sets of qualitative data was required. Thematic analysis is one of the most common analytical tools in qualitative research

(Guest et al., 2012). It emphasises identifying, analysing, and interpreting patterns or themes within qualitative data (Damayanthi, 2019). The fourth research objective of this thesis was to gather stakeholders' perceptions to identify the driving forces behind the CET in China. Stakeholders' perceptions were gathered by means of interviews, while the identification of potential factors (i.e., themes) fits well with the characteristics of thematic analysis. Thus, thematic analysis was adopted as the method employed to transcribe interview data and identify themes in this research.

5.4.3.1 Data transcription

The transcription of the interview data was undertaken during July and August 2019. All the interviews were carried out in Chinese, so their transcription was divided into two steps. First, the voice records were transcribed into Word documents in Chinese. The interviews were transcribed twice by the researcher with each transcription being carried out independently. The two groups of transcriptions were then cross-checked by the researcher to ensure that no omissions or errors were present. Second, the thematic analysis of the transcriptions was carried out by the researcher. This thematic analysis was based on the Chinese transcribed texts. The reasons for this approach were first to ensure that the original text was accurately interpreted to avoid misinterpretation due to the translation and secondly to increase efficiency and avoid spending too much time on the translation of the original recorded text. To ensure traceability of the original data, the voice records and transcribed texts will be kept by the researcher on a trusted device for at least 10 years.

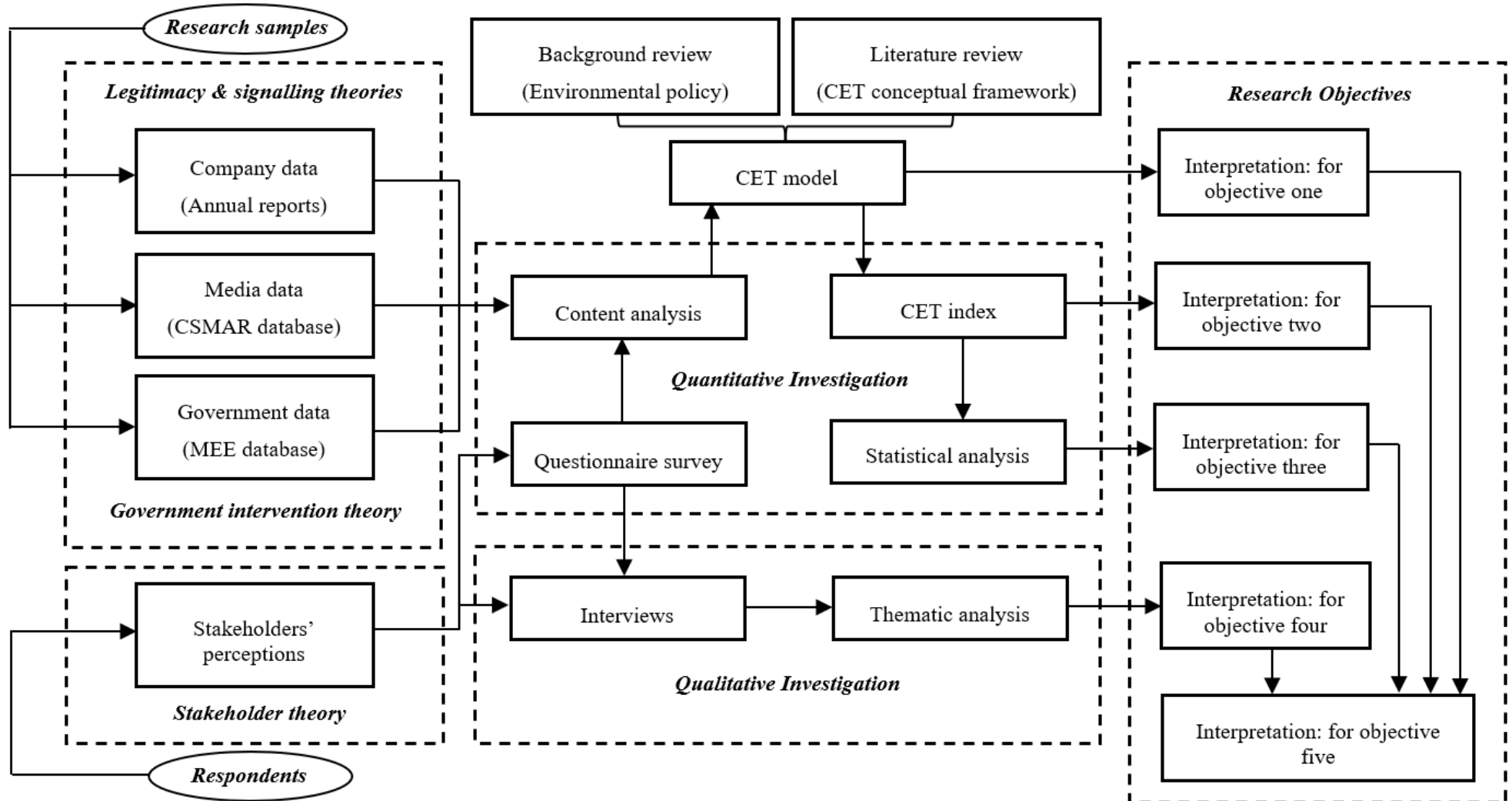
5.4.3.2 Theme identification

Identification of the essence of themes relates to how each specific theme forms part of the entire picture of the interview data (Guest et al., 2012). Thematic analysis is characterised by identifying which aspects of the data are being captured, what is interesting about the themes, and how the themes fit together to tell a coherent and compelling story about the data (Boyatzis, 1998). In this research, themes are defined as “a cluster of ideas and descriptions that can be used to interpret causal mechanisms, statements, and morals derived from the participants' responses”(Saldana, 2015).

In order to identify and discover further thematic depth, it is important to consider themes within the whole picture. Clarke and Braun (2016) argued that caution is needed when developing many levels of themes, as doing so may lead to an overly fragmented analysis. Therefore, the researcher used a two-tier theme method of identification and strictly followed the principle that conducting thematic analysis should attempt to go beyond surface meanings of the data to make sense of the data and tell an accurate story of what the data means.

The researcher conducted an initial thematic analysis of the interview data between September and November 2019. After completing the statistical analysis, in December 2020 the researcher refined the themes that made meaningful contributions to achieving the thesis's fourth research objective. The results and findings of interviews in terms of their final themes and subthemes that emerged are discussed and interpreted in detail in chapter 8. Figure 5.12 shows a panorama of the research process in this thesis. The thematic analysis and the other research methods adopted in this chapter are presented visually and clearly in the flowchart, showing their relationship to each of the thesis's specific research objectives and their connection to chapters 2, 3, and 4.

Figure 5.12 Panorama of the research process



5.5 Chapter Summary

Although positivism and constructivism have been the commonly accepted research paradigms in accounting for several decades, the philosophical notion of pragmatism can demonstrate its strength in social and environmental accounting research where the space is heterogeneous. Based on the research's purposes, this chapter sets out the chosen mixed methods approach and explains why it was an appropriate methodological choice for the current research. The chosen research paradigm of pragmatism provides a suitable philosophical stance for the thesis. It also guides the choices of specific research strategies in relation to the selection of methods and techniques for conducting the research.

Two groups of investigations, which employ quantitative and qualitative research methods respectively, are mapped out in Figure 5.12. In the quantitative investigation, content analysis and questionnaire survey are demonstrated to be appropriate for quantitative data collection and development of the CET index. A multiple regression analysis is chosen to analyse the quantitative data gathered. In the qualitative investigation, semistructured interviews with stakeholders of Chinese listed companies' environmental practice are selected to collect suitable qualitative data. These interviews are based on the thematic analysis to be conducted in order to gain in-depth understanding of the driving forces behind CET in China.

In the next chapter, the results of the content analysis and stakeholder survey are reported. These results helped the researcher both to understand the overall environmental transparency of A-share listed companies in China, and to develop the CET model in this thesis so as to eventually form a CET index in the Chinese context.

Chapter 6

Results of Content Analysis, Stakeholder Survey, and the Development of the CET Index

6.1 Introduction

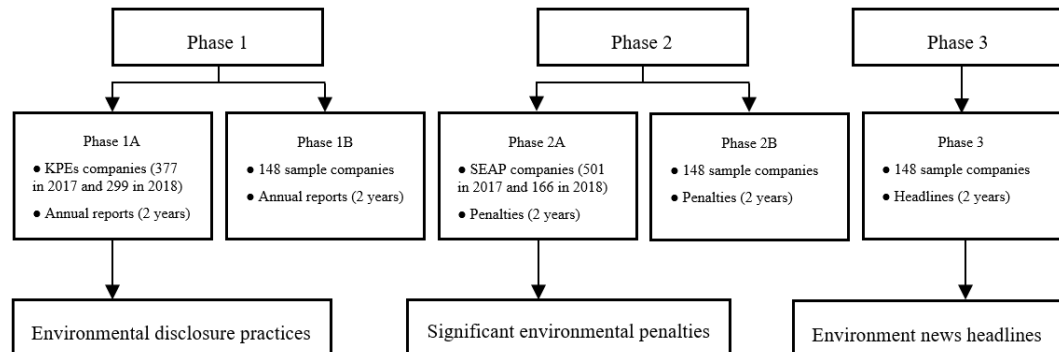
As the first part of the quantitative investigation, this chapter presents the results of the content analysis and stakeholder survey. Three different sources of data (i.e., company data, government data, and media data) are analysed and discussed respectively, along with the many findings which emerged in the process. These findings not only help to foster a better understanding of the environmental transparency of Chinese listed companies but also contribute to achieving the second research objective of this thesis. In addition, the stakeholder survey provides a valuable perspective and reference for the study of CET in China. Furthermore, from the perspective of information users the survey's results show what different sources of corporate environmental information mean to them and how they perceive CET in China. Finally, based on the results and findings of this chapter as well as the CET model proposed in chapter 4, a CET index is developed. The chapter is organised into the following sections.

Section 6.2 shows the results of the content analysis of company data, government data, and media data respectively. The findings are discussed at the end of each subsection. Section 6.3 describes the results of the stakeholder survey from two aspects: (1) demographic information and (2) stakeholders' perceptions. Sections 6.4 reports the three steps involved in developing a CET index for 148 sample companies. The results of the CET index are shown in Appendix J. Finally, section 6.5 summarises the chapter.

6.2 Content Analysis

This section is divided into three phases which show the results of the content analysis of the company data, government data, and media data respectively. The first phase presents a full picture of the mandatory environmental disclosure practices of Chinese listed companies in 2017 and 2018. Similarly, the second phase provides a panoramic view of significant environmental administrative penalties for Chinese listed companies in 2017 and 2018. Due to the overwhelming amount of media data related to Chinese listed companies, from a time-feasible perspective, the third phase focuses on demonstrating only the 148 sample companies' environment news headlines in 2017 and 2018. Overall, the results of the three phases in this section provided a solid quantitative data base for the development of a CET index of Chinese listed companies. This quantitative data base was derived from the specific results of the 148 sample companies in the first and second phases and from the whole results of the third phase.

Figure 6.1 *The content analysis process*



6.2.1 Phase 1: Mandatory environmental disclosure compliance

The environmental disclosure practices of Chinese listed companies were investigated on an annual basis by the researcher because the KPEs list varies from year to year. In 2017, for the first time, the CSRS required mandatory disclosure of 12 items of environmental information from KPEs listed companies. There were no changes to this mandatory disclosure requirement in 2018 other than the fact that the list of KPEs is dynamically managed. Therefore, the researcher quantified environmental disclosure practices of Chinese listed companies based on the KPEs list for 2017 and 2018 respectively. The results for 2017 and 2018 are reported

separately below from four perspectives, namely item, industry, ownership, and listing board, which consider the features of China's A-share market. Finally, a comparison is made for the 148 sample companies that appeared on both the 2017 and 2018 KPEs lists.

6.2.1.1 Environmental disclosure practices in 2017

A total of 377 A-share listed companies on the KPEs list were required to mandatorily disclose environmental information in 2017, and their mean score was 8.83 out of 12, with a standard deviation of 4.26. In 2017, 45 companies scored 0 (i.e., they did not disclose any of the environmental information required by the CSRC), accounting for 11.94%. One hundred and fifty-four companies scored a perfect score (i.e., they disclosed all the environmental information required by the CSRC), accounting for 40.85%. The number of companies with scores ranging from 1 to 9 was no more than 20, accounting for no more than 5.31%. Fifty-four and 58 companies respectively had scores of 10 and 11, accounting for 9.02% and 15.38%.

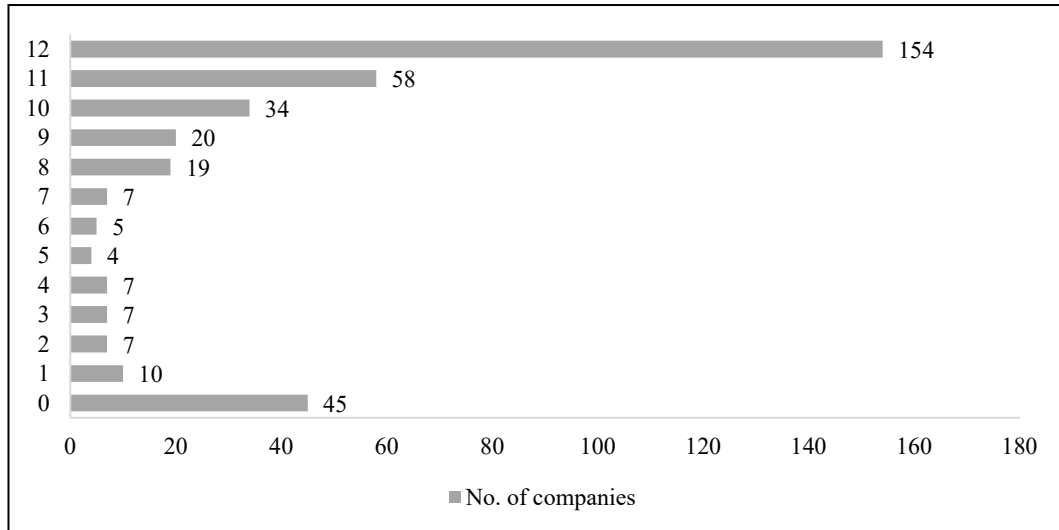
Table 6.1 *Overall results of EDI in 2017*

Score	No. of companies	Percentage (%)	Cumulative percentage (%)
0	45	11.94	11.94
1	10	2.65	14.59
2	7	1.86	16.45
3	7	1.86	18.3
4	7	1.86	20.16
5	4	1.06	21.22
6	5	1.33	22.55
7	7	1.86	24.4
8	19	5.04	29.44
9	20	5.31	34.75
10	34	9.02	43.77
11	58	15.38	59.15
12	154	40.85	100
Total	377	100	100

In addition, Table 6.1 shows that there was a polarisation of environmental disclosure practices in 2017, with companies scoring 0 and perfect scores accounting for 52.7% of the total. The number of companies scoring perfect scores was more than three times the number of companies scoring 0. The number of

companies with a score of 1 to 7 was similar and small. The number of companies with a score of 5 to 12 gradually increased, and the number of companies with a score of 12 was 2.7 times higher than the number of companies with a score of 11.

Figure 6.2 *EDI by score in 2017*



Overall, the results for environmental disclosure practice in 2017 are surprisingly unsatisfactory considering that this is a mandatory disclosure requirement for KPEs listed companies. Fewer than half of the companies disclosed environmental information in strict compliance with the CSRC’s requirements (i.e., those that scored a perfect score), which might reflect the fact that there is a lack of both supervision of the KPEs listed companies on the part of the regulator and of punitive measures.

Environmental disclosure practices by item

As described in section 5.3.2.1 of chapter 5, a total of 12 items was identified and used as rules of coding for environmental disclosures of KPEs listed companies. Table 6.2 shows the results of environmental disclosures in terms of the 12 items. Overall, the disclosure rate of each item ranged from 65% to 84%. Three items were disclosed by fewer than 70% of companies; seven items were disclosed by 70% to 80% of companies, and two showed a higher disclosure rate (more than 80%), with a relatively small gap between the items. In terms of specific disclosure of each item, ‘Item 7. Execution standards for pollutant discharge’ was the best disclosed

item, with 84% of companies disclosing it, followed by ‘Item 9. Construction and operation of pollution prevention facilities’, with 83% of companies disclosing it.

Table 6.2 EDI by item in 2017

Items	Mean score	No. of companies	Percentage (%)
Pollutant discharge information			
Item 1. Name of major pollutants and specific pollutants	0.77	289	76.66
Item 2. Way of discharge	0.74	279	74.01
Item 3. Number of discharge outlets	0.73	277	73.47
Item 4. Distribution of discharge outlets	0.65	244	64.72
Item 5. Concentration of discharge and total discharge volume	0.75	284	75.33
Item 6. Excess discharge	0.71	267	70.82
Item 7. Execution standards for pollutant discharge	0.84	317	84.08
Item 8. Permitted total discharge volume	0.67	253	67.11
Pollution prevention information			
Item 9. Construction and operation of pollution prevention facilities	0.83	312	82.76
Environmental compliance information			
Item 10. EIA of construction projects and PDP	0.69	259	68.7
Company policies and procedures			
Item 11. Emergency plans for unexpected environmental incidents	0.75	282	74.8
Item 12. Environmental self-monitoring programmes	0.71	267	70.82

Correspondingly, the worst item was ‘Item 4. Distribution of discharge outlets’, which was disclosed by 65% of companies, followed by ‘Item 8. Permitted total discharge volume’ and ‘Item 10. EIA of construction projects and PDP’, which were disclosed by 67% and 69% of the companies respectively. The low disclosure rate for the item ‘Distribution of discharge outlets’ was not only because some companies did not provide any description of this item, but also because some disclosed incorrect information, such as repeating the description of the number of discharge outlets and not indicating the location of the distribution. Therefore, this finding is a reminder for policy-makers to be more explicit about what needs to be disclosed for items that may be misunderstood.

Environmental disclosure practices by industry

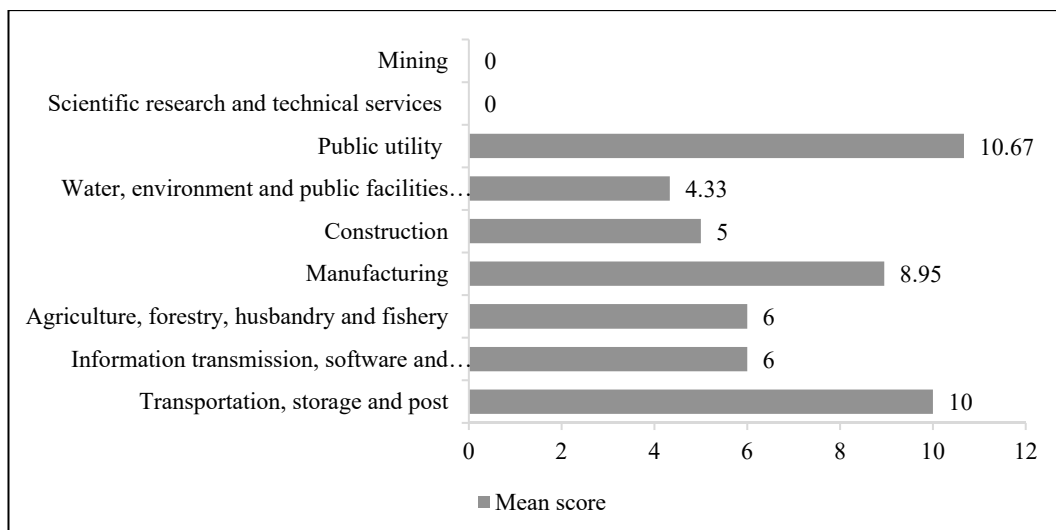
According to the Guidelines for the Industry Classification of Listed Companies (2012 Revision), 377 companies were distributed in nine industrial sectors, 96% of which belonged to the manufacturing industry (Table 6.3). In terms of the mean score (Figure 6.3), the transportation, storage, postal service industry, and public utility industry performed best in 2017, with scores of 10 and 10.67 respectively, while the scientific research and technical services industry and the mining industry had the worst environmental information disclosure practice, with one company each having a score of 0. However, as the number of companies in these industries was so small, the results can be seen as highly contingent.

Table 6.3 *EDI by industry in 2017*

Industry	No. of companies
Transportation, storage, and postal service	2
Information transmission, software, and information technology services	2
Agriculture, forestry, husbandry, and fishery	2
Manufacturing	361
Construction	2
Water, environment, and public facilities management	3
Public utility	3
Scientific research and technical services	1
Mining	1
Total	377

Table 6.3 shows that in 2017 key polluting companies regulated by environmental authorities were concentrated almost entirely in the manufacturing industry and that their mean score for environmental disclosure practices was 8.95. Although only a few companies in the other eight industries were required to make mandatory environmental disclosures, some of them scored well. For example, a perfect score was found in the public utility, agriculture, forestry, husbandry, and fishery industries, and in the information transmission, software, and information technology services industry.

Figure 6.3 *Industry mean score of EDI in 2017*



Environmental disclosure practices by ownership

A well-known feature of China's A-share market is the high incidence of government ownership (Lin et al., 2020). China's SOEs account for nearly 40% of its stock market and more than a third of its public investment (Amstad et al., 2020). Of the 377 KPEs listed companies scored in 2017, 65% were privately owned (246 in total) and 35% were state-owned (131 in total). In terms of their mean scores, there was little difference between SOEs and private companies, with scores of 8.88 and 8.81 respectively.

Table 6.4 EDI by ownership in 2017

Score	State-owned companies		Privately owned companies	
	No. of companies	Percentage (%)	No. of companies	Percentage (%)
0	8	6.11	37	15.04
1	5	3.82	5	2.03
2	4	3.05	3	1.22
3	6	4.58	1	0.41
4	2	1.53	5	2.03
5	2	1.53	2	0.81
6	2	1.53	3	1.22
7	2	1.53	5	2.03
8	9	6.87	10	4.07
9	10	7.63	10	4.07
10	13	9.92	21	8.54
11	20	15.27	38	15.45
12	48	36.64	106	43.09
Total	131	100	246	100

Table 6.4 presents the distribution of scores for state-owned companies and privately owned companies. The scores of both SOEs and private companies were concentrated in four scores of 12, 11, 10, and 0. The percentage of companies with perfect scores was 36.64% and 43.09% for SOEs and private companies respectively. Although a higher proportion of private companies scored perfect scores, the percentage of private companies scoring zero was also higher (15.04%), i.e., twice as many as that of SOEs (6.11%). This result indicates not only that the polarisation of environmental disclosure practices was more pronounced among private companies, but also that a certain number of private companies and a few SOEs did not comply with the mandatory requirements for environmental disclosures at all in 2017. Policy-makers should pay more attention to those companies that did not disclose their environmental information at all. If no appropriate penalties are imposed on these companies, the effectiveness of environmental policy may be compromised.

Environmental disclosure practices by listing board

Another feature of China's A-share market is its different listing boards (Girardin & Liu, 2019). China's A-share market includes various boards, the most important of which is the Main Board, which is designed for the listing of large-scale companies. The SME Board (Small and Medium Enterprises Board) is designed for small and medium size companies, which typically have high growth and high profitability but are still not meeting the listing requirements of the Main Board. The ChiNext Board (Growth Enterprises Market Board) is designed for high-tech SMEs which cannot be listed on the Main Board.

In 2017, A-share listed companies with mandatory environmental disclosure requirements involved the above three boards, namely the Main Board, SME Board, and ChiNext Board. Of the 377 KPEs listed companies, 210 were listed on the Main Board with a mean score of 8.17 and 124 were listed on the SME Board with a mean score of 9.48. Despite only a small number of companies being listed on the ChiNext Board (43 companies), these companies had the highest mean score of 10.21. The specific distribution of scores is shown in Table 6.5.

Table 6.5 *EDI by listing board in 2017*

Score	Main Board		SME Board		ChiNext Board	
	No. of companies	Percentage (%)	No. of companies	Percentage (%)	No. of companies	Percentage (%)
0	19	9.05	21	16.94	5	11.63
1	10	4.76	0	0	0	0
2	7	3.33	0	0	0	0
3	7	3.33	0	0	0	0
4	6	2.86	1	0.81	0	0
5	4	1.9	0	0	0	0
6	4	1.9	0	0	1	2.33
7	7	3.33	0	0	0	0
8	17	8.1	2	1.61	0	0
9	18	8.57	2	1.61	0	0
10	25	11.9	7	5.65	2	4.65
11	26	12.38	25	20.16	7	16.28
12	60	28.57	66	53.23	28	65.12
Total	210	100	124	100	43	100

In terms of the number and percentage of low score ranges (0-3), Main Board listed companies had the lowest 0 scoring percentage. However, companies with scores ranging from 0 to 3 were the highest, at 20.48%. Twenty-one companies listed on the SME Board with a score of 0 accounted for 16.94% and five companies listed on the ChiNext Board scoring 0 accounted for 11.63%. Neither the SME Board nor the ChiNext Board had any listed companies with scores ranging from 1 to 3.

Among the high score ranges (10-12), ChiNext listed companies performed the best. A total of 65.12% of ChiNext listed companies had a perfect score and 86.05% scored between 10 and 12. Companies listed on the SME Board were second best, with 53.23% achieving perfect scores and 79.03% figuring in the 10-12 ranges. The Main Board listed companies had the smallest proportion with perfect scores (28.57%) and high score ranges (52.86%).

Overall, both in terms of mean score and distribution of scores, ChiNext Board listed companies had the best environmental disclosure practice in 2017, followed by those listed on the SME Board. Consequently, the worst environmental disclosure practices among Main Board listed companies deserve the attention of policy-makers.

6.2.1.2 Environmental disclosure practices in 2018

A total of 299 A-share listed companies on the KPEs list were required by the CSRC to disclose environmental information on a mandatory basis in 2018. In general, the 299 companies had a mean score of 8.73, with a standard deviation of 4.57. Compared with the mean score of 8.83 in 2017, 2018 shows a slight downward trend, with a decrease of 1.13%. In 2018, there were still 45 companies that did not disclose any of the environmental information required by the CSRS, accounting for 15.05%; 137 companies scored a perfect score, accounting for 48.82%; 55 companies scored between 1 and 9, accounting for no more than 20% of the total. The number of companies with a score of 10 and 11 was 18 and 40 respectively, accounting for 6.02% and 13.38%.

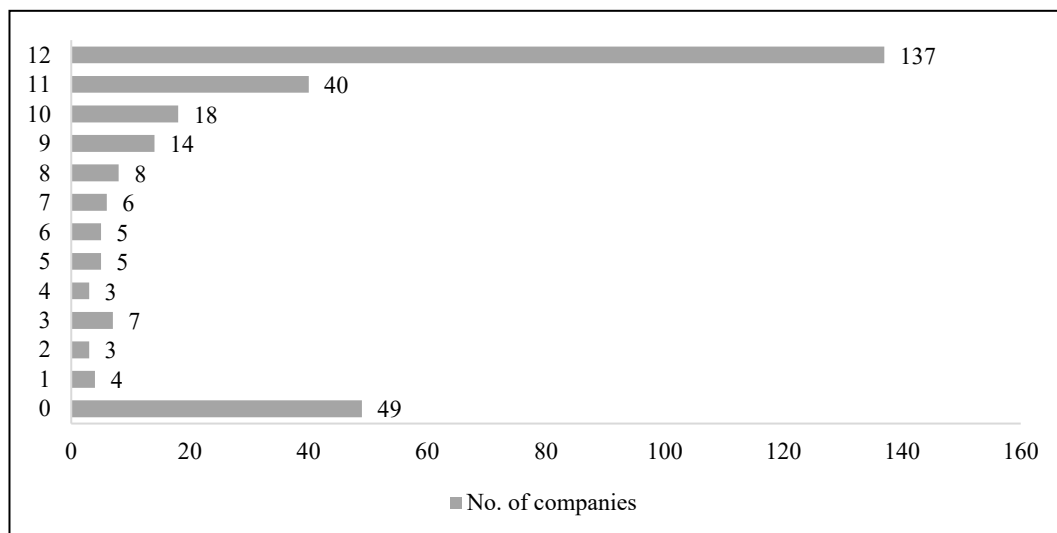
Table 6.6 Overall results of EDI in 2018

Score	No. of companies	Percentage (%)	Cumulative percentage (%)
0	49	16.39	16.39
1	4	1.34	17.73
2	3	1	18.73
3	7	2.34	21.07
4	3	1	22.07
5	5	1.67	23.74
6	5	1.67	25.41
7	6	2.01	27.42
8	8	2.68	30.1
9	14	4.68	34.78
10	18	6.02	40.8
11	40	13.38	54.18
12	137	45.82	100
Total	299	100	100

A notable trend was the increased polarisation in 2018, with companies scoring 0 and perfect scores accounting for 62.2% of the total. The number of companies with a perfect score was nearly three times higher than the number of companies with a score of 0, a result which was roughly the same as in 2017. The number of companies with a score of 1 to 8 was similar and small. From a score of 5, the number of companies steadily increases as the score increases. However, as the score approached 12 this steady upward trend changed to a dramatic rise. The

number of companies scoring 12 is approximately 3.4 times higher than the number of companies scoring 11.

Figure 6.4 *EDI by score in 2018*



Overall, the results for 2018 remain bleak. Although both the number of companies with a perfect score and companies with a score of 0 increased by almost 5% in 2018, the trend towards polarisation widened and yet again no more than half of the companies met all the mandatory requirements for environmental information disclosure.

Environmental disclosure practices by item

The gaps between the disclosure rate for each item remained small in 2018. Table 6.7 shows the results of environmental disclosures in terms of the 12 items. Overall, the disclosure rate of each item ranged from 57% to 84%. Three items were disclosed by fewer than 70% of companies, eight were disclosed by 70% to 80% of companies, and only one showed a higher disclosure rate (more than 80%). In terms of specific disclosure of each item, ‘Item 9. Construction and operation of pollution prevention facilities’ was the best disclosed item with 84% of companies disclosing it, and ‘Item 8. Permitted total discharge volume’ was the worst disclosed item with only a 57% disclosure rate.

Table 6.7 *EDI by item in 2018*

Items	Mean score	No. of companies	Percentage (%)
Pollutant discharge information			
Item 1. Name of major pollutants and specific pollutants	0.76	228	76.25
Item 2. Way of discharge	0.76	228	76.25
Item 3. Number of discharge outlets	0.64	191	63.88
Item 4. Distribution of discharge outlets	0.6	179	59.87
Item 5. Concentration of discharge and total discharge volume	0.71	211	70.57
Item 6. Excess discharge	0.77	230	76.92
Item 7. Execution standards for pollutant discharge	0.73	219	73.24
Item 8. Permitted total discharge volume	0.57	169	56.52
Pollution prevention information			
Item 9. Construction and operation of pollution prevention facilities	0.84	252	84.28
Environmental compliance information			
Item 10. EIA of construction projects and PDP	0.77	230	76.92
Company policies and procedures			
Item 11. Emergency plans for unexpected environmental incidents	0.79	237	79.26
Item 12. Environmental self-monitoring programmes	0.79	237	79.26

Compared to 2017, there were notable changes in the disclosure rate for nine items. Five items saw a significant decrease in disclosure rate in 2018 and all of these were within the range of the pollutant discharge information category (Items 1 to 8). ‘Item 7. Execution standards for pollutant discharge’, ‘Item 8. Permitted total discharge volume’, ‘Item 3. Number of discharge outlets’, ‘Item 4. Distribution of discharge outlet’, and ‘Item 5. Concentration of discharge and total discharge volume’ were down by 10.84%, 10.59%, 9.59%, 4.85%, and 4.76% respectively.

In contrast, four items showed an upward trend. They were ‘Item 12. Environmental self-monitoring programmes’, ‘Item 10. EIA of construction projects and PDP’, ‘Item 11. Emergency plans for unexpected environmental incidents’, and ‘Item 9. Construction and operation of pollution prevention facilities’, each of which was up by 8.44%, 8.22%, 4.46%, and 1.52% respectively. In terms of categories, these four items relate to pollution prevention information (Item 9), environmental compliance information (Item 10), and company policies and procedures (Items 11 and 12).

Although similar to the 2017 rate, the 2018 disclosure rate for each item remained within the 50%-90% range. One important finding was that after a 1-year policy adaptation period, KPEs listed companies tended to hide unfavourable information directly related to pollution discharging and at the same time to disclose more favourable information on pollution prevention and their environmental policy. This finding is crucial for policy-makers. When developing an environmental policy on mandatory environmental disclosure, a distinction should be made between the materiality of different categories of information, because it is possible for companies to use deficiencies in equally important disclosure items to hide key information while claiming compliance.

Environmental disclosure practices by industry

According to the Guidelines for the Industry Classification of Listed Companies (2012 Revision), 299 companies were distributed in 10 industrial sectors, 91% of which belonged to the manufacturing industry. Compared to 2017, the proportion of manufacturing companies in 2018 decreased by 5%, but still represented an absolute majority. The one company in the scientific research and technical services industry was no longer a key polluting company in 2018, while the wholesale and retail industry and the comprehensive industry category each had one company on the 2018 KPEs list.

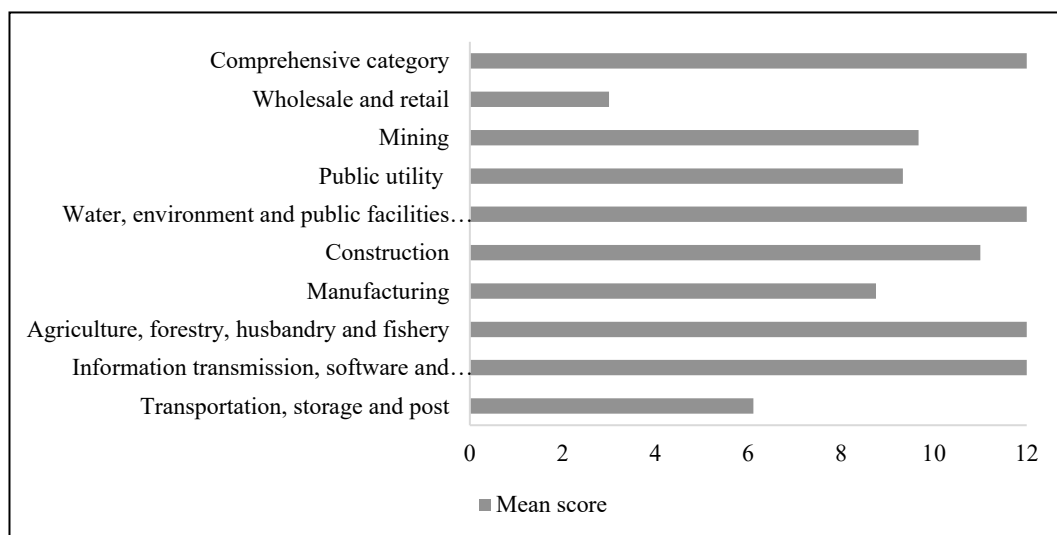
Table 6.8 *EDI by industry in 2018*

Industry	No. of companies
Transportation, storage, and postal service	9
Information transmission, software, and information technology services	1
Agriculture, forestry, husbandry, and fishery	1
Manufacturing	272
Construction	1
Water, environment, and public facilities management	1
Public utility	6
Mining	6
Wholesale and retail	1
Comprehensive category	1
Total	299

In terms of the mean score (Figure 6.5), the mining industry and the public utility industry performed well in 2018 with scores of 9.67 and 9.33 respectively, while

the transportation, storage, and postal service industry dropped to 6.11 from 10. The decline in the mean score for manufacturing companies was in line with the overall decline in 2018, falling to 8.75 from 8.95 with a decrease of 2.23%. Only one company in each of the other six industries made the 2018 KPEs list. Their results were therefore highly contingent and will not be described.

Figure 6.5 *Industry mean score of EDI in 2018*



Environmental disclosure practices by ownership

Of the 299 KPEs listed companies scored in 2018, the proportion of privately owned companies expanded from 65% to 72% (215 companies). Correspondingly, the proportion of state-owned companies fell from 35% to 28% (84 companies). Although the number of SOEs decreased, their mean score for environmental disclosure practices improved from 8.88 to 9.44. As private companies' mean score decreased in 2018 compared to the previous year, dropping to 8.45 from 8.81, 2018 witnessed a clear gap between SOEs and private companies regarding the mean score.

Table 6.9 *EDI by ownership in 2018*

Score	State-owned companies		Privately owned companies	
	No. of companies	Percentage (%)	No. of companies	Percentage (%)
0	7	8.33	38	17.67
1	0	0	5	2.33
2	0	0	4	1.86
3	3	3.57	4	1.86

Score	State-owned companies		Privately owned companies	
	No. of companies	Percentage (%)	No. of companies	Percentage (%)
4	2	2.38	2	0.93
5	2	2.38	2	0.93
6	1	2.38	4	1.86
7	3	2.38	4	1.86
8	4	4.76	5	2.33
9	5	5.95	9	4.19
10	5	5.95	13	6.05
11	12	14.29	28	13.02
12	40	47.62	97	45.12
Total	84	100	215	100

Table 6.9 presents the distribution of scores for state-owned companies and privately owned companies. A notable change compared to 2017 was that the proportion of SOEs with a perfect score increased by 11%, which means that nearly half of SOEs fully complied with the CSRC's environmental disclosure requirements in 2018, surpassing private companies for the first time. In contrast, there were no significant changes in the distribution of each score in the private companies compared to those for the previous year. The problem of noncompliance by private companies in the previous year remained, with 17.64% of private companies still not complying at all with the mandatory environmental disclosure requirements in 2018.

The finding that the environmental disclosure practices of SOEs are superior to those of private companies is consistent with the prior literature, for example Gao (2011), Kuo et al. (2012), and Córdoba-Pachón et al. (2014). This research extends their findings in social responsibility disclosure practices into the more niche area of environmental disclosure practices. However, some scholars have argued that the size of SOEs is usually much larger than that of private companies in China and thus that the size rather than the nature of ownership is the main reason that the CSR performances of SOEs is better than that of private companies (Zheng & Zhang, 2016). In response to this comment, the potential effect of company size (i.e., market value) is controlled from the statistical analysis of CET and corporate financial performance in chapter 7.

Environmental disclosure practices by listing board

In 2018, the 299 KPEs listed companies were still distributed in three listing boards (i.e., the Main Board, SME Board, and ChiNext Board). One hundred and sixty-five companies were listed on the Main Board; their mean score was 8.65, an increase of 5.87% from 2017. There were 84 companies on the SME Board, with a mean score of 9.15, a decrease of 3.48% from 2017. Due to the significant drop in the mean score of ChiNext Board listed companies (48 companies) from 10.21 to 8.25, SME Board listed companies became the best performers in 2018. The specific distribution of scores is shown in Table 6.10.

Table 6.10 *EDI by listing board in 2018*

Score	Main board		SME board		ChiNext board	
	No. of companies	Percentage (%)	No. of companies	Percentage (%)	No. of companies	Percentage (%)
0	16	9.7	16	18.6	13	27.08
1	5	3.03	0	0	0	0
2	3	1.82	0	0	1	2.08
3	4	2.42	2	2.33	1	2.08
4	4	2.42	0	0	0	0
5	3	1.82	1	1.16	0	0
6	5	3.03	0	0	0	0
7	5	3.03	2	2.33	0	0
8	7	4.24	2	2.33	0	0
9	14	8.48	0	0	0	0
10	17	10.3	0	0	1	2.08
11	27	16.36	10	11.63	3	6.25
12	55	33.33	53	61.63	29	60.42
Total	165	100	86	100	48	100

In terms of the number and percentage of low score ranges (0-3), only Main Board listed companies declined, i.e., by 3.5%, while SME listed companies rose marginally by 3.99% and ChiNext listed companies increased significantly by almost 20% compared to 2017. This increase was the main reason for the significant drop in the mean score of ChiNext listed companies in 2018.

Among the high score ranges (10-12), SME listed companies performed the best with 61.63% of SME listed companies having a perfect score and 73.26% scoring between 10 and 12. Although Main Board listed companies still did not perform as well as ChiNext listed companies in the high score ranges (10-12), they had made

significant progress, rising from 52.86% to nearly 60% in 2018. In comparison, ChiNext listed companies fell from 86.05% to 68.75%.

Looking back at the 2 years in general, both ChiNext Board listed companies in 2017 and SME Board listed companies in 2018 outperformed those listed on the Main Board in that year. This result is not quite in line with the traditional perception of Main Board listed companies in CSR performance, as they are often much larger than SME and ChiNext listed companies in terms of company size. Lepoutre and Heene (2006), Ali et al. (2017), and D'Amato and Falivena (2020) believed that company size predominantly appears to drive the CSR reporting agenda. Udayasankar (2008) suggested a U-shaped relationship between company size and CSR disclosures.

The CSRC recently (April 2021) announced the merger of the SME Board with the Main Board (Ren, 2021). The reason for the merger is that after 16 years of development, listed companies on the SME Board have converged with the Main Board in terms of market capitalisation size, performance, and trading characteristics. From this perspective, the progress in environmental disclosure practices among SME Board listed companies in 2018 could be explained to some extent by the impact of company size. As time goes on, the impact of company size on environmental disclosure practices of Chinese listed companies is likely to be further expanded.

6.2.1.3 Environmental disclosure practices by 148 sample companies

There were 377 A-share listed companies on the KPEs list in 2017 and 299 A-share listed companies on the KPEs list in 2018. Although the lists for the 2 years differ, a total of 148 A-share listed companies appear on both lists. As described in chapter 5, these 148 listed companies were selected as the sample companies for this research. Appendix A shows their stock codes, names, and key pollutant types.

Table 6.11 EDI by 148 sample companies

Item	State-owned companies		Privately owned companies		2017 mean score	2018 mean score	Difference
	2017 mean score	2018 mean score	2017 mean score	2018 mean score			
Pollutant discharge information							
Item 1. Name of major pollutants and specific pollutants	0.81	0.96	0.79	0.94	0.80	0.95	0.16
Item 2. Way of discharge	0.81	0.97	0.77	0.94	0.78	0.96	0.18
Item 3. Number of discharge outlets	0.76	0.86	0.76	0.76	0.76	0.82	0.06
Item 4. Distribution of discharge outlets	0.67	0.8	0.64	0.76	0.65	0.78	0.14
Item 5. Concentration of discharge and total discharge volume	0.81	0.91	0.78	0.93	0.79	0.92	0.13
Item 6. Excess discharge	0.76	1.00	0.73	0.97	0.74	0.98	0.24
Item 7. Execution standards for pollutant discharge	0.9	0.94	0.87	0.96	0.89	0.95	0.05
Item 8. Permitted total discharge volume	0.78	0.78	0.73	0.69	0.74	0.74	0.01
Pollution prevention information							
Item 9. Construction and operation of pollution prevention facilities	0.87	1.00	0.86	0.98	0.86	0.99	0.12
Environmental compliance information							
Item 10. EIA of construction projects and PDP	0.72	0.95	0.68	0.96	0.70	0.95	0.25
Company policies and procedures							
Item 11. Emergency plans for unexpected environmental incidents	0.79	1.00	0.76	0.98	0.78	0.99	0.21
Item 12. Environmental self-monitoring programmes	0.79	0.98	0.7	0.96	0.76	0.97	0.22
Total	9.47	11.15	9.07	10.83	9.24	11.01	1.76

In terms of the mean score, the sample companies scored 9.24 in 2017 and 11.01 in 2018. Their mean scores were all higher than the overall mean score for the year. Table 6.11 shows that the mean score for each item disclosed by the sample companies increased in 2018 compared to 2017. Of the eight items in the pollutant discharge information category, only 'Item 6. Excess discharge' had a large increase, while the remaining five items rose slightly. In contrast, all the other four items outside the pollutant discharge information category showed a significant increase. The increase in these four items is the main cause of the increase in the mean score of the sample companies.

A 2-year comparison of environmental disclosure practices of the 148 sample companies revealed that Chinese listed companies might achieve compliance and gain legitimacy by means of increased disclosure of noncritical environmental information. According to the results of the content analysis of 377 annual reports in 2017 and 299 in 2018, noncritical environmental information was most likely to be used by listed companies. The researcher found that most companies were vague in disclosing the four items outside the pollutant discharge information category, namely 'Item 9. Construction and operation of pollution prevention facilities', 'Item 10. EIA of construction projects and PDP', 'Item 11. Emergency plans for unexpected environmental incidents', and 'Item 12. Environmental self-monitoring programmes'.

In particular, for the latter three items, many companies simply mention in their annual reports that they have obtained environmental impact assessment permits for construction projects and prepared emergency plans for unexpected environmental incidents and environmental self-monitoring programmes without any specific information disclosure. Such information disclosure is ineffective and does not reflect the actual environmental performance of listed companies, nor does it help the public, especially investors, to exercise their right of supervision. Therefore, the existing provisions for mandatory requirements of environmental disclosure in annual reports of listed companies need to be further improved by clarifying the content of each item, especially items that are more ambiguous.

In addition to being discussed in this section, the 148 sample companies' data is used in section 6.4 for the development of CET index.

6.2.1.4 Discussion of the findings

Overall, mandatory environmental disclosure by companies has just begun in China. From the perspective of the environmental disclosure practices of Chinese listed companies, the information-based environmental policy is not being implemented properly and there is room for this policy to be improved.

First, the trend towards polarisation of environmental disclosure practices of Chinese listed companies is striking. More than half of companies in 2017 and 2018 disclosed either all or nothing, though three times the number of companies were in full compliance than in full noncompliance. In addition, the polarisation is more pronounced among private companies. A certain number of private companies and a few SOEs do not comply with the mandatory requirements for environmental disclosure at all.

Second, it is unclear how companies that do not comply or only partially comply with the mandatory environmental disclosure policy are supervised and penalised. There is currently a clear penalty mechanism for pollution and excessive pollutants discharging by companies, but it is not clear how to penalise violations of mandatory requirements of environmental disclosure. The lack of sanctions might be one of the key reasons why companies do not fully comply with these mandatory requirements.

Third, there is a lack of clarity in the description of the requirements of certain environmental disclosure items. For example, there is no detailed guidance on whether ‘Item 4. Distribution of discharge outlets’ refers to the absolute or relative geographical location of the outlets and what the degree of precision should be. With regard to ‘Item 2. Way of discharge’, it is not clear whether this means continuous and intermittent discharges or organised and unorganised discharges. As a result, listed companies may take advantage of this deficiency by disclosing duplicate or invalid information. For example, in 2017 and 2018, some companies repeatedly disclosed information on the ‘number of discharge outlets’ as the ‘distribution of discharge outlets’. In addition, some companies simply mentioned in their annual reports that their discharge outlets are located ‘within the plant area’, which is an invalid disclosure.

Fourth, over 90% of Chinese listed companies subject to mandatory requirements of environmental disclosure are in the manufacturing sector. Their performance determines the environmental disclosure practices of Chinese listed companies.

Fifth, state-owned companies outperform privately owned companies in terms of environmental disclosure practices in China. This finding is generally consistent with the findings of previous literature on CSR disclosure practices. However, it is worth noting that SOEs may have a company size advantage in China.

Sixth, the environmental disclosure practices of ChiNext and SME listed companies are higher than expected. Previous studies have suggested that Main Board listed companies have an advantage over SMEs in terms of size and corporate governance and therefore perform better in CSR disclosure practices. As China only recently completed the merger of the Main Board and SME Board in April 2021, the finding in this research may be due to the fact that the size of companies listed on the SME Board does not differ significantly from those listed on the Main Board. With respect to ChiNext listed companies, their performance of environmental disclosure practices has been highly volatile, with an excellent performance in 2017, but a significant decline in 2018.

Last, Chinese listed companies might achieve compliance and gain legitimacy by increasing disclosures of noncritical environmental information. Combined with the third finding above, the noncritical environmental information may be presented as invalid information. Evidence from this section suggests that after a 1-year policy adaptation period, companies have significantly increased the disclosure of noncritical environmental information and reduced, or slightly increased, information directly related to pollutant discharge. This finding supports and extends the legitimacy theory in the field of environmental disclosure practice.

6.2.2 Phase 2: Significant environmental administrative penalties

This section sheds light on the transparency of Chinese listed companies with respect to environmental violations through the content analysis of government data. According to the Securities Law and the Measures for the Administration of Information Disclosure by Listed Companies, A-share listed companies are required to disclose significant administrative penalties in their annual reports.

Significant environmental administrative penalties, as typical significant administrative penalties, should also be disclosed by A-share listed companies to the public if they have been imposed. In addition, some studies (e.g., Ilinitch et al., 1998; Lober, 1996; Wood, 1991) suggested that, apart from the observable and quantifiable pollutant discharges, regulatory violations and penalties can be considered as an important dimension in measuring the environmental performance of a company. Therefore, a comprehensive analysis of the significant environmental administrative penalties imposed on Chinese listed companies also helps to foster a better understanding of their environmental performance.

The results of the content analysis of significant environmental administrative penalties are presented on a year-by-year basis by the researcher, as the companies involved in the penalties varies from year to year. In 2017, 1,121 penalties were identified as significant according to the four qualitative criteria (Table 5.4 in section 5.3.2.2, chapter 5) and one quantitative criterion (Appendix C), involving 501 A-share listed companies in total. This study reports the results from four perspectives, i.e., disclosure, cause, frequency, and number. Similarly, 444 significant environmental administrative penalties involving 166 A-share listed companies were identified in 2018. These results were also reported from the four perspectives. All of these findings are discussed.

6.2.2.1 Significant environmental administrative penalties in 2017

In all, 501 A-share listed companies were subject to significant environmental administrative penalties in 2017, accounting for approximately 14% of all A-share listed companies in China. Considering the background of the environmental situation in China, especially the severe air pollution situation noted in chapter 2, this result is not surprising. The following section reports significant environmental administrative penalties imposed on A-share listed companies in 2017 in terms of penalty disclosure, penalty cause, penalty frequency, and penalty amount.

Significant environmental administrative penalties by disclosure

Overall, the information disclosure of significant environmental administrative penalties by A-share listed companies in 2017 was extremely disappointing. Only 20 of the 501 companies being punished disclosed their penalty information in the

annual reports, accounting for only 3.99%. Of the 20 companies with information disclosure, 14 disclosed all the penalties and 6 only partially disclosed their penalties, as shown in Table 6.12. In terms of specific information disclosure, most of the 20 companies disclosed in detail the time, place, penalty content, penalty amount, and rectification plan, while two companies—Sinopec Shanghai Petrochemical Co., Ltd. (stock code 600688) and Shanxi Lanhua Sci-tech Venture Co., Ltd. (stock code 600123) —disclosed only the number and total amount of penalties without other specific information in their annual reports.

Table 6.12 *SEAP by disclosure in 2017*

Penalty disclosure	No. of companies	Percentage (%)	Cumulative percentage (%)	Penalty frequency	Disclosure frequency
Full disclosure	14	2.79	2.79	31	31
Incomplete disclosure	6	1.2	3.99	36	9
No disclosure at all	481	96.01	100	1054	0
Total	501	100	100	1121	40

One possible reason for such a low disclosure rate of significant environmental administrative penalties is the lack of clear criteria for determining whether an administrative penalty is significant. The criteria used by the researcher were based on an extensive collection and analysis of policy documents. The researcher spent a month collecting different requirements from each province and eventually found four qualitative criteria and one quantitative criterion. However, this quantitative criterion needed to be in line with each province’s own regulations for large fines. It would be inconceivable for a listed company to spend such a long time compiling relevant policy documents simply to determine whether or not it needs to disclose information about an environmental administrative penalty.

The lack of a clear legal basis has also caused inconvenience to the environmental authorities and securities regulators. On the one hand, listed companies are unsure of the circumstances under which disclosure is required; on the other hand, they can take advantage of the excuse of “not knowing whether it is a significant administrative penalty” for not disclosing after being penalised by the environmental authorities. In order to promote better disclosure of environmental

information by listed companies, environmental authorities and securities regulators should introduce a clear definition of ‘significant administrative penalties’ and raise companies’ awareness of voluntary disclosures of environmental administrative penalties.

Significant environmental administrative penalties by cause

After careful content analysis, the causes of 1,120 penalties relating to A-share listed companies could be grouped into seven categories. As shown in Table 6.13, the highest frequency of penalties was due to the listed company’s violation of Air Pollution Prevention and Control Regulations. These violations accounted for 31.85%. and they are closely linked to the serious situation of air pollution in China. This result might indicate that environmental authorities were trying to alleviate the air pollution by increasing the penalties imposed on air polluting companies.

Table 6.13 *SEAP by cause in 2017*

Penalty cause	Frequency	Percentage (%)
Violation of the Air Pollution Prevention and Control regulations	357	31.85
Violation of the Water Pollution Prevention and Control regulations	134	11.95
Violation of the Solid Waste Prevention and Control regulations	81	7.23
Violation of the Total Amount Control system	209	18.64
Violation of the Three Simultaneities system for construction projects	191	17.04
Violation of the Environmental Impact Assessment system	116	10.35
Unauthorised dismantling, idling or improper use of pollution prevention facilities	33	2.94
Total	1121	100

The second major cause (18.64%) of environmental penalties was the violation of the total amount control system by the listed companies. The total amount control system is one of the systems for environmental management in environmental authorities. The system achieves its objectives through the top-down allocation of total amount of pollutants. Under this system, companies are required to discharge pollutants according to the total amount allocated.

Unauthorised dismantling, idling, or improper use of pollution prevention facilities accounted for only 2.94% of the total in terms of causes. The remaining four causes

all relate to the environmental management systems in environmental authorities. These causes are either a direct violation of the requirements of the environmental management systems or a violation of the regulations for specific types of pollution, such as water pollution, solid waste pollution, etc.

Significant environmental administrative penalties by frequency

From the perspective of penalty frequency, almost 90% of the 501 listed companies were penalised no more than four times. Two hundred and ninety-six companies received only one significant environmental administrative penalty in 2017, accounting for 59.08% of the total. However, five listed companies were still subject to more than 10 times the significant environmental administrative penalties from environmental authorities. These companies were the Shanghai Construction Group (600170), Chongqing Construction Group (600939), China Aluminium Corp (601600), Inner Mongolia Baotou Steel Union (600010), and Sinopec (600028). Of these, Inner Mongolia Baotou Steel Union and Sinopec both received a total of 37 significant environmental administrative penalties in 2017.

Table 6.14 *SEAP by frequency in 2017*

Penalty frequency	No. of companies	Percentage (%)	Cumulative percentage (%)
1	296	59.08	59.08
2	90	17.96	77.04
3	40	7.98	85.02
4	22	4.39	89.41
5	14	2.79	92.2
6	10	2	94.2
7	10	2	96.2
8	6	1.2	97.4
9	6	1.2	98.6
10	2	0.4	99
11	1	0.2	99.2
12	1	0.2	99.4
18	1	0.2	99.6
37	2	0.4	100
Total	501	100	100

Overall, the majority of companies had a relatively small number of significant environmental administrative penalties, with only around 10% of companies having more than four. This result shows that the environmental performance of A-share

listed companies, as measured by the regulatory violations and penalties, was generally good in 2017. However, environmental penalties are only one dimension. To get a comprehensive picture of the environmental performance of Chinese listed companies, it is also important to combine pollution data from companies' self-monitoring and environmental authorities' supervisory monitoring.

Significant environmental administrative penalties by amount

From the perspective of penalty amount, around 90% of the 501 listed companies had total fines of no more than RMB1 million, with 169 companies (33.73%) having fines of no more than RMB100,000. Six companies did not receive fines as a result of significant environmental administrative penalties, suggesting that these companies were only punished by suspension of production, or rescission of business permit, or administrative detention of the principal responsible person.

Table 6.15 *SEAP by amount in 2017*

Penalty amount (RMB)	No. of companies	Percentage (%)	Cumulative percentage (%)
0	6	1.2	1.2
0 - 100,000	169	33.73	34.93
100,001 - 1,000,000	267	53.29	88.22
1,000,001 - 10,000,000	57	11.38	99.6
10,000,001 or more	2	0.4	100
Total	501	100	100

Around half (267 companies) paid fines totalling between RMB100,001 and RMB 1 million for the year. A total of 59 listed companies were fined over RMB1 million, with two listed companies, Sinopec (600028) and Sanxia New Building Materials (600293), paying a huge fine of RMB13.95 million and RMB11.3 million respectively. As the No. 3 company on the Fortune 500 in 2017, Sinopec made a net profit of USD9,571.3 million for the year. Although Sinopec was fined USD2.11 million²⁷, the impact of this amount on it was minimal. Therefore, considering the different sizes and levels of profitability of listed companies, the total amount of fines should be combined with the total assets or net profit of the

²⁷ The figure is converted from RMB13.95 million based on the average RMB/USD exchange rate of 6.5942 in December 2017.

companies to comprehensively compare the actual impact of the penalty amount on the listed companies.

6.2.2.2 Significant environmental administrative penalties in 2018

A total of 166 A-share listed companies were subject to significant environmental administrative penalties in 2018, accounting for around 5% of all A-share listed companies in China. In terms of numbers and percentages, there was a significant decline of nearly two-thirds compared to 2017. With the number of A-share listed companies remaining stable in 2018, significant environmental violations by A-share listed companies were effectively reduced, which might suggest that to some extent various newly introduced environmental policies, including mandatory environmental information disclosures and environmental protection taxes, are beginning to take effect.

Significant environmental administrative penalties by disclosure

Compared to the previous year, the information disclosure of significant environmental administrative penalties by A-share listed companies improved remarkably with nearly a quarter of companies that received significant environmental significant penalties disclosing their penalty information in 2018, an increase of 20.71%. Among them, the proportion of companies choosing full disclosure improved most markedly, i.e., by 16.49%. However, three quarters of companies (75.3%) still did not disclose any environmental penalties despite this percentage being much lower than the 96.01% in 2017. In addition, the disclosures of significant environmental administrative penalties for the five listed companies that received the most penalties in 2018 were all poor. They were all penalised more than 10 times, but none of them made any disclosure of these environmental administrative penalties.

Table 6.16 *SEAP by disclosure in 2018*

Penalty disclosure	No. of companies	Percentage (%)	Cumulative percentage (%)	Penalty frequency	Disclosure frequency
Full disclosure	32	19.28	19.28	69	69
Incomplete disclosure	9	5.42	24.7	39	14

Penalty disclosure	No. of companies	Percentage (%)	Cumulative percentage (%)	Penalty frequency	Disclosure frequency
No disclosure at all	125	75.3	100	336	0
Total	166	100	100	444	83

Although the disclosures of significant environmental administrative penalties for A-share listed companies remained unsatisfactory in 2018, there was a clear increase in the awareness of voluntary disclosures by companies in the absence of changes to the relevant regulations. As previously mentioned, there are existing laws and regulations that require A-share listed companies to disclose significant administrative penalties. However, it is difficult to develop a uniform standard for what is significant due to regional differences.

Therefore, the researcher suggests that, given the current urgency of addressing environmental issues, securities regulators could consider adding the information on environmental administrative penalties as one of the mandatory environmental disclosure items. The advantages of doing so are that on the one hand it reduces the cost of judgement for companies, as there is no longer a distinction between whether an environmental administrative penalty is significant or not, and on the other hand it will also reduce the cost to stakeholders and investors of gaining access to the information.

Significant environmental administrative penalties by cause

In 2018, there were eight reasons for the 444 significant environmental administrative penalties. Of these reasons, seven were the same as in the previous year. The difference was that 10 penalties were imposed for violating the deadline pollution treatment system. This system is managed by environmental authorities and it requires polluting companies to rectify excess discharge or other violations within a certain period of time after the problems have been identified. If the problem is not solved by the end of the period, penalties are imposed. The two highest ranked reasons remained unchanged in 2018 and were still closely related to air pollution. Together, these two reasons resulted in approximately 50% of the significant environmental administrative penalties. Table 6.17 illustrates the distribution of penalty causes in 2018.

Table 6.17 SEAP by cause in 2018

Penalty cause	Frequency	Percentage (%)
Violation of the Air Pollution Prevention and Control regulations	144	32.43
Violation of the Water Pollution Prevention and Control regulations	44	9.91
Violation of the Solid Waste Prevention and Control regulations	8	1.8
Violation of the Total Amount Control system	75	16.89
Violation of the Deadline Pollution Treatment system	10	2.25
Violation of the Three Simultaneities system for construction projects	64	14.42
Violation of the Environmental Impact Assessment system	67	15.09
Unauthorised dismantling, idling or improper use of pollution prevention facilities	32	7.21
Total	444	100

Significant environmental administrative penalties by frequency

First of all, it is worth noting that the total number of significant environmental administrative penalties associated with all A-share listed companies in 2018 was 60.36% lower than in 2017, and the number of companies involved in penalties even decreased by 66.87%. With this in mind, the specific frequency of penalties imposed on 166 companies in 2018 is shown in Table 6.18. Although the figures for 2018 are almost identical to those for 2017, around 90% of companies were nevertheless penalised no more than four times. In addition, in 2018 the number of companies receiving more than 10 instances of significant environmental administrative penalties remained the same as for 2017, i.e., five listed companies. Among the five companies, Sinopec (600028) was still the one with the highest number of significant environmental administrative penalties (27 times).

Table 6.18 SEAP by frequency in 2018

Penalty frequency	No. of companies	Percentage (%)	Cumulative percentage (%)
1	82	49.4	49.4
2	30	18.07	67.47
3	21	12.65	80.12
4	16	9.64	89.76
5	2	1.21	90.97
6	3	1.81	92.78
7	4	2.41	95.19

Penalty frequency	No. of companies	Percentage (%)	Cumulative percentage (%)
8	1	0.6	95.79
9	1	0.6	96.39
10	1	0.6	96.99
11	2	1.21	98.2
21	1	0.6	98.8
22	1	0.6	99.4
27	1	0.6	100
Total	166	100	100

In addition, the researcher admits that the sharp reduction in significant environmental administrative penalties is impressive, given that the number of A-share listed companies and the relevant regulations have not changed significantly. However, it is too early to conclude that the environmental performance of Chinese listed companies has improved. For one thing, the stringency of administrative enforcement in China has been questioned by some researchers (Kostka & Nahm, 2017; Lo et al., 2006; Tilt, 2007; van Rooij et al., 2017). For another, the implicit and informal nature of corporate political connections that exist between Chinese listed companies and administrative authorities may also influence the outcome of penalties (Lin et al., 2018; H. Wang et al., 2003). Therefore, the measurement of the environmental performance of Chinese listed companies needs to take into account more factors, such as pollution data from companies' self-monitoring programmes, supervisory data from environmental authorities, etc.

Significant environmental administrative penalties by amount

In 2018, the total amount of significant environmental administrative penalties associated with 166 A-share listed companies was RMB126.27 million, a decrease of 56.43% from 2017. From the perspective of specific distributions, only one company was penalised without a fine. Approximately two-thirds of the companies paid fines totalling between RMB100,001 and RMB1 million, which is higher by 13.58% than the amount in 2017. The proportion of companies with fines of over RMB1 million increased by 5.69%. Among them, one company—Huifeng Bio Agriculture (002496)—was fined a total of more than RMB10 million for the year. This company's total fine amounted to RMB11.17 million.

Table 6.19 *SEAP by frequency in 2018*

Penalty amount (RMB)	No. of companies	Percentage (%)	Cumulative percentage (%)
0	1	0.6	0.6
0 - 100,000	25	15.06	15.66
100,001 - 1,000,000	111	66.87	82.53
1,000,001 - 10,000,000	28	16.87	99.4
10,000,001 or more	1	0.6	100
Total	166	100	100

6.2.2.3 Discussion of the findings

Overall, the content analysis of government data shows a downward trend in environmental violations by Chinese listed companies. However, the level of corporate disclosures of environmental violations remains low. There is still much room for improvement in the corporate disclosure of environmental administrative penalties in the Chinese context.

First, although the level of disclosures of significant environmental administrative penalties by Chinese listed companies in 2018 has improved significantly compared to 2017, the level of disclosure remains inadequate. Over 75% of penalised companies did not disclose relevant information in their annual reports. For stakeholders and investors, access to significant environmental administrative penalties of listed companies is currently only available through the database of environmental authorities. This situation is both inconvenient and inefficient, as the data needs to be collated and analysed over a long period of time after downloading to obtain the relevant information.

Second, the lack of clarity in the definition of ‘significant administrative penalty’ poses a huge obstacle to the mandatory disclosure on environmental administrative penalties for listed companies. At present, there is no unified and clear legal interpretation of ‘significant administrative penalty’ in China. Although some local laws and regulations contribute some definitions, they vary from one to another.

Third, the main cause of significant environmental administrative penalties was the violation of the Air Pollution Prevention and Control regulations by Chinese listed companies in both 2017 and 2018. This finding may suggest a correlation between

the air pollution emissions of companies and the serious air pollution situation in China. Administrative penalties against Chinese listed companies for environmental violations have to some extent acted as a deterrent to other listed companies. Overall, 2018 saw a significant reduction in environmental violations by Chinese listed companies.

Fourth, the environmental performance of Chinese listed companies has improved significantly in terms of the dimension of regulatory violations and penalties. However, these should also be combined with pollution data from companies' self-monitoring and environmental authorities' supervisory monitoring to enable a comprehensive judgement to be made. In addition, the actual impact of the environmental penalty amount on listed companies should take into account their total assets or net profits.

In conclusion, the two main findings of the content analysis of government data in this section are summarised as follows: (1) transparency of information on environmental penalties by Chinese listed companies is extremely low. The researcher recommends that policy-makers should make environmental penalty information one of the items for mandatory disclosure of corporate environmental information as soon as possible; (2) the environmental performance of Chinese listed companies is improving from the perspective of regulatory violations and penalties. The researcher recommends that policy-makers should continue to improve the existing mixed environmental policies, maintain the command-and-control regulations (e.g., environmental administrative penalty policy), and accelerate the improvement of market-based instruments (e.g., environmental tax policy) and information-based approaches (e.g., mandatory environmental disclosure policy).

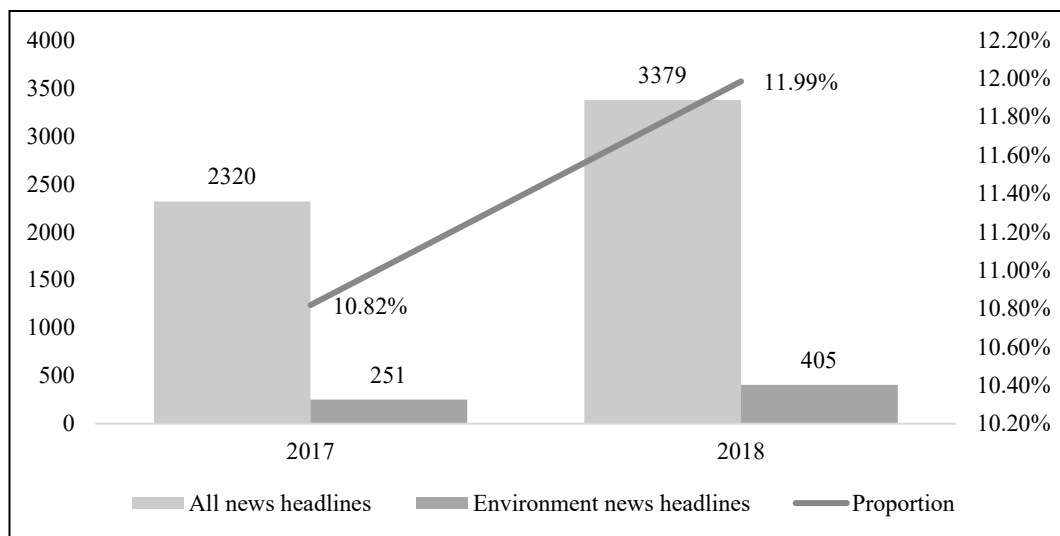
6.2.3 Phase 3: Environment news headlines

The content analysis of environmental news headlines was conducted for the 148 sample companies only. The results are no longer presented by year as the sample was consecutive in 2017 and 2018. The reason for narrowing the content analysis of media data from all A-share listed companies to the 148 sample companies rests on achievability. The total number of news headlines related to 3,596 A-share listed

companies was 52,983 in 2017 and 82,825 in 2018. The researcher did attempt to classify news headlines through automated methods such as key words. However, the accuracy of automated methods is much lower than manual classification accuracy. Therefore, with a sample of just 148 companies, it was possible for the researcher to analyse the entire news headlines relating to these companies for 2017 and 2018.

The news headlines data for the 148 sample companies noted in section 5.3.1.3 of chapter 5 were coded into three types of environment-related headlines according to the rules set out in section 5.3.2.3 of chapter 5. The coding process produced 251 and 405 environment news headlines in 2017 and 2018 respectively. Figure 6.6 shows the proportion of environment news headlines in relation to all news headlines for the years 2017 and 2018.

Figure 6.6 *ENH in 2017 and 2018*



In 2017, 10.82% of the news headlines were related to the environment of the sample companies, while in 2018 this percentage was 11.99%. The content analysis of all news headlines showed that the media’s major attention has been paid to share price fluctuations, earnings forecasts, shareholder changes, business strategies, and other areas that may affect the share price. Environment news headlines remained steady at approximately 1 in 10 in 2017 and 2018. The following two subsections present the environmental news headlines of the sample companies in terms of type and frequency respectively.

6.2.3.1 Environment news headlines by type

The number of environment news headlines related to the sample companies in 2018 increased by 61.35% compared to 2017. This increase indicates that, as the overall news headlines of the sample companies increased, their environment news headlines also showed an upward trend. As regards the three different types of environment news headlines, Type A refers to favourable environment news headlines. This type accounted for 12.75% of environment news headlines in 2017, and this percentage rose to 18.27% in 2018.

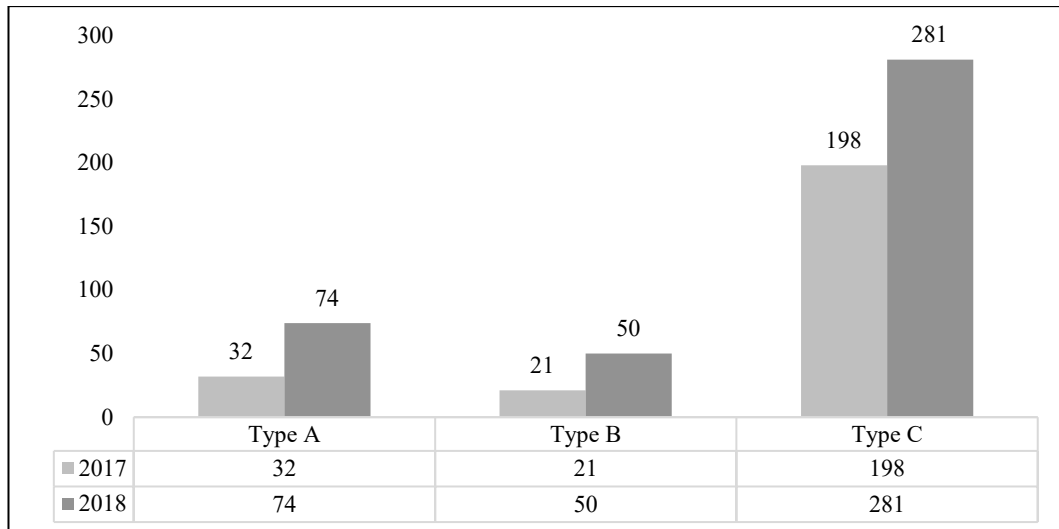
Table 6.20 ENH by type in 2017 and 2018

Type	2017 frequency	2017 percentage (%)	2018 frequency	2018 percentage (%)	Difference (%)
Type A	32	12.75	74	18.27	5.52
Type B	21	8.37	50	12.35	3.98
Type C	198	78.88	281	69.38	-9.5
Total	251	100	405	100	0

Secondly, Type B refers to unfavourable environment news headlines. In 2017, 8.37% of environment news headlines were unfavourable to the sample companies and this percentage increased slightly by 3.98% in 2018. The comparison shows that Type A had a larger share of headlines than Type B in both years and that Type A's headlines increased more in 2018 than those of Type B did. Generally speaking, Type B is more relevant to the environmental risks faced by the public, as this type often involves companies damaging the environment or being penalised by regulatory authorities.

Some researchers have suggested that environmental news may have a limited role in revealing environmental risks (Major & Atwood, 2004; Wakefield & Elliott, 2003). The finding of this section supports this conclusion due to the fact that Type B had the lowest share of environment news headlines. A low percentage of unfavourable news may result in a failure to create public pressure on the polluting companies and make it difficult to attract the attention of stakeholders and investors.

Figure 6.7 ENH by type in 2017 and 2018



Thirdly, Type C stands for neutral environment news headlines. This type made up the majority of all environment news headlines at 78.88% in 2017, although this percentage dropped to 69.38% in 2018. Although Type C is not as good as Type B in terms of agenda setting and legitimacy pressure on companies, it can help to maintain a constant media focus on environmental topics in listed companies. Aerts and Cormier (2009) pointed out that reactive environmental press releases affect the environmental legitimacy of companies. According to the rules of coding in this research, Type C neutral environment news headlines are reactive press releases for the sample companies.

6.2.3.2 Environment news headlines by frequency

Among the 148 sample companies, 53.38% had at least one environment news headline in 2017, and the percentage rose to 69.59% in 2018. In terms of frequency, around 90% of the companies involved in environmental news were reported no more than eight times in both years. One sample company was featured 12 times in 2017 for environment-related news. The company in question is a manufacturing company called Baotailong New Materials (601011). It generated the most environment news headlines in 2017 because the company's industrial graphene production project was officially launched in that year. In 2018, one company, namely Fushun Special Steel (600399) attracted a whopping 16 environment news headlines. The main reason was that the company was subject to several significant administrative penalties in 2018 for environmental pollution issues.

Table 6.21 *ENH by frequency in 2017 and 2018*

Frequency	2017 No. of companies	Percentage (%)	2018 No. of companies	Percentage (%)
1	24	30.38	14	13.59
2	23	29.12	31	30.1
3	9	11.39	16	15.54
4	6	7.59	9	8.74
5	4	5.06	11	10.68
6	4	5.06	4	3.88
7	1	1.27	5	4.86
8	0	0	2	1.94
9	3	3.8	3	2.91
10	4	5.06	5	4.85
11	0	0	2	1.94
12	1	1.27	0	0
16	0	0	1	0.97
Total	79	100	103	100
No. samples	148	53.38%	148	69.59%

6.2.3.3 Discussion of the findings

Overall, the results of the content analysis of the 148 sample companies' media data in this section are able to provide only partial insights into the media coverage of Chinese listed companies and to form one of the databases for the comprehensive CET assessment of the sample companies, because the sample companies represent only approximately 4% of all A-share listed companies. The media coverage of these companies is not sufficiently representative of the media coverage of all Chinese listed companies. Nevertheless, the researcher made several observations as follows.

First, the number of news headlines relating to the sample companies tended to increase over the 2 years, which indirectly led to an increase in the number of environment news headlines. The proportion of environment news headlines in relation to all news headlines is relatively stable at nearly 10%.

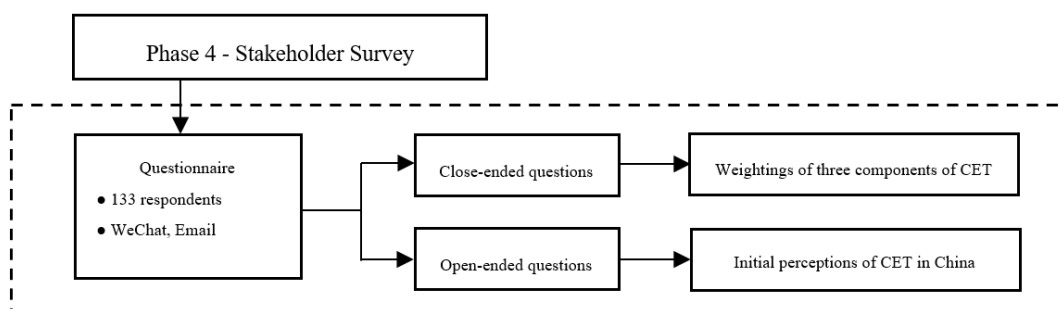
Second, the low proportion of unfavourable environment news headlines of the sample companies may limit the effective role of the media in revealing environmental risks and monitoring their environmental performance.

Third, about half of the sample companies had no environmental news headlines in 2017. Although there was an improvement in 2018, about 40% of the sample companies still had no environment news headlines. The sample companies are all on the KPEs list, which means that they are key polluters that environmental authorities are focusing on. The scope of environmental news coverage clearly does not meet the needs of stakeholders and investors and regulators.

6.3 Stakeholder Survey

The stakeholder survey was designed to assign weightings for each component of CET, while also attempting to gain some initial insights from stakeholders for the subsequent statistical analysis and thematic analysis. Marquis and Toffel (2012), Hasseldine et al. (2005), and Naynar et al. (2018) have suggested that stakeholder preferences are an important source of weighting factors and that questionnaire survey can be used to collect these perceptions. The results of content analysis provide the data basis for the CET assessment of the sample companies, while stakeholders' perceptions need to be incorporated into the assessment to ensure objectivity. Thus, a questionnaire survey was adopted as an appropriate tool in this research for collecting stakeholders' perceptions of corporate environmental disclosure, government environmental supervision, and media environmental coverage. Figure 6.8 shows the stakeholder survey process which was followed in this research.

Figure 6.8 *The process of stakeholder survey*



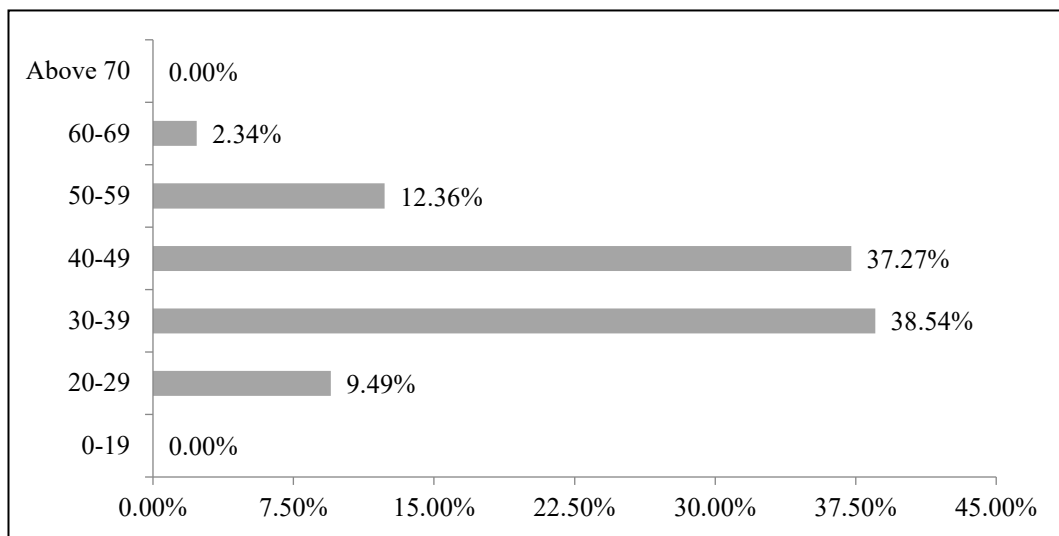
6.3.1 Demographic information of respondents

The demographic information of the 133 respondents covers five categories, namely age, gender, highest educational attainment, annual revenue, and employer type.

Age group

The respondents ages ranged from 20 to 69. Figure 6.9 shows the wide age distribution of the respondents. People aged 30 to 49 made up the majority, accounting for about 75% of the total respondents, which indicates that most of the respondents are in their prime career development years. As the respondents are senior executives in their respective organisations, their perceptions are valuable in terms of the research topic for this thesis.

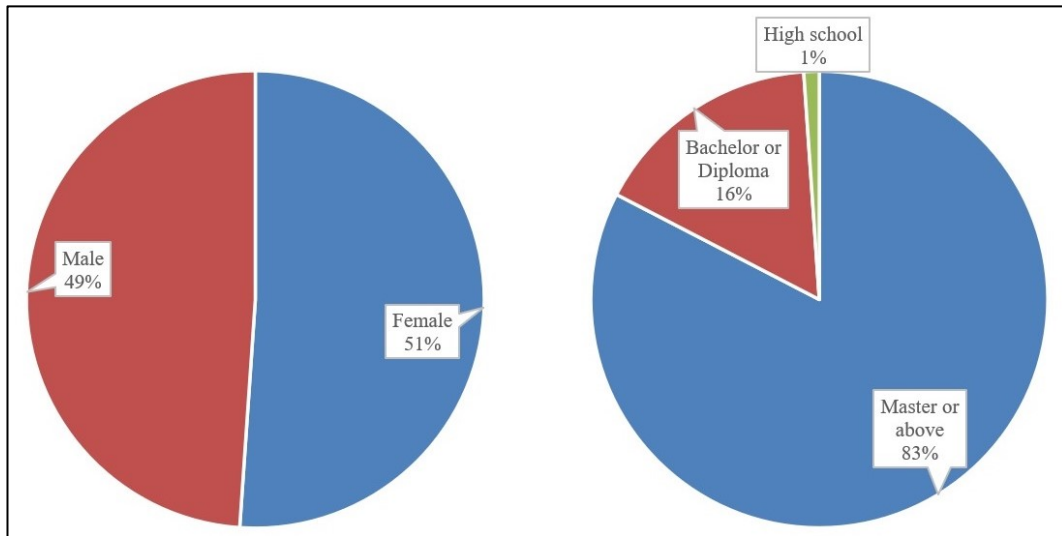
Figure 6.9 *Age groups of respondents*



Gender and highest educational attainment

Figure 6.10 shows both the gender of the respondents and their highest educational attainment. In terms of gender distribution, the ratio of men to women is close to 1 to 1, which means that there is no gender bias in the respondent sample of this research. In terms of educational background, 83% of respondents have a master's degree or above. This is consistent with the fact that their positions require a certain professional background. The good educational background of the respondents contributes to their accurately understanding and responsibly answering the survey.

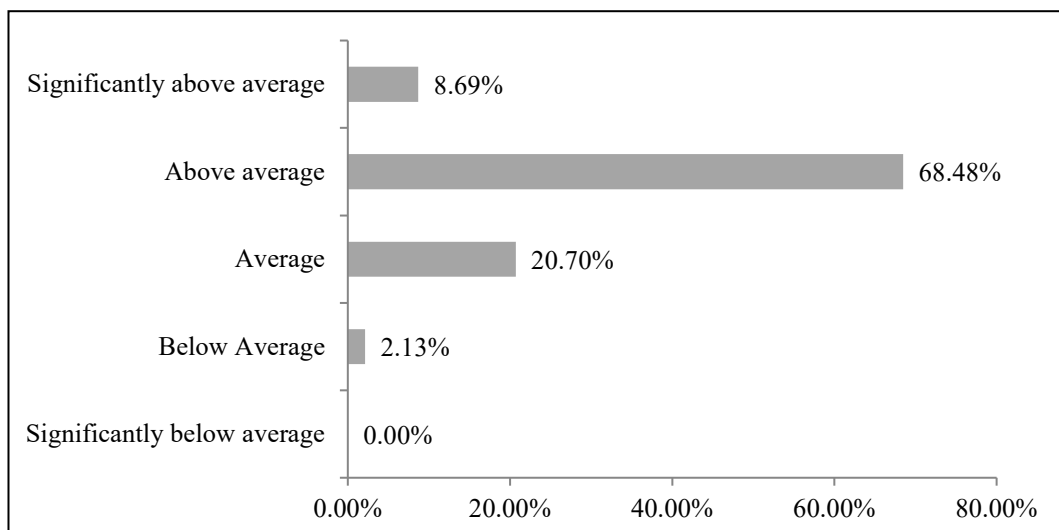
Figure 6.10 *Gender and highest educational attainment*



Annual revenue

In terms of the respondents' income, the vast majority have an annual income higher than China's per capita disposable income reported by China's statistics authorities in 2018 (National Bureau of Statistics, 2019). Such incomes are not unexpected considering that they are senior executives in their respective organisations. Notably, as income is a private topic in China, only vague ranges were set in the questionnaire. Given the quality of modesty that is emphasised in Chinese culture, the actual annual income of the respondents may be higher than the results show. Figure 6.11 shows respondents' answers to questioning about their income.

Figure 6.11 *Annual revenue of respondents*



Employer type

The last question examined in the demographic information related to the nature of their employer, and so it was a very important question. Chen et al. (2004) have suggested that the impact of demographics, such as income and the type of employment on the stakeholders' perceptions, is strong in China. If respondents' employers are concentrated in state-owned or privately owned companies, that fact may lead to statistical bias in the final answers. Therefore, ensuring a broad representation of respondents requires that the proportion of employers of different nature does not vary too much.

According to Figure 6.12, 36% of respondents are working for state-owned companies, while 32% are from private owned companies. Government employees account for 23%. As working for nongovernmental organisations and being self-employed are not the main forms of employment in China (Hsu, 2014; Luo & Chong, 2019), it is not surprising that these two segments together account for about 9% of the total respondents. In general, excluding nongovernment organisations and self-employment, the remaining three types of employment are split evenly, which indicates that the respondent sample in this research is broadly representative in the Chinese context.

Figure 6.12 *Employer types of respondents*



6.3.2 Phase 4: Stakeholders' perceptions

In line with the two different types of questions, this section divides the questionnaire results into close-ended question results and open-ended question results. Close-ended question results are used to provide weighting factors for variables in the CET model, while open-ended question results present initial perceptions of the CET in China from the stakeholders' perspectives.

6.3.2.1 Close-ended question results

As noted in section 5.3.3.1 of chapter 5, the reporting here is divided into three modules, each corresponding to one source of environmental information (i.e., company, government, and media). Each module consists of five closed questions; the first two followed a dichotomous approach and the last three used a 10-point rating scale. The last three questions are proxies for each of the three attributes of environmental information reviewed in section 4.2.3.1 of chapter 4 (i.e., accessibility, clarity, and reliability). Appendix I shows descriptive statistics of all 133 respondents' answers for close-ended Questions.

Corporate environmental disclosure

Question 1.1 Have you ever browsed any annual reports issued by any A-share listed companies?

Table 6.22 *Response statistics for Q1.1*

Answer	Frequency	Percentage (%)
Yes	105	78.95
No	28	21.05
Total	133	100

Table 6.22 shows that 78.95% of respondents have experience of browsing annual reports of A-share listed companies. This result is in line with expectations, as most of the respondents' positions are highly related to financial markets.

Question 1.2 Are you aware that the annual report contains environmental disclosures?

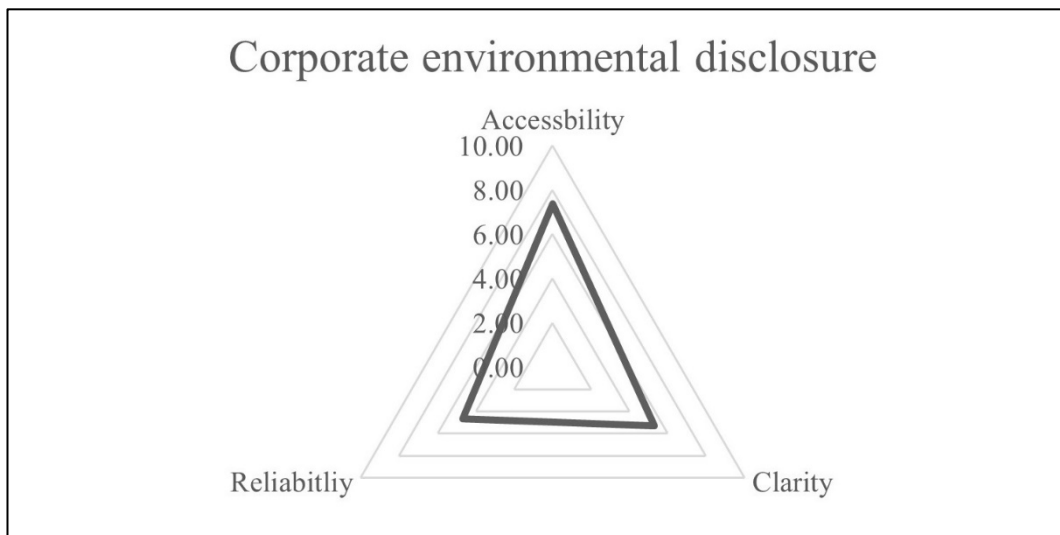
Table 6.23 *Response statistics for Q1.2*

Answer	Frequency	Percentage (%)
Yes	93	69.92
No	40	30.08
Total	133	100

As shown in Table 6.23, 69.92% of the respondents have read the environmental disclosures in annual reports. This is a relatively high percentage, considering that annual reports usually contain extensive and lengthy content. The result indicates that the corporate environmental disclosures are being valued by information users.

Questions 1.3-1.5 asked respondents to rate the accessibility, clarity, and reliability of corporate environmental disclosure on a scale of 1 to 10. Figure 6.13 shows the mean scores of the three variables in the form of a radar chart.

Figure 6.13 *The radar chart for Q1.3-1.5*



It can be seen from the figure that the highest mean score of the three variables is accessibility, which reaches more than 7 points. Reliability is the lowest, with less than 5 points. Although corporate disclosure is perceived by stakeholders as a convenient way to access environmental information, its reliability is questioned by them. The finding is in line with the studies by Yu et al. (2020) and Marquis and Toffel (2012) who argued that corporate environmental disclosures are motivated by greenwashing, so the reliability is questionable.

Table 6.24 shows the descriptive statistics for the three variables. The standard deviation of clarity is 1.41, indicating that stakeholders' perceptions of the clarity

of corporate environmental disclosures vary considerably. This variation may also be related to the polarisation of environmental disclosure practices of Chinese listed companies found in section 6.2.1. Overall, taking the three variables together, the final score for corporate environmental disclosure is 5.7913.

Table 6.24 *Descriptive statistics for Q1.3-1.5*

Variable	Max	Min	Mean	Std.Dev.
Accessibility	9	5	7.3823	1.07
Clarity	8	2	5.3166	1.41
Reliability	7	2	4.6750	1.23
Final score	-	-	5.7913	-

Government environmental supervision

Question 2.1 Have you ever viewed any administrative penalties of listed companies from government websites?

Table 6.25 *Response statistics for Q2.1*

Answer	Frequency	Percentage (%)
Yes	69	51.88
No	64	48.12
Total	133	100

The results show that only about half of the respondents have viewed the information about listed companies' administrative penalties disclosed on government websites. This finding comes as no surprise to the researcher, because for the research purpose of the thesis, the researcher needed to download relevant data from government websites. The whole experience of accessing information is laborious and the websites are not clear and direct in terms of guidance. From the researcher's personal experience, there is still much room for improvement in the disclosure of information on government websites.

Question 2.2 Are you aware that some administrative penalties are environmental administrative penalties?

Table 6.26 *Response statistics for Q2.2*

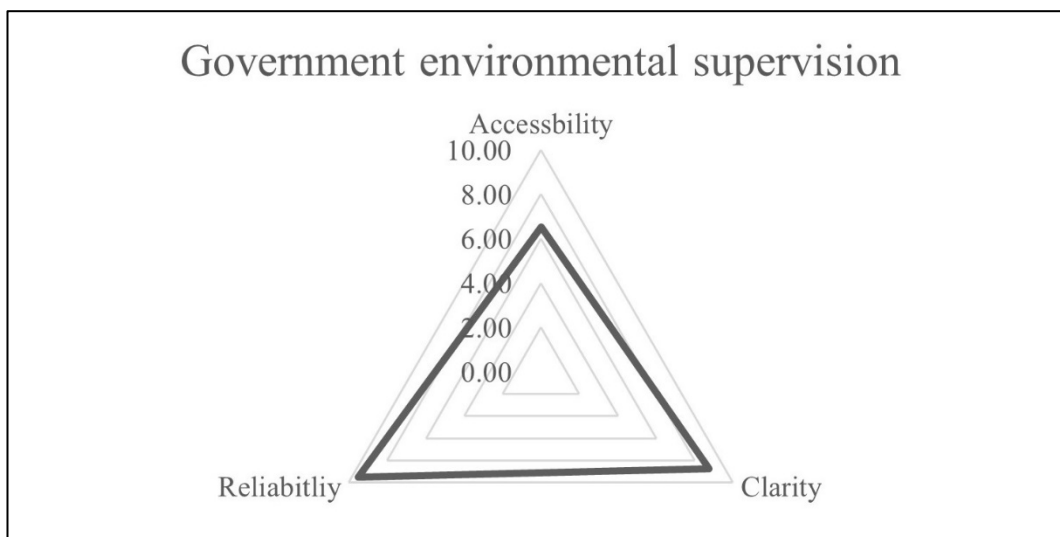
Answer	Frequency	Percentage (%)
Yes	58	43.61

Answer	Frequency	Percentage (%)
No	75	56.39
Total	133	100

As only half of the respondents have accessed information on administrative penalties for listed companies via government websites, it can be expected that even fewer respondents are aware that some administrative penalties are environmental administrative penalties.

Questions 2.3-2.5 asked respondents to rate the accessibility, clarity, and reliability of environmental penalties information disclosed by government authorities on a scale of 1 to 10. Figure 6.14 shows the mean scores of the three variables in the form of a radar chart.

Figure 6.14 *The radar chart for Q2.3-2.5*



The results show respondents have little doubt about the information disclosed by the government on environmental penalties related to listed companies. The mean score of reliability is 9.5014, almost a perfect score. In addition, as shown in Table 6.27, the standard deviation of reliability is 0.72, indicating a relatively concentrated distribution of respondents' assessments.

Similarly, the clarity variable is rated highly (8.7506). This finding suggests that corporate environmental information published by the government is informative for stakeholders. In terms of the accessibility, respondents' assessments are generally consistent with the responses to Q2.1 and 2.2, which shows that, although

government information is clear and reliable, it is not easily accessible to information users. Overall, combining the three variables together, the final score for government environmental supervision is 8.2565.

Table 6.27 *Descriptive statistics for Q2.3-2.5*

Variable	Max	Min	Mean	Std.Dev.
Accessibility	8	3	6.5175	0.94
Clarity	10	5	8.7506	1.12
Reliability	10	7	9.5014	0.72
Final score	-	-	8.2565	-

Media environmental coverage

Question 3.1 Have you ever watched or read any news headlines on listed companies from media channels?

Table 6.28 *Response statistics for Q3.1*

Answer	Frequency	Percentage (%)
Yes	118	88.72
No	15	11.28
Total	133	100

Table 6.28 shows that approximately 90% of respondents get information on listed companies through media channels. Carroll and McCombs (2003) suggested that by setting the direction and quantity of coverage, the media can expand the public's attention towards an issue. As the medium of information dissemination, the media is most easily perceived by information users.

Question 3.2 Are you aware that some news headlines are related to the environment?

Table 6.29 *Response statistics for Q3.2*

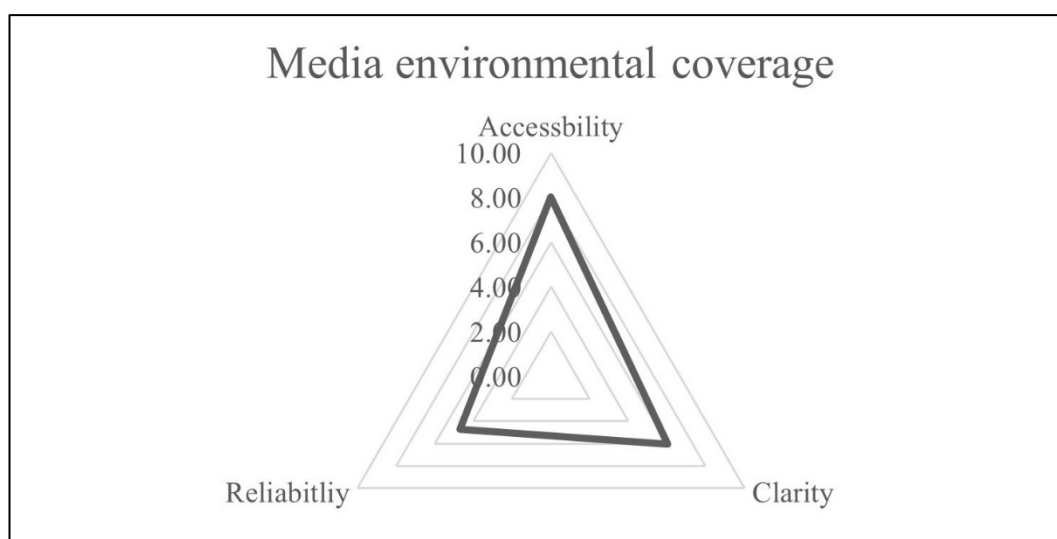
Answer	Frequency	Percentage (%)
Yes	100	75.19
No	33	24.81
Total	133	100

According to the results in section 6.2.3, the proportion of environment news headlines to all news headlines is relatively stable at nearly 10%. However, Table

6.29 shows that about 75% of the respondents can perceive that media reports cover environmental information of listed companies. This finding may indicate that stakeholders have a strong interest in environmental coverage of listed companies and that the media can play a greater role in supervising the environmental behaviour of listed companies than can other channels.

Questions 3.3-3.5 asked respondents to rate the accessibility, clarity, and reliability of media environmental coverage on a scale of 1 to 10. Figure 6.15 shows the mean scores of the three variables in the form of a radar chart.

Figure 6.15 *The radar chart for Q3.3-3.5*



By combining Figures 6.13, 6.14, and 6.15, it can be seen that the highest mean score for accessibility is media environmental coverage (8.0201). In terms of the mean scores for clarity and reliability, media environmental coverage comes close to corporate environmental disclosure. However, the standard deviation of reliability is 1.55, suggesting that respondents have very different views on the truthfulness and reliability of media environmental coverage. In general, the final score for media environmental coverage is 6.2609.

Table 6.30 *Descriptive statistics for Q3.3-3.5*

Variable	Max	Min	Mean	Std.Dev.
Accessibility	10	6	8.0201	1.08
Clarity	9	3	6.0511	1.34
Reliability	8	1	4.7113	1.55

Variable	Max	Min	Mean	Std.Dev.
Final score	-	-	6.2609	-

6.3.2.2 Open-ended question results

The second part of the questionnaire asked four open questions which are directly related to the CET in China. Respondents were required to provide short answers for these open questions. Multiple answers were allowed. In line with the questions asked, the results are presented in four parts, which show the word cloud and high frequency word statistics for answers to each question respectively. Only words that appeared more than three times in answers are counted as high frequency words. Figures and tables were automatically generated by the electronic questionnaire service provider Wenjuan.com.

Question 1

The first open question asks stakeholders what factors they believe could enhance the environmental transparency of an A-share listed company.

Figure 6.16 Word cloud for open-ended Q1



It can be seen from Figure 6.16 and Table 6.31 that regulatory factors are perceived by most stakeholders as effective ways to improve the environmental transparency of A-share listed companies. Words such as regulations, penalties, regulatory requirements, regulatory guidance, and stringent regulations repeatedly appear in their answers. Apart from regulatory-related factors, the answers can be broadly

divided into internal and external factors. Internal factors include mainly mandatory environmental disclosure, board of directors, and corporate pollution treatment, etc. External factors on the other hand cover a wide range and include terms such as corporate accountability, incentives, media supervision, public supervision, stakeholder pressure, and third parties, etc. Overall, external factors appear more frequently in the answers than internal factors do.

Table 6.31 *High frequency words for open-ended Q1*

Word	Count	Relevance
regulations	19	0.202
penalty	15	0.295
accountability	14	0.298
mandatory disclosure	7	0.795
incentives	7	0.265
regulatory requirements	6	0.795
media supervision	6	0.795
board of director	5	0.993
public supervision	5	0.662
regulatory guidance	5	0.662
stakeholder pressure	5	0.662
stringent regulations	5	0.662
corporate environmental accountability	4	0.795
third party supervision	4	0.795
strict enforcement	4	0.530
pollution treatment	4	0.530
...		

Question 2

The second open question relates to stakeholders' perceptions of factors that reduce the environmental transparency of an A-share listed company.

Figure 6.17 *Word cloud for open-ended Q2*



As seen in Figure 6.17 and Table 6.32, the factor most cited by stakeholders is the low cost of violation for companies. This finding may be related to China's currently inadequate environmental laws and regulations. Companies can bypass environmental policies without paying the proper cost for damaging the environment or for failing to disclose environmental information as required. From stakeholders' perspective, this finding therefore provides support for the need to examine the compliance of A-share listed companies with environmental policies already considered in sections 6.2.1 and 6.2.2.

In addition, impression management is perceived by stakeholders as an important factor to reduce the environmental transparency of A-share listed companies. This finding is consistent with legitimacy and signalling theories (Brennan & Merkl-Davies, 2013). When companies use environmental disclosure as a legitimacy tool, environmental performance may be exaggerated, and environmental pollution may be concealed (Cho & Patten, 2007). In such cases, the substantial environmental disclosures made by companies does not necessarily demonstrate that they have provided transparent environmental information (Yu et al., 2020).

Last, similar to the answer to the first question, regulatory factors, such as lack of regulations, ambiguous disclosure standards, lack of supervision, lack of penalties, ineffective supervision, lax enforcement, etc., are still considered to be closely related to the environmental transparency of A-share companies.

Table 6.32 *High frequency words for open-ended Q2*

Word	Count	Relevance
low violation cost	13	0.997
impression management	8	0.409
lack of regulations	7	0.537
ambiguous disclosure standard	7	0.537
lack of supervision	7	0.537
lack of penalty	7	0.537
ineffective supervision	7	0.358
lax enforcement	7	0.358
poor media exposure	6	0.460
ambiguous criteria	6	0.307
false disclosure	6	0.051
easy false disclosure	5	0.384
inadequate regulations	5	0.256
easy penalty	5	0.256
penalty mechanism	4	0.205
...		

Question 3

The third open question sought stakeholders' views on what a high level of CET can bring to an A-share listed company.

Figure 6.18 Word cloud for open-ended Q3



As can be seen from the literature review in section 4.5.2.2 of chapter 4, existing studies mainly link the environmental information quality to corporate financial performance. The responses of the third open question provide more evidence for this argument. According to Figure 6.18 and Table 6.33, answers related to

corporate financial performance, such as profitability and financial burden, are high frequency words in stakeholders' responses. In addition, most stakeholders believe that a high level of CET influences investor decisions and confidence and brings a positive image to companies.

Table 6.33 *High frequency words for open-ended Q3*

Word	Count	Relevance
investor	15	0.376
profitability	12	0.366
financial burden	11	0.913
financial performance	10	0.830
positive corporate image	8	0.996
sustainable development	8	0.581
high environmental cost	7	0.871
confidence	7	0.151
environment performance	5	0.415
social responsibility	5	0.415
environmental protection	5	0.166
public attention	4	0.332
environmental protection awareness	4	0.373
real operations situation	4	0.373
stakeholder engagement	4	0.249
effective management	4	0.249
...		

Question 4

The last open question asked stakeholders what a low level of CET means for an A-share listed company.

Figure 6.19 *Word cloud for open-ended Q4*



Like the answers to the third open question, as shown in Figure 6.19 and Table 6.34, the most frequent words, for example short-term benefits, less financial burden, short-term profits and so on, are related to corporate financial performance. This finding seems to indicate that stakeholders believe that companies will prioritise short-term profit maximisation. Investments made to improve environmental transparency, for example pollution prevention facilities or emission reduction technologies, are not considered to bring short-term financial benefits to a company. This is an interesting finding, but more empirical evidence is needed to support this argument.

Table 6.34 High frequency words for open-ended Q4

Word	Count	Relevance
short terms benefits	11	0.997
financial performance	9	0.544
investor	9	0.164
negative corporate image	8	0.725
reasonable public doubt	6	0.544
less financial burden	5	0.181
financial burden	5	0.181
environmental pollution	5	0.121
concealment	5	0.100
uncertainty	5	0.093
Short-term profit	4	0.363
expenses of environment	4	0.363
corporate credibility	4	0.242
less investment	4	0.121
profitability	4	0.089

Word	Count	Relevance
...		

6.3.2.3 Discussion of the findings

Overall, the results of the stakeholder survey not only contribute to the development of a CET index for the 148 sample companies, but also shed some light on the statistical analysis in chapter 7 and the thematic analysis in chapter 8.

First, the demographic information of the respondents shows that they are broadly representative. Chen et al. (2004) suggested that the impact of demographics in areas such as income and the type of employment on the stakeholders' perceptions is strong in China. In this research, 36% of respondents are working for state-owned enterprises, while 32% are from private enterprises. Government employees account for 23%. The income of 77% of respondents is higher than China's per capita disposable income reported by China's statistics authorities in 2018 (National Bureau of Statistics, 2019).

Second, respondents evaluate corporate environmental disclosure, government environmental supervision, and media environmental coverage respectively via three variables (i.e., accessibility, clarity, and reliability). The results show that the media has the highest accessibility, while the clearest and most reliable information comes from the government. The final scores are used to weight the variables in the CET model in the next section.

Last, internal and external factors, such as regulation, accountability, impression management, etc., are perceived by respondents as relevant to the driving forces behind CET in China. However, more in-depth investigations are needed to understand how these factors affect CET in China.

6.4 Development of CET Index

As indicated in section 4.6 of chapter 4, the thesis develops a CET model based on a systematic review of existing CET literature. The model addresses some of the deficiencies in existing research discussed in chapter 4. In addition to corporate disclosures, environmental information from government and media sources is also included in the model. The model also incorporates stakeholders' perceptions as

weight factors. Combined with the characteristics of A-share listed companies and stakeholders as well as the regulatory regime in the Chinese context, the model is developed as follows:

$$CET_i = \lambda_1 EDI_i + \lambda_2 SEAPI_i + \lambda_3 ENHI_i$$

Table 6.35 *Definitions of variables in the CET model*

Variable	Definition
CET_i	A proxy for CET
EDI_i	Environmental disclosure index
$SEAPI_i$	Significant environmental administrative penalty index
$ENHI_i$	Environment news headlines index
λ	Weighting factors (Stakeholders' perceptions)

Table 6.35 defines the variables in the CET model. As can be seen from the model, the CET of listed companies is assessed in three steps, namely normalisation, weighting, and calculation.

6.4.1 Normalisation

The first step is normalisation. In this research, different normalisation formulas were used for three different sources of data: (1) Min-max feature scaling for EDI; (2) Dynamic feature scaling for SEAPI; and (3) J-F coefficient for ENHI. The formulas are drawn from the extant literature and details were presented in section 4.6, chapter 4. The three different types of data for the 148 sample companies in 2017 and 2018 are normalised by the formulas in Table 6.36.

Table 6.36 *Formulas of variables in the CET model*

Variable	Formula	Variable Description
EDI_i	$EDI_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$	x_i = Environmental disclosure score
$SEAPI_i$	$SEAPI_i = 1 - \frac{a_i - b_i - \min(a)}{\max(a) - \min(a)}$	a_i = Penalty frequency b_i = Disclosure frequency
$ENHI_i$	$ENHI_i = \begin{cases} (e^2 - ec)/t^2, & \text{if } e > c \\ (ec - c^2)/t^2, & \text{if } e < c \\ 0, & \text{if } e = c \end{cases}$	e = No. of favourable news headlines c = No. of unfavourable news headlines

Variable	Formula	Variable Description
		$t = \text{No. of all news headlines}$
λ_i	$\sum_{i=1}^3 \lambda_i = 1$	$\lambda_i = \text{weightings from stakeholders' scores}$

6.4.2 Weighting

In the second step, stakeholders' perceptions of environmental disclosure by listed companies, environmental administrative penalties by the government, and environmental news coverage by the media were converted into weighting factors and added into the calculation formula of CET. As indicated in section 6.3.2.1, the final scores for the above three items are 5.7913, 8.2565, and 6.2609 respectively. Therefore, the corresponding weightings are 0.2851, 0.4066, and 0.3083, as shown in Table 6.37.

Table 6.37 *Weightings of variables in the CET model*

Variable	Final Score	Percentage (%)	Weighting
Corporate environmental disclosure	5.7913	28.51	$\lambda_1 = 0.2851$
Government environmental penalty	8.2565	40.66	$\lambda_2 = 0.4066$
Media environmental coverage	6.2609	30.83	$\lambda_3 = 0.3083$
Total	-	100.00	-

6.4.3 Calculation

The last step is calculation. First, the EDI, SEAPI, and ENHI for each sample company are calculated separately based on the formulas in Table 6.36. Secondly, the weighting factors are multiplied by the corresponding variables according to Table 6.37. Finally, the weighted EDI, SEAPI, and ENHI were summed to obtain the final weighted CET. Appendix J shows the results of the calculation.

6.5 Chapter Summary

In this chapter, a CET index of 148 sample companies over 2 years is developed based on the results of content analysis and stakeholder survey. The content of this chapter can be summarised in three parts.

In the first part, the environmental disclosure practices by Chinese listed companies are investigated in terms of items, industries, ownerships, and listing boards. A total of seven findings are gained from the content analysis of company data. Also, the significant environmental administrative penalties of Chinese listed companies are presented in terms of disclosures, causes, frequency, and amount. Four findings and two conclusions are made from the content analysis of government data. In addition, the environment news headlines of 148 sample companies are shown in terms of types and frequency. Three observations are made from the content analysis of media data.

In the second part, demographic information and results of the stakeholder survey are introduced in detail. The sample of respondents is representative from the perspective of demographic information. Stakeholders' perceptions are presented through two types of questions: close-ended questions and open-ended questions. The close-ended questions' results provide weighting factors for variables in the CET model, while open-ended questions' results shed some light on the statistical analysis in chapter 7 and the thematic analysis in chapter 8.

Last, this chapter introduces the three steps of the CET assessment, namely normalisation, weighting, and calculation. The results of calculation are listed in Appendix J. In the next chapter, two hypotheses are developed and tested based on the CET index developed from this chapter.

Chapter 7

CET and Corporate Financial Performance

7.1 Introduction

As the second part of the quantitative investigation, this chapter sets out the results and discusses the implications arising from the statistical analysis which aims to fulfil the third research objective of this thesis and analyse the relationship between CET and corporate financial performance critically and quantitatively. The results confirm a significant negative association between CET and corporate financial performance. Thus, while a mandatory disclosure mechanism with clear guidelines is necessary, it should include effective external supervision mechanisms and improved rewards and penalties systems. The robustness test shows that the results are reliable. The chapter is structured as follows:

Section 7.2 reviews the CET theories in chapter 3 and applies them to explain the relationship between CET and corporate financial performance. Based on CET theories and the findings of chapter 6, section 7.3 develops two hypotheses and introduces the sample. Section 7.4 constructs the research model and provides a detailed description of the independent, dependent, and control variables. As the main part of the statistical analysis, section 7.5 tests the hypothesis. This section comprises four parts, namely descriptive statistics, correlation test, regression results, and robustness test. The results of the tests are discussed, and practical insights are provided in section 7.6. Section 7.7 summarises the chapter.

7.2 CET Theories and Corporate Financial Performance

Chapter 3 set out the theoretical foundation for CET, which provided the basis for constructing logical thinking between variables. This section details the relationship between the theories behind CET and corporate financial performance, which in turn sets the stage for the hypothesis development presented in the next section.

According to signalling theory, companies with an advantageous position in terms of environmental information are one of the important information senders in the market (Kim et al., 1993). As an increasingly strong social consensus is forming around environmental challenges, stakeholders are increasingly looking to understand companies' reputation and ability to assume social responsibility via their environmental information (Tallman & Li, 1996). As a result, there is an increasing tendency for companies to choose to increase their environmental disclosure.

First, companies with good environmental performance take advantage of their 'good work' to signal that they are willing and able to be socially responsible for environmental protection. This 'good' performance differentiates them from poor environmental performance companies and brings them more economic benefits. Market-based studies have shown that information on environmental costs and liabilities is useful to interested investors and creditors (Blacconiere & Patten, 1994; Li & McConomy, 1999; Neu et al., 1998). Companies that need more external financing will make more disclosures (Barth et al., 1997; Healy et al., 1999; Laidroo, 2009). Thus, environmental disclosure conveys economic information so that investors can adjust their expectations of the company based on the environmental information disclosed (Clarkson et al., 2008; Freedman & Jaggi, 1988), which in turn affects the financial performance of the company (Wang et al., 2002).

Second, companies with average or poor environmental performance also try to make use of public transparency of corporate environmental information. This stance can create the impression that the company is proactive in accepting stakeholders' supervision, complying with environmental policies, and promoting a culture of environmental protection (Xiao & Li, 2002). By disclosing environmental information, companies define, or even exaggerate, their

environmental responsibilities in order to convey and reinforce public perceptions in the service of corporate self-interest. Environmental disclosures that serve impression management are value-oriented (Martins et al., 2021). Like earning management in corporate financial reporting, the environmental information disclosed is strategically selective (Leary & Kowalski, 1990; Lehman & Tinker, 1987). The findings in chapter 6 shows that noncritical and positive environmental information dominates corporate annual reports, with a declining trend in the proportion of environmental information directly related to pollutant discharge.

However, the formation of a company's reputation is a long process. Companies need to constantly adjust their behaviour patterns, build up their corporate image, and develop their corporate culture in the years of operation, thus forming their own reputation in the market (Jiang, 2021). Therefore, the environmental disclosure behaviour of a company not only affects the market response in the present, but also permeates into the corporate reputation in the future. When a company actively undertakes social responsibility and gains the value recognition of stakeholders, it forms a corporate reputation, which can help the company improve its financial performance and further discipline its behaviour, ultimately forming a virtuous cycle (Chang, 2015). From the perspective of CET, when companies actively disclose environmental information, they can establish a corporate image of actively fulfilling their social responsibility for environmental protection. In this process, in order for the signal of corporate environmental information disclosure to be better communicated to stakeholders, companies should improve the quantity and quality of their environmental information disclosure.

In the reality of market competition, the existence of information asymmetry may lead to adverse selection and moral hazard. For listed companies, as their knowledge of corporate environmental information is far richer and more comprehensive than that of external stakeholders, there are more opportunities for companies to take advantage of this information gap to make decisions that are detrimental to stakeholders. As a result, this behaviour can bias stakeholders' judgements. For example, when a company has negative information on environmental protection, it may use the information gap to conceal or embellish the negative news, resulting in nontransparent environmental information

disclosure (Liu & Zhang, 2017). In such cases, it is difficult for stakeholders to make accurate judgements based on the environmental information disclosed unilaterally by the company, which suggests that analysing the impact of corporate environmental disclosure on financial performance alone may lead to biased results.

In addition, the phenomenon of information asymmetry is one of the key assumptions of government intervention theory. Governments make environmental policies to regulate the environmental behaviour of companies; the sanctions they can impose include administrative penalties for environmental violations, environmental taxes for pollutant discharge, and mandatory disclosure requirements for environmental information, etc. According to government intervention theory, companies will pay greater attention to environmental information disclosure in order to prevent themselves from facing the risk of environmental policy violations.

In recent studies, there is a growing tendency for researchers to use legitimacy theory and stakeholder theory to explain corporate environmental disclosure behaviour (Cho & Patten, 2007; Clarkson et al., 2008; de Villiers & van Staden, 2010; Deegan, 2002; Fallan & Fallan, 2009; Magness, 2006; T. D. Wilmshurst & G. R. Frost, 2000). According to legitimacy theory, companies' economic issues cannot be studied in isolation and should be discussed in conjunction with social factors such as politics and public opinion (Gray et al., 1996). Substantial or potential threats to the legitimacy of a company arise when the value created by the company is not in line with the values accepted by society (Deegan, 2002; Lindblom, 1994). According to stakeholder theory, the survival and growth of a company depends on its ability to contribute to its stakeholders who empower it (Magness, 2006). Companies with poor environmental performance face increased political and public opinion pressures that threaten their legitimacy. As a result, they disclose more extensive remedial measures to external stakeholders in their annual reports (Cho & Patten, 2007). In the context of mandatory disclosure, environmental information acts primarily as a legitimacy tool (Patten, 2005), in order to satisfy the growing information demands of stakeholders (Fallan & Fallan, 2009). Existing empirical findings support both legitimacy theory and stakeholder theory (Cho & Patten, 2007).

The theories (signalling theory, government intervention theory, legitimacy theory, and stakeholder theory) discussed above do not contradict each other; in fact, they complement each other. This research therefore combines them to provide a theory triangulation of CET, as shown in section 3.4 in chapter 3. In the context of mandatory disclosure, government environmental policies motivate companies to respond positively to achieve a position of legitimacy. Legitimacy pressure comes mainly from the government and the media. The government directly influences companies through the enactment of a series of environmental policies, while the media indirectly influences companies through agenda setting (Lee & Hutchison, 2005). Liu and Anbumozhi (2009) identified the determinants of the level of corporate environmental disclosure based on stakeholder theory. They found that the environmental disclosure strategy by Chinese listed companies is used mainly to meet government requirements, while other stakeholders, such as shareholders and creditors, have a very weak influence on the level of corporate environmental disclosure. Bewley and Li (2000) suggested that companies are more likely to disclose environmental information in response to more news media coverage and more environmental regulations.

First, corporate environmental disclosure under mandatory requirements is overall a response to political and public pressure. The day-to-day operation and the decision-making of a company need to be in line with the expectations of the public, and, more importantly, the requirements of environmental policies. When a company's behaviour goes against these requirements and it cannot maintain legitimacy, it will struggle to gain social acceptance and be sustainable in the marketplace. This situation will in turn have an impact on the company's financial performance. In order to achieve sustainable development and avoid unnecessary penalties, listed companies actively adapt to the requirements of public opinion and environmental policies. In particular, heavily polluting companies disclose environmental information to meet the demands of society in order to avoid environmental administrative penalties and negative environmental media coverage.

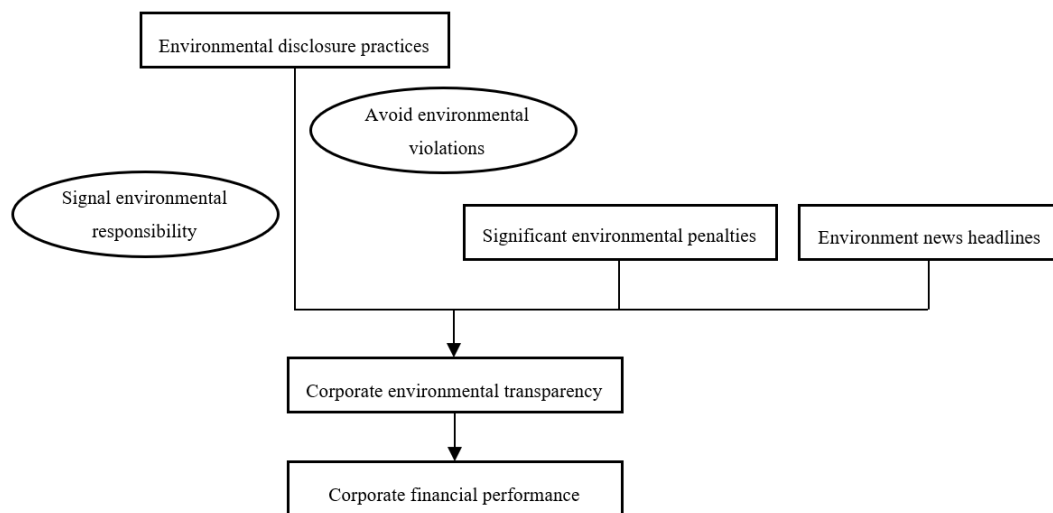
Secondly, information asymmetry and corporate impression management make it difficult to accurately measure the actual situation of the quality of a company's environmental disclosure. This research therefore developed the concept of

corporate environmental transparency based on previous research on the quality of corporate environmental disclosure. This concept not only considers environmental information disclosed by companies, but also incorporates information on environmental administrative penalties and environment news headlines. From the point of view of accuracy and objectivity, CET is more appropriately used to test the relationship with corporate financial performance.

7.3 Hypothesis Development and Samples

The above analysis provides a theoretical basis regarding the relationship between CET and financial performance. Figure 7.1 shows this relationship. When companies increase their environmental information disclosure, they release positive signals to the stakeholders that they are proactive in assuming environmental responsibility and avoiding environmental violations. As a result, a good corporate image and a better social reputation can help to finance the business and protect companies from environmental administrative penalties and thus increase financial performance. This process is regulated by the government via different environmental policies. Media also exert external pressure in a variety of ways to create a social climate in which environmental protection is strongly promoted. Through these two external supervision mechanisms, the value effect of corporate environmental disclosure can be more accurately reflected. To be specific, the value effect of corporate environmental disclosure is more significant when companies are subject to less environmental administrative penalties and have fewer negative environmental news headlines.

Figure 7.1 *CET and corporate financial performance*



KPEs listed companies in China are key polluters and they are under legitimacy pressure from both the government and the media. China has developed a series of environmental policies (CCRs, MBIs, and IBAs) in response to the severe environmental situation in an effort to improve environmental quality. Companies that do not comply with the relevant environmental policies may suffer financial losses or even be deprived of the qualifications that allow them to continue operating. In addition, in recent years it has been quite common for major environmental pollution incidents, such as excessive discharge of waste water or gas, crude oil pipeline leak, heavy metal contamination, etc., to be exposed by the media rather than to be actively disclosed by the listed companies. The concealment and false disclosure of environmental information by some companies has raised concerns about the quality of corporate environmental disclosure. Stakeholders rely on limited information when making decisions as a result of information asymmetry between managers and stakeholders; moreover, information asymmetry can lead to poor decisions due to biased evaluation. Therefore, the government and the media are playing an increasing role in monitoring corporate environmental issues and providing more information for stakeholders.

KPEs listed companies make environmental disclosures in order to gain the favour of their stakeholders. They expect to alleviate the dual legitimacy pressures through effective communication with external stakeholders. However, according to the results of environmental disclosure practices of listed companies in China in chapter 6, fewer than 50% of KPEs listed companies have fully disclosed the 12 mandatory environmental disclosure items. This result shows that companies are either not

fully compliant with current environmental policies when it comes to environmental responsibility, or that CET can negatively affect financial performance. These inferences remain inconclusive in current research. Greater CET can help build a good social image and attract more investment, but it also means dealing with more legitimacy pressure from the government and media. In addition, increased investment by listed companies in environmental protection for cleaner production may also increase operating costs and operational risks, which in turn may have a negative impact on corporate financial performance. Thus, H_a and H_b are proposed:

H_a : There is a positive association between CET and corporate financial performance in the short term.

H_b : There is a negative association between CET and corporate financial performance in the short term.

According to the CSRC's reporting standards and the Regulations on the Administration of the List of Key Pollutant-discharging Entities (KPEs), A-share companies on the KPEs list are required to disclose their environmental information on a mandatory basis. Therefore, all A-share companies on the KPEs list from 2017 to 2018 were included as a sample. Through the selection process described in detail in section 5.3.1.1 of chapter 5, 377 companies were identified in 2017 and 299 companies in 2018. Excluding companies that have been on the KPE list for only 1 year, a sample of 148 companies was finally obtained (Figure 5.3, chapter 5). Appendix A shows the key pollutants distribution of the sample companies. The sample consists of 148 companies which were observed over for a 2-year period with a total of 296 observations. The data came from the following sources: CET was assessed by quantifying three types of environmental information data and a weighting process as shown in chapter 6. Corporate information and financial data for the sample companies was obtained from the CSMAR database.

7.4 Research Model and Variables

By strictly following extant literature, the main regression model was established to test the impact of CET on the corporate financial performance as shown below:

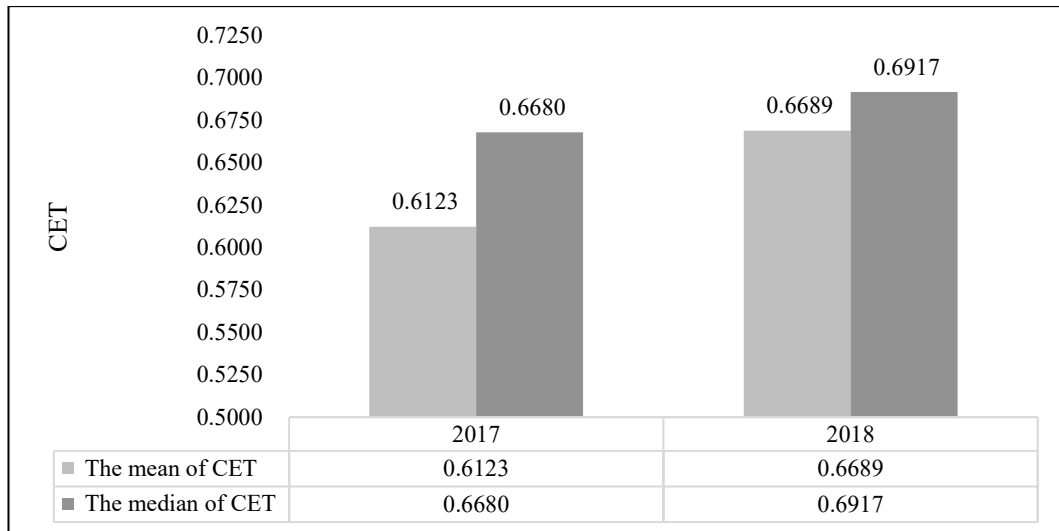
$$ROA_{i,t} = \beta_0 + \beta_1 CET_{i,t} + \beta_2 MV_{i,t} + \beta_3 MBR_{i,t} + \beta_4 MKRET_{i,t} + \varepsilon_{i,t}$$

where ROA represents the return on assets, CET represents the corporate environmental transparency, MV represents the market value—size of the company—MBR represents the market-to-book ratio, and MKRET represents the market return. β_0 is the intercept, β_1 – β_4 is the regression coefficient, and ε_i is the error term.

7.4.1 Independent variable

The independent variable is CET, which represents the level of environmental transparency of an A-share listed company. The contents of CET include corporate environmental disclosure practices, significant environmental administrative penalties, and environment news headlines. The method commonly used to quantify these text-based data sources is content analysis. This method codes the environmental information from relevant reports (corporate annual reports, government penalty reports, and media news reports) and then scores them according to self-developed or generally accepted standards (Clarkson et al., 2008; Wiseman, 1982). Content analysis is widely used in China to study issues related to environmental accounting (D. Li, C. Cao, et al., 2017). In addition, in order to develop a comprehensive and objective CET index, stakeholder survey was adopted to weight the three components of CET. After controlling the acceptable margin of error to 5%, 133 stakeholders' perceptions were collected at the Beijing National Accounting Institute. The detailed process of development of the CET index can be found in section 6.4 in chapter 6. Appendix J shows the CET index of 148 sample companies for the years 2017 and 2018.

Figure 7.2 *The mean and median of the CET index*



According to Figure 7.2, both the mean and median of CET increased between 2017 and 2018; however, the index distribution was not in the high scoring range. The descriptive statistics of three components of CET are shown in section 6.2, of chapter 6. In general, CET has improved over time. The average CET increased from 0.6123 in 2017 to 0.6689 in 2018. The mean and median of CET rose significantly (Figure 7.2), indicating that the orientation of environmental policies has had some positive effects.

7.4.2 Dependent variable

The dependent variable is corporate financial performance, which reflects the level of asset management and business operations of an A-share listed company. Common measures of financial performance include return on assets (ROA), return on equity (ROE), Tobin's Q, and others. Tobin's Q is the ratio of a company's market value to its assets' replacement cost. A higher Tobin's Q represents better financial performance. It can be a good indicator of a company's financial performance in a well-developed capital market. However, China's capital market is not yet well-developed. If a market-based indicator such as Tobin's Q is chosen to measure financial performance, it is subject to many uncontrollable factors, which may cause inaccurate empirical results. In contrast, accounting-based indicators, such as ROA and ROE, are audited and assured by accounting firms. Thus, they are more reliable than Tobin's Q in the context of China.

Additionally, the 148 sample companies are all on the KPEs list, which means that they are from heavily polluting industries and supervised by environmental authorities. Companies in heavily polluting industries usually have high-value assets. While the use of ROE seems to be more in line with the goal of maximising shareholders' wealth, the lower book value of net assets may lead to inaccurate empirical results. Besides, creditors' interests are not taken into account. Compared to Tobin's Q and ROE, ROA is also widely used (Clarkson et al., 2013; Hussain et al., 2018), and more importantly, it can more comprehensively reflect the profitability of both shareholders and creditors. Therefore, ROA is chosen to measure corporate financial performance and ROE is used as a substitute indicator for robustness testing.

7.4.3 Control variables

In addition to the dependent variable, control variables may also influence the outcomes when conducting empirical studies. Following D. Li, C. Cao, et al. (2017), Lee (2017), and Ho et al. (2021), this research selected market value (MV), market-to-book ratio (MBR) and market return (MKRET) as control variables.

First, stakeholder theory suggests that larger companies attach greater importance to environmental protection behaviour and are more willing to take on environmental responsibility (Liu & Anbumozhi, 2009) than smaller companies are. Large companies get more public attention than small companies do. Under pressure from the government and media, large companies try to avoid irresponsible environmental activities. Market value represents the size of a company. It is measured by multiplying the current stock price by all outstanding shares. In competitive product markets, the greater the market value of a company, the faster the business grows and the better the financial performance. This effect is assumed to be independent after controlling for other factors affecting corporate financial performance.

Second, the market-to-book ratio is a financial valuation metric used to evaluate a company's current market value to its book value. The book value is the amount that would be left if the company liquidated all of its assets and repaid all of its liabilities. This ratio is typically used by investors to show the market's perception

of a listed company's value. A low ratio (less than 1) could indicate that the market value of a company is undervalued (i.e., a bad investment), and a higher ratio (greater than 1) could mean the market value of a company is overvalued (i.e., it has performed well). Investor decisions based on this basis could have an impact on a company's business operations, creating financial opportunities or risks for the company. As a result, this ratio will have different impacts on corporate financial performance.

Third, as market indicators were selected as control variables, the impact of market returns on individual stocks should be controlled for. In the context of the Chinese stock market, the 1-year return of the CSI 300 Index is widely used as an appropriate proxy for market return. The CSI 300 is a capitalisation-weighted stock market index designed to replicate the performance of the top 300 stocks traded on the Shanghai Stock Exchange and the Shenzhen Stock Exchange. Over the years, it has been deemed the Chinese counterpart of the S&P 500 index and a better gauge of the Chinese stock market than the more traditional SSE Composite Index.

7.5 Hypothesis Testing

This research used a multiple regression model to test the proposed hypotheses. SAS was used to conduct statistical analysis on the 148 selected sample companies. This section comprises four parts, namely descriptive statistics, correlation test, regression results, and robustness test.

7.5.1 Descriptive statistics

As shown in Table 7.1, the independent variable ROA has a mean value of 0.0673, a minimum value of -0.4738, and a maximum value of 0.4134, indicating a wide variation in the financial performance of the sample companies. The mean value is less than the standard deviation and the coefficient of variation exceeds 1, which indicates a high degree of overall dispersion in ROA.

Table 7.1 *Descriptive statistics of variables*

Variable	Min	Max	Mean	Std.Dev.
ROA	-0.4738	0.4134	0.0673	0.09

Variable	Min	Max	Mean	Std.Dev.
CET	0.2205	0.8651	0.6406	0.10
MV	20.85	28.05	22.60	0.98
MBR	0.1022	1.2557	0.6080	0.23
MKRET	-0.2531	0.3607	0.1100	0.26

For the dependent variable CET, the maximum value is 0.8651, the minimum value is 0.2205, and the average value is 0.6406, indicating that CET is uneven and not optimistic. Among the control variables, the mean value of market value is 22.60 (in millions), which indicates that the size of KPEs listed companies is relatively large. The standard deviation is 0.98, which indicates that the distribution of company size of the sample companies is relatively concentrated and less discrete. It is worth noting that the average market-to-book ratio is 0.6080, suggesting that the KPEs listed companies are generally performing below market expectations, which also suggests that they are exposed to greater financial risks. Finally, market return varied considerably between the 2 years 2017 and 2018; the average return is a positive 0.11.

7.5.2 Correlation test

The Pearson correlation test can determine whether there is a correlation between variables. The results of the Pearson correlation test are shown in Table 7.2. It can be seen that the correlation coefficient between CET and ROA is significantly negative at the 1% level, which tentatively supports H_b . In addition, all control variables have a significant correlation with the dependent variable ROA, which indicates that they can influence the corporate financial performance. In general, the results suggest that there is no evidence supporting the existence of a multicollinearity problem for the independent variables, since the correlation coefficients of the independent variable and the control variable are less than 0.7 (Khanna et al., 2004; Sun & Davey, 2021).

Table 7.2 *Pearson correlation test*

Variables	ROA	CET	MV	MBR	IR
ROA	1	—	—	—	—

Variables	ROA	CET	MV	MBR	IR
CET	-0.056***	1	—	—	—
MV	0.260**	-0.048**	1	—	—
MBR	-0.232**	0.134*	-0.057***	1	—
MKRET	0.020***	-0.292*	0.107**	-0.177**	1

Notes: The superscripts ***, ** and * denote significance at 1%, 5%, and 10% respectively.

7.5.3 Regression results

To verify the impact of CET on the corporate financial performance of Chinese listed companies, a multiple regression analysis of the relevant variables was conducted according to the model designed for this research. The results in Table 7.3 show that CET has a significant negative influence on corporate financial performance ($\beta = -0.0503$, $p < .01$), which is consistent with the predication. Thus, H_b is supported.

Table 7.3 Regression results—ROA as the dependent variable

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-0.4314	0.1563	-0.84	0.4007
CET	1	-0.0503	0.0598	-2.76	0.0061
mv	1	0.0242	0.0067	-3.61	0.0004
mbr	1	-0.0641	0.0292	2.20	0.0288
mkret	1	-0.0003	0.047	-0.01	0.9943

Notes: N 296 Adj.R² 0.0568 F Value 5.29

The above table also shows that the regression coefficient between market value and financial performance ROA is significant at the 1% level. This result indicates that larger companies perform better in terms of financial performance ROA than smaller ones. The regression coefficient between market-to-book ratio and financial performance is -0.0641, which is significant at the 1% level. This result suggests that a higher market value needs to be backed up by a corresponding book value, otherwise the more a company's market value is overvalued, the greater the financial risk.

However, different conclusions may be drawn due to the different choices of proxy variables. Therefore, the complex mechanism of the impact of market value and market-to-book ratio on corporate financial performance remains to be further explored by researchers. This research focuses on the impact of CET on corporate financial performance, and so the possible reasons for the negative impact of CET on the financial performance of the sample companies are outlined next.

First, the cost to companies of undertaking and fulfilling environmental responsibility is too high (Hassel et al., 2005). As China's domestic environmental technology is still developing, many of the technologies and equipment they use need to be imported from abroad. In addition to the high cost of environmental technology and equipment, environmental management has always been a very labour-intensive and costly project. Therefore, A-share listed companies in these heavily polluting industries will increase their operating costs if they actively pursue environmental initiatives and improve their environmental transparency.

Second, the transformation between a company's environmental transparency and its economic benefits is slow (Yi Yang et al., 2020). The investment of time and money by listed companies in their employees, consumers, etc. is something that can make direct improvements in their productivity, and such conversions are highly efficient. However, the degree of marketisation in China is uneven. The return on investment in environmental protection is not the same as in other areas, and it is difficult to get an equivalent return on these human and financial resources in the short term.

Third, government investment remains inadequate. Based on data from 41 countries, Graafland (2019) found that small-scale government investments and poor reward and penalty mechanisms decrease corporate environmental responsibility. Although the Chinese government has introduced a number of environmental policies, such as its environmental protection tax and mandatory environmental disclosure, and the central government has been sending environmental protection inspectors to improve the ecological environment in various regions, there is still a lack of investment in providing incentives for companies to fulfil their environmental responsibilities. At present the government employs more rigid measures, such as legal or administrative means. There is also a lack of sound

mechanisms in terms of rewards and penalties. The low cost of violation is the key to environmental problems that have been difficult to solve in China. Companies that are active in environmental protection consume significant environmental costs but are not reasonably rewarded for doing so. This situation makes it difficult to cover their costs and can seriously discourage them from protecting the environment.

7.5.4 Robustness test

By adopting alternative operationalisations of the variables, the researcher then ran additional robustness tests. ROE is another widely used proxy to measure the corporate financial performance of a company, so a regression analysis is presented by using ROE instead of ROA. Table 7.4 shows that there is still a significant negative relationship between CET and ROE, indicating that the level of corporate environmental transparency has a negative impact on corporate financial performance. This result is basically consistent with the result of ROA, which suggests that the model and results are robust and reliable.

Table 7.4 *Robustness test—ROE as the dependent variable*

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.6834	0.8133	0.84	0.4014
CET	1	-0.6995	0.3098	-2.26	0.0247
mv	1	-0.0028	0.0348	-0.08	0.9371
mbr	1	-0.2476	0.1535	-1.61	0.1077
mkret	1	-0.0596	0.2452	-0.24	0.8081
Notes:	N 296	Adj.R ² 0.0177	F Value 2.27		

7.6 Discussion

The hypothesis testing results show that there is a negative association between CET and corporate financial performance. This finding makes up for the deficiency in existing research on corporate environmental disclosure and broadens the research field of environmental accounting. The empirical findings in this research suggest that companies with a high level of CET have worse corporate financial performance and that CET does not send a positive signal to the market. This

finding is consistent with existing research on corporate environmental disclosure, which has found a significant negative relationship between corporate environmental disclosure and financial performance (Bird et al., 2007; Filbeck & Gorman, 2004; Hassel et al., 2005; Lioui & Sharma, 2012).

From the practical point of view, first of all due to the problems of a strong disclosure autonomy and the possibility of false disclosure, mandatory disclosure of environmental information is necessary. However, environmental disclosure items need to be clarified (Ahmad & Mohamad, 2014). There is a lack of internal motivation for companies to improve the quality of their environmental disclosures, as environmental transparency can have a negative impact on their financial performance. Due to the absence of guidelines, there is a lack of clear formats for environmental disclosure items. Though environmental information disclosure has been made mandatory for KPEs listed companies, they have more autonomy in their choice of content when making disclosures. As a result, the quality of environmental information disclosed by KPEs listed companies is low and the transparency is poor. Mandatory disclosure of environmental information is necessary, but the specific content of disclosure items should be refined to improve the disclosure quality.

Second, government and media supervision mechanisms are important parts of corporate environmental disclosure policies. Due to the high cost and insignificant short-term economic benefits of assuming environmental responsibility, corporate environmental disclosure is often used as a tool for companies to promote their environmental legitimacy (Cho & Patten, 2007). The results in chapter 6 suggest that the environmental disclosure practice of KPEs listed companies is not good enough to reflect their environmental transparency. The results in this chapter show that when external monitoring mechanisms, such as the government and the media, expose a company's environmental behaviour to stakeholders, this exposure has a negative impact on the company's financial performance. Lioui and Sharma (2012) attributed the negative association between corporate environmental information and financial performance to investors' perception of environmental measures as potential costs or fines. In the absence of effective external monitoring mechanisms, environmental legitimacy pressures hardly lead to substantial behavioural change

by companies beyond environmental disclosure. By introducing government and media data this research shows that CET can exert a constant legitimacy pressure on companies by affecting their financial performance.

Third, the synergy between environmental authorities and the CSRC is key to the effective implementation of the policy of mandatory disclosure of environmental information. Environmental information is a type of corporate information. Neither environmental authorities nor the CSRC alone can regulate corporate environmental disclosure. The CSRC should continue to deepen its cooperation with environmental authorities and actively improve the mandatory environmental disclosure system for A-share listed companies.

Last, audit assurance can play a greater role in corporate environmental disclosure. The growing prominence of environmental issues has raised concerns among external users of corporate information about corporate environmental practices and their environmental information disclosure. In order to gain the trust of external investors, companies need to provide more accurate environmental information. Furthermore, as the relationship between environmental transparency and financial performance is negative, there is a risk that companies may conceal, exaggerate, or misrepresent environmental information to reduce their environmental transparency in the absence of external assurance. If a company's environmental disclosures are subject to audit assurance, companies will have to discipline and improve their environmental disclosure practices in order to obtain a good audit result. At the same time, stakeholders of the company have easier access to accurate environmental information.

7.7 Chapter Summary

This chapter tests the hypotheses related to the impact of CET on corporate financial performance and further explores the practical implications of the relationship between the two. The testing tool is multiple regression. Based on the sample selection in section 5.3.1.1, chapter 5, the final test sample consists of a total of 296 observations from 148 A-share listed companies between 2017 and 2018. CET data is based on the CET index of the sample companies in chapter 6, while corporate financial data and market data are downloaded from the CSMAR database.

The results show that there is a negative relationship between CET and corporate financial performance. In the short term, greater environmental transparency means higher environmental resource allocation, which affects resource inputs in the production process and consequently has a negative impact on profits (Zhao & Murrell, 2016). However, the impact of CET on corporate financial performance is not unchanging and it requires continuous investment over a longer period to achieve sustainable development (Lu et al., 2018).

The results of this chapter offer several practical implications. First, mandatory disclosure of environmental information and external monitoring mechanisms are necessary. Policy-makers should introduce environmental disclosure guidelines to specify the content and format of disclosure items. While legal or administrative measures should be adopted to strengthen rigid supervision, companies that actively fulfil environmental responsibilities should be rewarded, and penalties for environmental violations should be increased (D. Li, Y. Zhao, et al., 2017). In addition, to gain a better policy effect from mandatory environmental disclosure, it is necessary to improve the synergy between the environmental authorities and the CSRC; environmental audits should also be conducted through qualified auditors to ensure the authenticity and comparability of information.

In the next chapter, stakeholders' perceptions of factors affecting (improving and reducing) CET in Chinese listed companies are analysed to gain in-depth insights that could not be explained by the quantitative results in chapters 6 and chapter 7.

Chapter 8

Stakeholder Interview

8.1 Introduction

Based on the fourth research objective of this thesis, and more specifically to gain in-depth insights into stakeholders' perceptions of the driving forces behind CET in the Chinese context, semistructured interviews were carried out with 12 interviewees from six different industries. The questions related to the semistructured interviews can be found in Appendix H. The interviews were prepared and conducted according to the instructions described in chapter 5, section 5.4. This chapter presents both the results and the related interpretations of the interview findings. Overall, through reference to prior studies, this chapter critically explores the drivers of CET from the stakeholder perspective in the Chinese context. The chapter is structured as follows.

Section 8.2 first introduces several themes that emerged from the semistructured interviews. In conjunction with these interview themes, the section then explores and analyses interviewees' perceptions of the drivers of CET in turn. The section also critically explores interviewees' perceptions of influencing factors from both the internal and external environment, such as impression management and stakeholder pressure. In addition, interviewees' perceptions of the needs and motivations for CET-related practices (e.g., environmental disclosures in annual reports) are also thoroughly examined. Section 8.3 presents a summary of the key findings of the chapter.

8.2 Thematic Analysis and Discussion

Using theme analysis, the researcher confirmed several themes that are considered to have potential implications for CET in the Chinese context. The following subsections indicate that some of these themes relate to internal or external drivers of the organisation, whereas others relate to the attitudes and roles of key players, such as board directors, whose attitudes may have influences on CET-related practices in the decision-making process. These themes are listed below.

- Accountability
- Impression management
- Board of directors
- Regulation
- Stakeholder pressure
- CET promotion
- Financial performance

8.2.1 Accountability

Gray et al. (1996) defined accountability as the obligation to account for the actions for which an entity is held responsible. In this era of shared responses to environmental crises, companies must respond to social expectations that they fully discharge their environmental accountability (Deegan et al., 2002). According to the concept of environmental accountability, companies should be held accountable for the environmental impacts of their operations (Holland & Foo, 2003). From an accountability perspective, the main goal of corporate environmental transparency is to hold entities accountable for their environmental responsibilities (Gray, 2005).

On the one hand, the interview data collected for this research showed that the representatives of the Chinese listed companies interviewed (such as Organisation C, Organisation D, Organisation I, and Organisation J) realised and acknowledged their accountability not only to society, but also to the natural environment. The following statements from Organisation C, Organisation I, and Organisation J are typical in this regard.

Our company realises one of our responsibilities is to be environmentally accountable to society. Therefore, environmental disclosure is one of the measures of environmental transparency that the company adopts to show our responsibility for the environment. (Organisation C)

The reason our company discloses environmental information in the annual report is that we suppose it's the obligation of listed company to disclose to the public the environmental results of their operation. We believe that this obligation originates from the listed company, especially the social and environmental responsibilities undertaken by the Chinese state-owned listed companies. (Organisation I)

...within the company's operation, there are relationships among the company and country, the company itself, employees, investors, shareholders. You must deal with these relationships in a proper manner... the economic profit cannot always be the only and the most valuable objective of every company's operation. (Organisation J)

On the other hand, most interviewees believed that accountability is the key driver for Chinese listed companies' CET-related practices. For instance, the interviewees from Organisation A, Organisation G, and Organisation H clearly stated that most listed companies have acknowledged their accountability to the public in relation to concerns about their environmental results due to the company's operation, showing that they are committed not only to environmental protection actions, but also to public disclosure of environmental information. Regarding the relationship between corporate accountability and corporate environmental disclosure, it was argued (Organisation K, accounting professor) that accountability is the most important and perhaps the only influencing factor related to corporate environmental disclosure behaviour.

The original intention of disclosing environmental information by the listed company is entirely because they should be held accountable for environmental protection and the disclosure of related

information. The purpose of environmental information disclosure should not be to gain increasing investment by existing investors or to attract the attention of more investors. This should be one part of their work.... (Organisation K)

The statements made by the interviewee representatives of listed company showed that environmental disclosure is perceived as a way to discharge accountability to the public. Accountability is thus an influential factor related to CET in China.

The finding of this research is consistent with Solomon and Lewis (2002); their empirical findings suggested that accountability is regarded by companies as the primary motivating factor for corporate environmental disclosure Holland and Foo (2003) also found that companies' nonfinancial disclosures are related to their sense of accountability. In order to increase accountability, companies are expected to report not only on their financial status and performance, but also on their social and environmental status.

However, although the interviewees clearly stated that Chinese listed companies should be aware of environmental accountability, they pointed out the status quo in Chinese listed companies regarding awareness of their environmental responsibilities is currently low. For example, interviewees from Organisation G, Organisation H, and Organisation K all indicated a lack of subjective awareness of environmental concerns in Chinese society. The representative from Organisation G commented that:

Environmental accountability has not become a hot topic of discussion in society. The public and society are not keen for this concept. There is a lack of effective promotion by CSRC, SSE, and SZSE ... the key reason is the lack of attention to the environment. Not only entrepreneurs', but also the public's, awareness is too weak in China currently when it comes to environmental protection. (Organisation G)

As pointed out by the interviewee from Organisation G, this kind of weak awareness has limited the power to influence corporate environmental accountability in terms of the environmental transparency of listed companies. The interviewee further

explained that whereas corporate behaviours which indicate environmental accountability have no obvious positive impact on companies, it seems that a company suffers only limited negative impact on its operation if it is not accountable for the environmental consequences of its actions. The weak relationship between environmental accountability and financial benefit to a company may to some extent contribute to the company's decision not to include environmental information in its annual report. The representative from Organisation D (vice-president of finance) provided the following opinion:

In terms of environmental operation, our management team takes it very seriously and always holds specific meetings to develop and summarise the company's environmental operation strategy. A lot of resources have been invested in this work. But we believe this kind of information is our internal operational information and there is no need to disclose the information to investors or society through the annual report. (Organisation D)

Additionally, although the representatives from listed companies acknowledged their awareness of environmental accountability, they also emphasised that their priority is financial accountability to the company itself and to society. For example, the representatives from Organisation C and Organisation D said its financial accountability should be the primary task of the company.

For a listed company, it is very crucial to create more value. This value creation should be consistent with the demand of society. I have told my employees that this social demand is the source of the company's responsibility; it includes not only profits, but also responsibilities for society, employee, industry, and the environment. At the current stage, the primary task of a listed company is the responsibility to create economic value. (Organisation C)

If a listed company has huge loss in a certain fiscal year, the company will struggle to care about the environmental impact due to its operation. As a result, the company does not pay much attention to environmental accountability. If a person is suffering from hunger, it

is difficult to believe that he can fund or help others. It is the same for company operations; a company should focus primarily on its financial performance, otherwise it is unlikely to be able to care about the social and natural environment. (Organisation D)

Financial accountability should be the priority of a listed company. On the premise of playing by the regulations and laws, profit is the most important contribution of a company to the society. (Organisation D)

The low priority given to environmental accountability by the representatives of listed companies means that their companies may be too slow to respond to changes in social concerns about environmental accountability and may lag behind social expectations. In China, accountability seems to be a driving force behind CET. However, its role is reactive rather than proactive (Parker, 2005). Parker (2005) asserted that accountability is based on the principle of the right to information and that this right is essentially driven by law or quasi-law. The interviewee from Organisation K made the same point in this regard.

In essence, environmental accountability is different from CSR. Environmental accountability depends on government supervision, while CSR is beyond government supervision and focuses on practices which are not clearly expressed in laws and regulations...as a result, environmental accountability relies more on supervision. (Organisation K)

The interviewee from Organisation E clearly stated that the awareness of environmental accountability depends not only on the voluntary basis, but also on the regulatory requirement. This point of view is consistent with that of the interviewee from Organisation K. They both believed that, while moral constraint alone is insufficiently effective, when it is complemented with regulatory requirements, listed companies are more likely to be environmentally accountable and to invest more resources to CET-related practices. For example, the interviewee from Organisation E suggested:

I think the most effective way to make Chinese listed companies more transparent about their environmental performance depends on the regulator. Regulators must clarify what consequences listed companies may face for not being environmentally transparent. For example, while CSRC now specifies what kind of environmental information listed companies must disclose, it does not specify what penalties should be imposed on those companies that do not comply with the requirements. The power of purely moral restraints is quite limited. (Organisation E)

Organisation A's interviewee made a similar point when saying that the government should guide listed companies to increase their awareness of environmental accountability. Doing so would require some regulatory instruments, such as the current mandatory requirements of environmental disclosure in annual reports and some economic instruments, such as credit ratings of corporate environmental accountability. These opinions are reflected in the following quote.

Government should take responsibility for guiding the environmental accountability of companies. Of course, it is better to start with a compulsory way...there would be other guidance work as companies' awareness is increased...if a company does a good job in environmental protection, a higher credit rating maybe will be given to the company by government or rating agencies.... (Organisation A)

Therefore, it can be concluded that corporate accountability, on the grounds of the principle of the right to information, could be determined by "the provisions and standards of legislative and regulatory bodies"(Parker, 2005). The interviewees all agreed on this point.

A few insights can be drawn from the interview evidence which connects accountability to CET. The interviewees emphasised that the awareness of environmental accountability does have an impact on the CET-related practices of listed companies. They mentioned that accountability is a kind of positively influential power as regards the environmental transparency of Chinese listed companies, despite the fact that there is still a long way to go for these companies

to generally accept overall environmental accountability. Therefore, accountability still has limited impact on CET. These findings are consistent with Gray et al. (1996) who suggested that accountability is an important normative justification for corporate environmental disclosure in the literature. Thus, the accountability approach seems to be a persuasive perspective with explanatory power.

However, this conclusion should be considered with caution. Parker (2005) believed that the accountability approach is reactive, implying that companies lag behind social expectations. Perhaps more importantly, there are asymmetric forces between listed companies and society that may lead to the distortion of environmental information that is disclosed. The findings in chapter 6 indicate that only half of Chinese listed companies disclose environmental information in full compliance with the mandatory requirements of the CSRC in their annual report. Some scholars noted that “overall and frank accountability is not in an organisation’s obvious self-interests”(Gray, 2005). This observation supports the assertion that accountability is a normative perspective with limited explanatory power for understanding CET.

In addition, this finding supports Bebbington et al. (2008) suggestion that it is not always the case that environmental disclosure enhances corporate accountability. Although some Chinese listed companies adopt environmental disclosure to discharge their environmental accountability to society, careful understanding of the actual motivations behind the CET-related practices is needed.

8.2.2 Impression management

Impression management is seen as an attempt by companies to “shape the impression of the relevant public by means of environmental disclosures, which might make the company appear to be transparent, but it [which] says nothing about the ‘truthfulness’ or ‘falsity’ of these disclosures”(Neu et al., 1998). Furthermore, García Osma and Guillamón-Saorín (2011) explained that “corporate disclosure could be used to be a timely vehicle to communicate corporate performance to third parties, but they can also be manipulated to distort users’ perceptions of corporate achievements”. The analysis of the interview data suggests that Chinese listed companies might use environmental disclosure to manage not only the perceptions

of their customers, but also the impression of their relevant public about the environmental impacts of their operations. According to the interviewee from Organisation J, the opportunity to convey a positive image to the public is the primary consideration for the company when deciding on environmental disclosures. If information about a company's pollution issues is circulated in the market, or punished by the government, or exposed by the media, and the company itself fails to make the relevant disclosure, the transparency of the company would be questioned, and public's perception of the company's image would also be damaged.

Our board of directors cares a lot about the public's perceptions of the company's image. If the company is penalised by the government or exposed by the media for concealing environmental information, especially about pollution emissions, then the company's image may be damaged. (Organisation J)

Similar indications of this view can be seen in the interviews with interviewees from Organisation C, Organisation D, and Organisation I.

We disclose environmental information to promote brand recognition. When our customers buy a product, they will bring some emotional considerations. We can win customers' goodwill by demonstrating a high level of environmental transparency. (Organisation C)

This will promote our company's image. (Organisation D)

Based on the 'Three-Importance and One-Large' system²⁸, decisions on environmental disclosures are made collectively by the senior leadership. The main consideration in the decision-making is the image of the company and social benefits. (Organisation I)

The interviewees from Organisation A and Organisation H both believed that environmental disclosure plays a key role in building their companies' positive

²⁸ A decision-making system commonly practised by most state-owned companies in China; it is based on the principle that important issues, important individual appointments, important project arrangement, and the use of large funds must be decided through collective discussions.

image through communicating their environmental performance in an open and transparent manner to the relevant public, indicating that their companies are environmentally responsible in all operations. The interviewee from Organisation F attributed the decisions of listed companies regarding environmental disclosure in part to the goal of meeting the public's expectations of their environmental performance.

Some interviewees, for instance the interviewees from Organisation E and Organisation L, did not clearly confirm the direct link between environmental disclosure practices and impression management. However, all of them believed that the public relations department of listed companies should be responsible for the truthfulness of environmental disclosures. This kind of organisation structure and task assignment implies that impression management has an impact on environmental disclosures of listed companies to a certain extent. The following quote from Organisation G's interviewee also indicates that a company seeking to build a positive image in the eyes of the public is more likely to invest resources in its CET-related practices.

As a consulting agency, we especially focus on ESG information disclosed by listed companies every year and recommend our clients to increase disclosures of ESG information...in terms of corporate governance, it has a close relation with reputation. Some corporate governance rankings take serious consideration of ESG information disclosed by listed companies. (Organisation G)

The above evidence is consistent with Neu et al. (1998) study, which pointed out that companies may use environmental disclosure to manage public impression by means of emphasising selected specific and positive environmental information in the organisation, while at the same time restructuring or neglecting negative environmental information. Criado-Jiménez et al. (2008) found that in the Spanish context companies adopt different strategies to manage the impression of stakeholders and that these strategies reduce the transparency of the company to a certain extent.

An important finding in chapter 6 is that 1 year after the implementation of mandatory environmental disclosure, Chinese listed companies had increased their noncritical and descriptive environmental disclosures while also maintaining or reducing their critical environmental disclosures. Combined with the interview evidence, the underlying rationale for this change in the behaviour of Chinese listed companies is that they are seeking for some form of window dressing or ritualism (Criado-Jiménez et al., 2008). One possible reason why Chinese listed companies avoid reporting pollutant discharge information and ‘bad’ news is that such data is difficult to collect and will make the company vulnerable to external criticism (Criado-Jiménez et al., 2008; Neu et al., 1998) than it otherwise would be.

Previous studies have shown that companies adopt environmental disclosure for the purpose of transparency, rather than to manipulate public impression (Arena et al., 2015). A banking representative firmly denied that their environmental disclosures are closely related to the motivation of positive image management.

The purpose of our environmental disclosures is not to obtain the public's trust or to let them know how well we're doing in this area, but simply because it is a part of our work. We should do this, and we have done it already. There is no particular purpose. (Organisation B)

However, as revealed in chapter 6, quite a few Chinese listed companies on the KPEs list fail to provide stakeholders with enough information to assess their environmental performance. In addition, in their annual reports most Chinese listed companies conceal the fact that they are subject to significant government environmental administrative penalties. Thus, in the current Chinese context, impression management seems to be a useful perspective which implies that Chinese listed companies are more likely to manage public perceptions through communication rather than by changing their outputs, goals, and operating modes to more environmentally friendly approaches.

Chinese listed companies apparently deliberately disclose positive environmental information in a selective manner, even restructuring or ignoring negative environmental information. As a result, the link between environmental disclosure and environmental performance is always ambiguous and partial (Neu et al., 1998).

This conclusion implies that impression management is an important influencing factor for CET in the Chinese context.

8.2.3 Board of directors

The interviewee from Organisation D pointed out that the board of directors has no influence on the organisation's environmental transparency. This interviewee mentioned that the extent and nature of environmental information are entirely determined by management and that annual reports are also drafted by management. The main purpose of environmental disclosures in the annual report is to coordinate the company's relationship with regulatory bodies (such as local and central government). Environmental information is clearly not the main concern of the organisation's stakeholder groups.

Environmental disclosures in annual reports are organised by management. They are drafted under the guidance and supervision of the senior management team. The environmental information is repeatedly inspected and reviewed by management. They only coordinate the relationship between our company and government bodies. All of the relationship should be considered in decision-making about environmental disclosures. (Organisation D)

The representative from Organisation J indicated that the organisation's board of directors pays close attention to environmental performance. However, this company seems to have its own internal policy. Under this policy, its board of directors regularly receives detailed information of the company's environmental operations. However, this kind of internal policy might result in the board of directors' being less active in promoting the CET-related practices. The following quote offers some insights in this regard.

In terms of environmental operations, during the annual meeting of the board of directors, the management spend a lot of time reporting the environmental performance of last year and the working plan for next year in this regard. We believe it is not necessary to publicly disclose some negative information in detail.... (Organisation J)

Interviewees from Organisation B, Organisation F, Organisation K, and Organisation L provided consistent opinions on the influence of the board of directors on CET. They all agreed that the board of directors is an influential but not very active factor when it comes to CET. The following statement comes from the representative of Organisation B.

So far, in terms of our company, the board of directors has not pushed hard for environmental information transparency. For companies in heavily polluting industries, they face more regulatory pressure to meet their goals of limiting pollutant emissions due to strict regulation by environmental authorities. For us however as a banking company, we do not face specific pressure from environmental authorities or the CSRC regarding environmental performance and environmental disclosure. Therefore, the board is more concerned with financial information transparency, which is closely related to the value creation of the company in the annual report...as a result, the board pays limited attention to environmental disclosure. There is not enough motivation and effort by the board when it comes to CET. We have to tell the truth.... (Organisation B)

Thus, it appears that the board of directors of Organisation B pays only limited attention to the company's environmental disclosures in relation to meeting the SSE's disclosure recommendations for nonheavily polluting industries. No additional efforts were made to improve the level of the company's CET. The interviewee from Organisation C said that the board would likely be happy to see a high level of CET; however, this interviewee also acknowledged that the board would not exert pressure on management to achieve this goal.

The board has raised recommendations on environmental transparency. The purpose is to balance financial performance and social benefit...the board will only make recommendations rather than implement supervisions or exert additional pressures on the management team. (Organisation C)

Only the interviewee from Organisation I indicated that this company's board is very proactive towards CET. The proactivity of the board can be attributed to the supervision of environmental authorities and the gradual pressure from the public.

The attitude of the board towards CET is always proactive and positive. CET relates to the climate changing crisis which is a concern for a lot of society...our company will manage to do a better job in this field. (Organisation I)

Interviewees from Organisation G, Organisation I, and Organisation K suggested that the presence of an environmental committee has a positive impact on CET for listed companies. For example, the interviewee from Organisation I explained that that organisation has an environmental committee on the board that oversees CET-related practices, including environmental operations and environmental disclosures. This interviewee insisted that the existence of an environmental committee on the board demonstrates the importance that the board places on the company's environmental responsibility to society; moreover, it greatly enhances CET.

We have a special committee on our board of directors. Normally, we only have special committees at the senior management level, and they focus on a certain area of the company's operations, such as risk management, international trade, which are very important businesses for the company. Now, we have a special committee on the board of directors. The name of this committee is the Environmental Management Committee. The existence of this committee indicates the company's preference in that area. (Organisation I)

This finding is consistent with Khan et al. (2013). Their empirical evidence indicated that the presence of a CSR committee enhances the extent of the company's CSR disclosure. McKendall et al. (1999) argued that the presence of an environmental committee on the board will act as an additional control mechanism in corporate governance and ensure that the board of directors is more accountable to stakeholders and to the protection of the public interest.

However, it is important to note that not all environmental committees are internal bodies of the board of directors. Organisation I's environmental committee is based on its board of directors and consists of directors, while Organisation C and Organisation J's environmental committees are at senior management level and consist of executives. In fact, the environmental committee at senior management level could make a more direct contribution to designing and developing the company's CET strategy than could a board level committee. Nevertheless, the existence of an environmental committee indicates that the board of directors or senior management places great importance on the environmental consequences of the company's operations, which can drive its CET.

The following perspectives can be summarised from the above interview evidence:

- It is still debatable whether and to what extent the board of director impacts the CET decisions of Chinese listed companies. Perhaps this uncertainty is caused by the characteristics of different boards, for example, the preference of the board members, board composition, ownership, and specific committees.
- The boards of directors of Chinese listed companies seem to link their companies to the external environment (Pfeffer, 1972) to ensure that their management takes stakeholders' interests into account (Michelon & Parbonetti, 2012). The result of the interviews shows that although CET related practices are not a priority for most companies, their boards are aware of the growing public demand for information about the environmental consequences of companies' operations.
- The board of directors seems to play an administrative role (Pfeffer & Salancik, 1978), overseeing senior management to ensure the environmental disclosures requirements of the CSRC are fulfilled.
- More empirical evidence is needed to identify whether and to what extent the specific characteristics of different boards impact CET decisions.

8.2.4 Regulation

Evidence from interviews on the theme of accountability suggests that government supervision is critical to environmental accountability. Regarding the impact of

environmental regulation on CET, interviewees' perceptions of regulatory intention appear to have an impact on the environmental disclosure behaviour. Some interviewees indicated that one of the important reasons for publishing environmental information in their annual reports is their perception of mandatory requirements. Interviewees from Organisation C, Organisation D, Organisation I, and Organisation J all admitted that the CSRC's mandatory requirements for environmental disclosure have influenced their companies' decisions to some extent. For example, the representative from Organisation C commented:

Our company is mandatorily required to disclose environmental information by the CSRC. Our company believes there is some compliance pressure to disclose this kind of information to the public. Therefore, our company discloses environmental information in its annual report. (Organisation C)

However, while interviewees generally acknowledged the mandatory requirement to disclose environmental information, they also claimed that they have the discretion to determine the extent and nature of environmental information. For example, the interviewee from Organisation D indicated that the SSE has issued a template for annual reports as a reference format; this template has a fixed subsection covering 12 environmental items. Companies can determine the level of detail to disclose for each item based on their own understanding. The interviewee from Organisation D (vice president of finance) further pointed out that:

We have disclosed 12 environmental items according to the SSE's annual report template. For items not included in the template, it is up to our company to decide whether to disclose them. To be honest, there is no clear guidance on the extent to which these 12 items should be disclosed. Our company prefers to disclose the information specifically required by the CSRC. As for other information related to environmental protection, we may choose to disclose it if we are satisfied with our work. Most often, we do not disclose information in this area. (Organisation D)

Interviewees from accounting firms, i.e., Organisation G and Organisation H, also confirmed the views of the representative of Organisation D. The interviewee from Organisation G indicated that listed companies prefer to publish information that is explicitly required by the CSRC and the SSE, but avoid reporting any additional information beyond that required by the regulatory requirements.

In terms of annual reports, our clients strictly follow the SSE's guidance...they do not report additional environmental information in their annual reports. When they consider disclosing detailed environmental information, it would be useful to have some incentive arrangements, for example, some rewards from the regulator for listed companies. (Organisation G)

The interviewee from Organisation H indicated that the typical logic behind the decision not to disclose nonmandatory environmental information is to avoid any risks associated with additional disclosures.

In our view, listed companies disclose environmental information only because they are required to do so. Without a mandatory requirement, only a few companies voluntarily report this type of information. For example, you can have a good performance in a certain area of environmental accountability. However, if your performance in the annual report is a little different from the actual situation, or even if there is an inaccurate figure; this will constitute a potential risk for the listed company...if there is an inaccurate figure, the company will have to apologise and make corrections. So, it will have a negative impact on its financial performance. (Organisation H)

In summary, interviewees confirmed that the mandatory requirements of environmental disclosure in China have not been strictly followed by listed companies so far. Interviewees believed that the lax regulation is an important factor influencing Chinese listed companies' decisions to disclose environmental information and consequently that this factor influences their CET. The main reasons why companies have started disclosing environmental information are government regulation and encouragement. Thus, this research provides additional

evidence for Zhang and Wang (2011) assertion that government policies actively encourage Chinese listed companies to disclose their environmental information and also Weber (2014) assertion that the stock exchange, as a stakeholder with sanctioning powers, may be a strong influencer of environmental transparency of Chinese listed companies. The evidence also appears to be consistent with da Silva Monteiro and Guzmán (2005) and (da Silva Monteiro & Guzmán, 2010) findings that government regulation encourages more companies to disclose environmental information.

However, in the view of some interviewees, when it comes to the extent and nature of environmental disclosures, the regulatory influence seems to be dramatically reduced. For one thing, the lack of punishments for violating the mandatory requirements of environmental disclosure was mentioned by interviewees as a reason why the managements of Chinese listed companies prefer to selectively disclose noncritical and descriptive environmental information in their annual reports.

For another thing, even the current mandatory requirements of environmental disclosure in China are perceived by interviewees as lacking in both specificity and explicit guidance regarding the extent and nature of the environmental information to be disclosed. For example, interviewees revealed a preference for disclosing environmental information in a descriptive manner. Choosing this option could be much more helpful to companies' wishing to transmit a positive and environmentally friendly image to their stakeholders than providing quantitative information; it should also be helpful in avoiding the potential risks which might arise from critical environmental disclosure. While interviewees agreed that reporting 'bad' news can enhance a company's credibility, they were more worried about the concerns described by Adams (2002), who noted in his study that some people concern about the public reaction to disclose detailed issues, such as penalty or punishment. This kind of fear of the unknown reactions seems to explain why bad news is seldomly in the reports of these companies.

8.2.5 Stakeholder pressure

The CSRC, SSE, SZSE, and environmental authorities in central and local government were each perceived by interviewees as influential stakeholder groups which can affect the environmental transparency of Chinese listed companies. There also exist other stakeholder groups which were perceived by interviewees as influential on CET; these include the following groups.

8.2.5.1 Investors

Interviewees from Organisation A, Organisation C, Organisation G, and Organisation J agreed that investors' informational preferences influence companies' operations. The interviewee from Organisation A was representative in stating that listed companies' decisions regarding CET-related practices are directly and primarily related to the needs of investors.

What do investors need, particularly for companies in environmentally sensitive industries? If you have neither environmental protection measures nor an environmental disclosure strategy, you may confront serious business risks in the future.
(Organisation A)

However, the representative of Organisation B explained that their organisation did not realise that there is a strong demand from investors for transparency in their environmental operations.

We will not say that the purpose of disclosing the environmental information is to make investors trust us more. We will never say that. We do not disclose the information for investors. (Organisation B)

Moreover, most interviewees in this research did not mention investors as an influential factor in relation to CET. In fact, the contrasting opinions generated from the interviews regarding investors' preference or indifference to CET are consistent with the opinions of government representatives. When interviewing representatives of government agencies, one interviewee (director of finance bureau) stated that the financial market in China is placing increasing emphasis on environmental protection and accountability in the operations of listed companies,

suggesting that investors are increasingly concerned about corporate environmental performance. He also said that the financial market in China is not mature enough to react correctly and quickly based on information disclosed by listed companies, although it should be acknowledged that the slow reaction of the financial market may be due to the failure of listed companies to provide sufficient information for investors to assess the environmental performance of listed companies.

In the macro environment, financial markets are being more and more concerned about environmental operations and information. This is a global trend...financial markets will be more friendly to listed companies that do well in CET...it is important to note, however, that not all financial market participants will pay particular attention to the environmental disclosure of listed companies. (Organisation E)

Cormier and Magnan (2003) argued that a company, wherever it comes from, will determine its environmental transparency strategy through accessing its financial status and investors' requirements. The interviews in this research provide additional evidence for this assertion and suggest that, at least for some listed companies, investors' requirements for environmental information motivate them to increase transparency in order to tackle information asymmetry between management and investors (Juhmani, 2013). Insights from interviews with government representatives also provide consistent results, implying that investors encourage listed companies to disclose environmental information to deal with information asymmetries and reduce agency costs (Berthelot et al., 2003).

However, it should be noted that some interviewees believed that investors are indifferent to environmental information. One possible reason for this indifference is the difference in listed companies in terms of investor groups. For example, different investor groups, such as foreign and domestic investors, may have different levels of concern about the environmental transparency of listed companies. Wegener et al. (2013) found that in the Canadian context, domestic and foreign investors have different levels of concern about the decision of listed companies to disclose environmental information.

8.2.5.2 The public

Interviewees from Organisation C and Organisation I stated that public concern may be an influential factor in relation to their CET-related practices. Only these two interviewees in the sample explicitly stated that public pressure has an impact on the extent and nature of their companies' environmental disclosures. However, the finding that Chinese listed companies manage impression for their relevant public by selectively disclosing positive environmental information ('good news') implies that the increasing public concern about environmental performance is driving Chinese listed companies to be more aggressive in their environmental disclosures.

The interview data provided insights into the impact of impression management factors on CET in China and support Zeng et al. (2012) finding that the variables of organisational image and reputation have a significant impact on both the behaviour and content of environmental disclosures. This finding is consistent with Cormier and Gordon (2001) and O'Donovan (2002) that companies must manage their legitimacy gaps through environmental practices that are transparent to the relevant public in this era of a growing environmental awareness in China, where the public is increasingly concerned about environmental pollution and protection.

8.2.5.3 Third parties

Most interviewees perceived third parties as an influencing factor in relation to CET. However, as a partner in the audit department of an accounting firm, the interviewee from Organisation H explicitly mentioned that auditors do not pay attention to the environmental information disclosed by companies because they focus only on the financial information in annual reports.

We do not currently conduct any assurance engagements on the environmental information of listed companies. This is not because we do not have the capability to do so, but because of the lack of a universal assurance criteria. (Organisation H)

The representative of Organisation C noted that bringing in a third party to verify a company's environmental information ensures that the information disclosed is

more objective, accurate, and credible. Organisation C hired an environmental consulting firm to verify the environmental information in its annual reports. Organisation C's interviewee said that the organisation did not use an accounting firm because they believe that verification from a professional organisation, such as an environmental consulting firm, would be perceived by the public as more objective than verification from an accounting firm.

Our company's environmental information is verified by a third party, an environmental consulting firm...a local company...with more objectivity, accuracy, and credibility...without third party certification, it's like you are talking about yourself, which would be meaningless.... (Organisation C)

Interviewees' perceptions of the relationship between third parties and CET are consistent with the empirical evidence provided by Huang and Kung (2010), which supports a positive relationship between auditor quality (if environmental information is audited by a renowned accounting firm) and CET. The higher the auditor quality, the higher the transparency of the audited environmental information. When asked about the association between external auditors of annual reports and CET, with the exception of the interviewees from Organisation C and Organisation H, a consistent conclusion appeared to be reached, with interviewees' supporting a significant positive relationship between the two. This finding provides evidence to support Barros et al. (2013) assertion that external auditors are more likely to encourage companies to disclose accurate, comprehensive, and transparent environmental information.

8.2.5.4 Nongovernmental organisations

The interviewee from Organisation D explicitly said that that organisation does not believe that nongovernmental organisations (NGOs) have any influence on the company's CET, despite the high environmental sensitivity of its operations.

Our company has not perceived any particular concern from environmental groups in our operations. In fact, we have experienced no opposition from green groups.... (Organisation D)

In addition, none of the interviewees mentioned NGOs or nonprofit organisations as a factor influencing CET. One organisation from an environmentally sensitive industry (construction) explicitly stated that the concerns of NGOs in China have no influence on their decisions regarding environmental transparency. This finding implies that NGOs are not powerful enough to influence CET, at least in mainland China currently.

8.2.5.5 Peer pressure

The interviewee from Organisation I noted that the high level of environmental transparency among state-owned companies has encouraged others to be more transparent about their own environmental performance.

To be honest, with regard to environmental transparency, state-owned companies have made significant progress in this area. I think there exists a kind of peer convergence. We have had quite a lot of communications with our peers on many occasions; there seems to be a trend in recent years for state-owned companies to add environmental information in their annual reports. (Organisation I)

Campbell (2003) also suggested that companies with similar backgrounds will generally agree on the approximate level and direction (increase, decrease, or no change) of environmental transparency, but rarely resolve agreement at the year-to-year level.

The finding that competitors' environmental transparency strategies may increase the extent and nature of companies' environmental disclosures implies that peer pressure may influence CET. This finding is consistent with Zeng et al. (2012) study, which suggested that Chinese listed companies are more likely to disclose environmental information if their industrial peers engage in environmental disclosure. It is important to note that in the Chinese context, little academic attention has been paid to investigating the relationship between peer pressure and CET from this perspective. Therefore, further investigation in this area is needed to gather adequate empirical evidence and more and deeper insights.

8.2.6 CET promotion

When interviewees were asked about their insights on promoting the level of CET in the Chinese context, they pointed out two types of approaches:

- More detailed guidance from the regulators
- Stringent regulation and strict enforcement

8.2.6.1 More detailed guidance from the regulators

As discussed in chapter 6, at present there is currently a gap between the environmental disclosure practices of Chinese listed companies and the requirements of the CSRC. In this case, there is sufficient room for regulators to improve the level of CET in China. Interviewees from Organisation E, Organisation G, and Organisation K all indicated that more detailed reference templates classified by industry would guide listed companies to disclose more accurate and reliable environmental information. The interviewee from Organisation E suggested that the CSRC or the SSE should issue detailed guidance for each environmental disclosure item so that listed companies can judge whether their disclosures meet the requirements.

If listed companies can voluntarily conduct CET-related practices without the supervision of regulators, this implies that their awareness of environmental accountability is at a high level. However, this is not the case at present. For regulators, this means that mandatory requirements should cover a wider range of industry sectors including heavily polluting industries and even nonlisted companies. (Organisation E)

The interviewee from Organisation G acknowledged that it would be impractical for the SSE to develop a ‘one-size-fits-all’ environmental disclosure template. This interviewee further suggested that the SSE should provide a demonstration of high-quality environmental disclosure, along with specific guidance on “what ought to be disclosed” and “what is obligated to disclose”. These views are presented in the following extract.

The SSE should provide a 'good' model for environmental disclosure. The current template tries desperately to achieve a 'one-size-fits-all' approach that lacks specificity and cannot be applied to various industries. The SSE should provide demonstrations of what it regards as a high-quality environmental disclosure practice and make models of how to reach the expectations of a high level of CET. The SSE can also clarify the expected level of CET and the 'bottom line' of CET.
(Organisation G)

8.2.6.2 Stringent regulation and strict enforcement

In the interviews, there was some consensus supporting the view that stringent regulation would largely increase the number of companies disclosing environmental information, resulting in higher overall CET levels in China. For example, the following quote from the interviewee from Organisation F highlights this view.

It would be very helpful if there was a penalty mechanism for violations of mandatory policies...definitely more companies will disclose their environmental information and the level of CET in China will be improved. (Organisation F)

In addition, interviewees from Organisation B, Organisation E, Organisation F, Organisation H, Organisation K, and Organisation L agreed on specified standards and regulations as an additional influencing factor that could improve the level of CET. Typical views in this regard are reflected in the quote below.

Without stringent regulation, few companies will invest resources into CET-related practices. Thus, it should begin with supervision. Regulators must set standards...if listed companies fail to meet these standards, they will be penalised. It is these supervisions from the SSE and the CSRC that will improve companies' CET to a large extent.
(Organisation K)

In addition, interviewees also emphasised the positive role of local governments in promoting the idea that listed companies should present a high level of CET in their

jurisdictions. For example, the interviewee from Organisation J highlighted that the importance local governments and environmental authorities place on environmental protection will positively influence companies' decisions regarding CET. The interviewee from Organisation L noted that strict enforcement of environmental protection regulations by environmental authorities will increase the objectivity of environmental information disclosed by listed companies. This interviewee also indicated that listed companies would be more likely to actively disclose their environmental performance in the context of strict enforcement of environmental regulations. The following statement highlights some insights in this regard.

In previous years, environmental authorities, on the one hand, did not have sufficient enforcement powers; on the other hand, they faced constraints from local governments pursuing overwhelming goals, (i.e., GDP growth)...recently, however, the central and local governments have been facing increasing public pressure from both domestic and overseas opinions on environmental protection, so the enforcement of environmental protection laws has become more stringent and severe. If you fail to meet the standards of emission reduction, you will face such severe penalties that your production will be severely and negatively impacted, or even shut down by the government. (Organisation L)

8.2.7 Financial performance

As mentioned above, interviewees who represented management of some listed companies (e.g., Organisation B and Organisation D) clearly emphasised that financial performance is the most important factor they consider in any decisions they make in their operations. Thus, whether and to what extent a company's CET-related practices contribute to the financial performance of the business may be of primary concern to the company's management (Álvarez-Gil et al., 2007). Interviewees from Organisation B and Organisation D provided comments on this topic, as shown below:

For companies in all industries, the most important purpose is to make a profit...if a high level of CET cannot transfer into tangible economic benefits, it will make it difficult for companies to have an incentive to drive the changes associated with them.... (Organisation B)

Good financial performance is the basis on which a company can continue to operate. The company is not a nonprofit organisation, and all actions should be aimed at maximising financial benefits. We will closely monitor the impact of the company's CET-related practices on financial performance to determine whether the current level of CET is consistent with the company's objective. (Organisation D)

However, as discussed in chapter 4, previous literature on the consequences of environmental information quality have not reached conclusive results nor consensus on the association between environmental information quality and corporate financial performance. The findings in this regard are also complex in existing studies in China. Taylor and Shan (2007) found a significant positive relationship between environmental information disclosure and corporate financial performance in China, but this relationship may not be significant in the short run. In contrast, Liu and Anbumozhi (2009) and Meng et al. (2013) pointed out a negative relationship between environmental information quality and financial performance of Chinese listed companies. Their findings are generally consistent with interviewees' perceptions in this research. The interviewees believed increasing the level of CET in the short term will have a negative impact on listed companies' financial performance which is reflected as an increased financial burden and difficulty in bringing financial returns on investment.

Moreover, the results of the statistical analysis in chapter 7 also showed that a significant negative result is obtained when corporate financial performance is tested with the CET index instead of an environmental disclosure index. Combining the quantitative evidence in chapter 7 with the qualitative evidence in this chapter, some of the findings in chapter 6 seem to be reasonably explainable, namely (1) the environmental disclosure practices of Chinese listed companies do not meet the expectations of policy-makers; (2) the information transparency of Chinese listed

companies regarding government environmental penalties is very low; and (3) the environmental performance of listed companies is underreported by the media. These findings all point to the current problem of poor environmental transparency among Chinese listed companies. The reason for this state of affairs may be that in the short term higher environmental transparency has a negative impact on financial performance.

8.3 Chapter Summary

It can be inferred from chapter 6 that there is a gap between the environmental disclosure practices of Chinese listed companies and the objectives of mandatory environmental disclosure policies. By discussing the results of the qualitative investigation and the associated findings through an interpretation of the interview data and critical discussion, this chapter pays specific attention to the potential explanations for CET in the Chinese context. The chapter also attempts to identify additional evidence on the factors from both the internal and external context of corporate operations in driving CET.

From the perspective of internal factors, the main motivation for Chinese listed companies to promote CET is to discharge their environmental accountability to society and to manage the relevant public's perception of the company image. However, interviewees acknowledged that the environmental disclosure still lacks clarity and reliability in the current Chinese context. It appears that Chinese listed companies' assertion of acknowledging their environmental accountability to the public and wider society does not automatically lead to reliable environmental disclosures and transparent environmental performance. Furthermore, whether and to what extent the board of directors influences CET is controversial among the interviewees.

From the perspective of external factors of Chinese listed companies, interviewees suggested that CET in the Chinese context is driven by a wide range of external factors ranging from compliance with regulatory requirements to stakeholder pressure. The discussion and interpretation of interviewees' perceptions provides potential explanations for the sources of influencing powers driving CET. In

addition, other themes, such as CET promotion and financial performance, are also discussed and critically explored in this chapter.

Overall, the findings of the thematic analysis of the interview data in this chapter are closely related to the findings in chapter 6 and chapter 7. Chapter 6 identified the problem of poor environmental transparency among Chinese listed companies by constructing a CET index, and chapter 7 found a negative relationship between CET and corporate financial performance. The findings in this chapter explain that this negative relationship constrains the motivation of Chinese listed companies to improve CET. In the absence of short-term economic benefits for companies, governmental intervention is essential to promote CET in China. These approaches may include, but are not limited to, (1) more detailed guidance from regulators and (2) stringent regulation and strict enforcement. A more detailed summary of the interview findings is presented in section 9.3.2 of chapter 9.

In the next chapter, a review of the thesis is provided. In addition, chapter 9 concludes the thesis by showing the main findings and outlining the contributions of the thesis. Some suggestions for future research related to the main findings are also provided.

Chapter 9

Research Conclusion

9.1 Introduction

In response to Forssbaeck and Oxelheim (2014) call for academic attention to be given to the complex concept of CET arising from a wide range of social science disciplines and practices, this thesis, based on the perspectives of various theories, has two main focuses. First, a quantitative investigation was undertaken to evaluate the environmental transparency of Chinese listed companies (chapter 6), and an empirical test was conducted on the relationship between CET and corporate financial performance (chapter 7). Secondly, the perceptions of stakeholders in relation to the internal and external driving forces behind CET in the Chinese context were examined via semistructured interviews (chapter 8).

A number of findings emerged from the quantitative and qualitative investigations, and these findings provided the basis for a comprehensive understanding of the concept of CET and its economic consequences. In this concluding chapter, the research objectives and the process of achieving them are reviewed. The main findings are presented. Finally, the chapter concludes with the research implications, contributions to knowledge, and a discussion of limitations as well as suggestions for future research.

Section 9.2 provides a review of the motivations and objectives of this research and how these objectives were achieved. Drawing on the study's mixed methods research design, section 9.3 presents the main findings of the quantitative and the qualitative investigation respectively and the linkages between them. Section 9.4 outlines the theoretical and practical implications of this research. Section 9.5 summarises the research contributions. Section 9.6 explains the limitations of this research, while highlighting opportunities for future research. Section 9.7 concludes the chapter.

9.2 Review of the Research

Transparency has been a recurring concept in academic research and practice across a wide range of social science disciplines (Forssbaeck & Oxelheim, 2014). Especially in the field of policy-making, transparency is often seen as a prerequisite for legitimacy, policy efficiency, and good governance (Gray & Kang, 2015). For example, historical events such as the Great Depression and the 2008 financial crisis have triggered reforms in relevant accounting or financial policies toward making corporate information more transparent.

Recently, the environmental crisis has triggered a new round of policy reform practices. For example, the ISSB (IFRS, 2021), which aims to develop a globally unified sustainability reporting standard, was announced at COP26. The trend towards environmental policy reform has also influenced Chinese policy-makers. As the country with the highest share of carbon emissions in the world, China is determined to accelerate various reform measures to achieve its carbon neutrality target by 2060, including improving environmental transparency of heavily polluting companies through the implementation of mandatory environmental disclosure policies.

In this context, the concept of transparency has attracted the attention of accounting academics. Existing literature focuses mainly on the field of corporate social and environmental disclosure. There is a general presumption in this field that broader stakeholders' concerns about corporate transparency in social and environmental responsibility are related to a company's social and environmental disclosure practices (Guo et al., 2021). However, this relationship has not been further interpreted, leading to the fact that the concepts of environmental disclosure, environmental information quality, and environmental information transparency are often used confusingly by accounting researchers. This confusion seems to create the assertion that corporate environmental disclosure can be considered as equating to corporate environmental transparency.

In fact, this assertion is highly controversial (Dando & Swift, 2003; Moneva et al., 2006). Critics have argued that while transparency involves 'telling a full story about ourselves', being completely open and honest about ourselves is considered

impossible (Coslor, 2016; Roberts, 2009). Andrew and Cortese (2011), Hussain et al. (2020), Journeault et al. (2021), and Semeen and Islam (2021) also questioned the practice of companies' responding to challenging environmental disclosure by keeping silent, deliberately ignoring, or diverting attention.

On the one hand, in the current general lack of environmental disclosure regulations and hence standardised (and comparable) disclosures, transparency is considered a complex concept that has not been defined so far (Coslor, 2016; Gold & Heikkurinen, 2018; Roberts, 2009). On the other hand, the increased importance of transparency has called for more works that review existing research on transparency and explore its meaning and significance in different areas (Forssbaeck & Oxelheim, 2014).

Therefore, in response, the main motivation of this research was to systematically explore the concept and measure of CET and on that basis to further investigate the environmental transparency of Chinese listed companies and how it impacts corporate financial performance quantitatively. In addition, this research also aimed to gain in-depth insights into the CET driving forces arising from the internal and external context of companies through a qualitative investigation. To achieve this overall goal, as specified in (See section 1.5 of chapter 1) five research objectives were set. Their goals were to:

- Develop a conceptual framework for CET and apply it to the construction of a weighted comprehensive CET model.
- Develop a CET index for Chinese listed companies through the CET model and the results of content analysis and stakeholder survey.
- Examine the relationship between CET and corporate financial performance in the Chinese context.
- Collect stakeholders' perceptions of factors that influence (improve and reduce) CET in the Chinese context.
- Make recommendations for environmental policy-makers.

9.2.1 Objective 1: CET concept framework and CET model

To address the first research objective, this research conducted a systematic review of the existing CET literature. The exploration of the concept of transparency in research fields such as accounting, strategic management, financial markets, organisational culture, business ethics, and information systems provided the reference for the development of a conceptual framework for CET. In this thesis, the concept of transparency is primarily derived from Schnackenberg and Tomlinson (2016), where transparency refers to “the perceived quality of intentionally shared information from a sender”. The concept implies three characteristics of transparency. First, the information is perceivable by the information user; second, the sender reports the information intentionally, which fulfils the obligation of accountability; and third, transparency is a kind of information quality. Therefore, CET is defined as an all-encompassing phase that incorporates the dimensions of ‘perceived environmental disclosure’, ‘corporate environmental accountability’ and ‘environmental information quality’. According to this definition, this research further reviewed the existing literature related to the three dimensions.

First, the dimension of perceived environmental disclosure has two main perspectives in extant literature, namely the perspective of the information user and the perspective of the information source. From the first perspective, accessibility, clarity, and reliability are considered as important factors in users’ perceptions of information. The three attributes of environmental information were generalised from similar conceptualisations in the literature. From the second perspective, in addition to disclosing environmental information in corporate reports, other channels, such as environmental penalties disclosed on government websites and environmental reports from the news outlets, act as a means to convey corporate environmental information to stakeholders (Guo et al., 2021). The classification adopted in this research is in line with Islam and Van Staden (2016) suggestion that focuses on the public availability of information from multiple channels. Thus, the perceived environmental disclosure was classified into three types: corporate disclosure, government supervision, and media coverage.

Second, the literature review on the dimension of corporate environmental accountability was guided by Gray et al. (1996) definition of accountability. Gray et al. (1996) pointed out that accountability has two basic aspects, namely doing the right thing (performance) and giving an account of it (reporting). Therefore, this research reviewed extant literature on corporate environmental performance and corporate environmental reporting. Existing research has focused mainly on the relationship between the two. However, whether and to what extent environmental reporting reflects a company's environmental performance is unclear. Findings vary widely based on different empirical evidence. This thesis does not attempt to resolve this debate; rather, its goal is to provide an environmental transparency perspective to reconcile the various perspectives.

Third, the dimension of quality of environmental information is the core of the CET conceptual framework. Prior accounting studies provided many insights into the measurement, determinants, and consequences of environmental information quality. In terms of measurement, an environmental disclosure index, such as the Wiseman Index, the Clarkson GRI index, etc., is commonly used as a proxy. In most cases (about 80% of corporate environmental disclosure research), the 'quality' is measured using a model that includes only one or two dimensions. These models either assume that the amount of environmental disclosure reflects its importance to stakeholders, or that all items evaluated are equally important; most importantly, almost all of them assume that the source of environmental information can only be the company itself. In terms of determinants and consequences, existing studies in the main link the environmental information quality to corporate financial performance and show three different results: a positive association, a negative association, and no significant relationship (Horváthová, 2010).

Through a systematic literature review of the CET conceptual framework, this research argues that, while corporate environmental disclosure can be criticised for not providing a comprehensive account, it is still an important part of transparency and has been widely used in quantitative accounting research to understand the motivations behind ongoing corporate transparency practices (Bushman et al., 2004; Han et al., 2012; Islam & Van Staden, 2016). Disclosing information signals a willingness to be transparent, or an important step toward transparency. Although

this research recognises the complexity of understanding and measuring transparency, existing explorations of environmental information quality models provide important references for building a CET model.

Finally, this research constructed a CET model applicable to Chinese listed companies. The model excludes various assumptions that have been widely criticised in current quality models and incorporates the availability of information disclosures from different sources; in addition, it applied stakeholders' perceptions as weighting factors. This model contains four variables: EDI is the corporate environmental disclosure index; SEAPI is the significant environmental administrative penalty index; ENHI is the environment news headline index; and λ is the weight derived from stakeholders' perceptions.

9.2.2 Objective 2: CET index development

The construction of the CET model made it possible to develop a CET index of sample companies. However, to turn this possibility into a reality, the index needed to be supported by quantitative data. To achieve the second research objective, this thesis successfully quantified a large amount of textual data using content analysis and questionnaire survey. These textual data were mainly collected from corporate annual reports, government penalty reports, media reports, and stakeholder surveys. The quantified data could be used to analyse not only the mandatory environmental disclosure practices of Chinese listed companies, but also the environmental penalties imposed on them by the government and the environmental news reported about them by the media. More importantly, these data covered the range of sample companies, and so by inputting the data into the CET model, a CET index of sample companies could be derived. Based on the four variables in the CET model, this research divided the development process of the CET index into four phases.

Phase 1: Corporate environmental disclosure practice

The purpose of phase 1 was to develop an EDI for Chinese listed companies. According to Nazli Nik Ahmad and Sulaiman (2004), content analysis requires the identification of coding rules and scoring rules. The coding rules can be developed by the researcher (based on the previous literature) (An & Davey, 2011; Liu & Davey, 2014; Sun & Davey, 2021) or by using generally accepted standards or

initiatives (Clarkson et al., 2008; de Villiers & van Staden, 2006). Considering the suspected subjectivity of the coding rules developed by researchers in the existing literature and the difficulty of replicating the results of their content analysis, this research selected the ‘generally accepted standards’ as the coding rules. The generally accepted standards in this research refer to the annual reporting standards for A-share listed companies issued by the CSRC in 2017. According to the standards, there are 12 environmental disclosure items for Chinese listed companies; these are categorised under four themes, namely pollutant discharge information, pollution prevention information, environmental compliance information, and company policies and procedures.

In terms of the scoring rules, following the principle of minimising the influence of the researcher’s personal subjective judgment on the results, this research adopted a 2-point scale system to measure the extent of environmental disclosures of Chinese listed companies. In the 2-point scale system, ‘0’ was assigned when a disclosure item in the list was not disclosed at all, and ‘1’ was assigned when the item was disclosed (See Appendix B for the detailed scoring rules). Overall, the coding rules and scoring rules identified in this research allowed the researcher and the reader to analyse the corporate annual report with the same perception and understanding (i.e., achieve ‘shared meaning’ between the researcher and the reader). Ultimately, based on these rules, this research coded and scored annual reports of Chinese listed companies to form their EDI over the 2 years, 2017 and 2018.

Phase 2: Significant environmental administrative penalty

The purpose of phase two was to develop a SEAPI for Chinese listed companies. Since the Securities Law and the Measures for the Administration of Information Disclosure by Listed Companies have mandatory requirements for A-share listed companies to disclose information on significant administrative penalties in their annual reports, this type of penalty information was the focus of this research. At this phase, the researcher identified all significant environmental administrative penalties of Chinese listed companies from the collected 4,071 government penalty reports and finally obtained a quantitative description of the government environmental penalty information. This information served both as a measure of

the poor environmental performance of Chinese listed companies and as a test of the transparency of their environmental penalty disclosures.

This research identified five coding rules based on the general criteria for significant administrative penalties in China and the provincial criteria for identifying large fines (Appendix C). According to the five coding rules, a total of 1,121 significant environmental administrative penalties related to Chinese listed companies were identified for the year 2017, involving fines RMB289.79 million (USD43.95 million) in total; for the year 2018, 444 significant environmental administrative penalties related to Chinese listed companies were identified, involving fines of 126.27 million RMB (USD18.34 million) in total. Finally, the penalty frequency and disclosure frequency of Chinese listed company were normalised to form their SEAPI.

Phase 3: Environment news headline

Phase three aimed to develop an ENHI for Chinese listed companies. According to the CSMAR's news subdatabase, the total number of news headlines related to Chinese listed companies was 52,983 for 2017 and 82,825 for 2018. Using stock codes, this research narrowed down the news headlines from all Chinese listed companies to sample companies only. In 2017, there were 2,320 news headlines for these companies and 3,379 in 2018. There are various methods to measure media coverage in existing studies, but one method was particularly suitable for content analysis. The J-F coefficient of imbalance is a scoring method for content analysis proposed by Janis and Fadner (1943). It was first introduced by Deephouse (1996) in the study of corporate legitimacy. Since then, Bansal and Clelland (2004), Clarkson et al. (2008), Aerts and Cormier (2009), and others have adopted the J-F coefficient of imbalance as a measure of media coverage.

The application of the J-F coefficient approach requires the researcher to first classify news headlines to accurately identify three different types of news, namely favourable news, unfavourable news, and neutral news. Then the number of three different types of news is used as three variables and put into the formula to get a media coverage index. Thus, the researcher classified the collected news headlines into favourable environmental news, unfavourable environmental news, and neutral

environmental news. News headlines not related to the environment were excluded. Finally, the number of the three types of environmental news for each sample company was counted. Calculations were made according to the formula of the J-F coefficient approach to obtain the ENHI for sample companies in this research.

Phase 4: Stakeholders' perceptions

The purpose of phase four was to quantify stakeholders' perceptions of corporate environmental disclosure, government environmental supervision, and media environmental coverage through questionnaire survey, while trying to obtain the respondents' initial insights into the determinants and consequences of CET. Based on the two different aims, this research used two different types of questions (i.e., closed-ended and open-ended questions).

The closed-ended questions were designed as three modules, each corresponding to a source of corporate environmental information (i.e., company, government, and media). Each module consists of five closed-ended questions, with the first two questions using a dichotomous approach and the last three questions using a 10-point rating scale. The last three questions represent the three attributes of environmental information (i.e., accessibility, clarity, and reliability). There were four open-ended questions each of which was directly related to CET. In addition, five questions were included at the end of the questionnaire to obtain demographic information about the respondents. Appendix G lists the questions used in the questionnaire. All questions were reviewed by Waikato Management School Human Research Ethics Committee and an ethical approval was granted for this research (See Appendix D).

The challenge of using a stakeholder survey approach in accounting research is the selection of appropriate stakeholder representatives (Crane & Ruebottom, 2011). To ensure the representativeness and reliability of the survey results, the researcher set four strict criteria for stakeholder selection. On the basis of these criteria, the Beijing National Accounting Institute was chosen as the location for the questionnaire survey. The final respondents were participants of the institute's high-end accounting talent training programme. These participants not only have a professional background in accounting and management, but also come from

different stakeholder groups, such as listed companies, financial institutions, accounting firms, government agencies, and tertiary institutions, etc. This diversity ensured that respondents were both familiar with the content of the survey and able to participate in the research from the perspectives of various stakeholder groups. Finally, 133 stakeholders in total participated in the study's questionnaire survey. The results of the closed-ended questions were used in the CET model to form the weighting factors for the other three variables.

In summary, each of the above four phases yielded the data required for its corresponding variable in the CET model. Through the final calculation, this research developed a CET index for 148 Chinese listed companies over the 2-year period covering 2017 and 2018 (See Appendix J). The development of the CET index fulfilled the second research objective of this thesis and laid the foundation for achieving the third objective.

9.2.3 Objective 3: CET and corporate financial performance

The third research objective was to examine the relationship between CET and corporate financial performance in the Chinese context. The statistical analysis method used in this research is multiple regression. Multiple regression constitutes a set of techniques that can be used to explore “the relationship between one continuous dependent variable and a number of independent variables or predictors (usually continuous)”(Slinker & Glantz, 2008). Pallant (2020) argued that multiple regression is suitable for addressing “whether a predictor variable is still able to predict an outcome when the effects of other variables are controlled for”. In order to investigate the relationship between CET and the financial performance of the sample companies, this research needed to control the impact of various external variables, such as market value, market-to-book ratio, and market return, before observing whether CET can influence corporate financials. Therefore, multiple regression was considered suitable to address the research question of this research.

This research first reviewed the role of CET theories (i.e., government intervention theory, stakeholder theory, legitimacy, and signalling theories) in constructing logical thinking between CET and corporate financial performance. On this basis, two hypotheses and the regression model were further developed in this research.

In the regression model, the independent variable was the CET index, the dependent variable was ROA, and the control variables were market value, market-to-book ratio, and market return.

Corporate environmental disclosure index has typically been used as the dependent variable in prior literature. However, Andrew and Cortese (2011), Hussain et al. (2020), Journeault et al. (2021), and Semeen and Islam (2021) questioned whether corporate environmental disclosure can be considered as a measure of transparency. The researcher believes that the CET index is more representative of a company's true environmental information transparency status than is the corporate environmental disclosure index. Therefore, the CET index was used as the dependent variable in this research. The reason for choosing ROA as a measure of corporate financial performance was that accounting-based indicators are more reliable than market-based indicators in the Chinese context. In contrast, ROE was not selected because the interests of creditors are not taken into account. Compared with Tobin's Q and ROE, ROA is also widely used (Clarkson et al., 2013; Hussain et al., 2018), and more importantly, it provides a more comprehensive picture of shareholders' and creditors' profitability. Therefore, ROA was chosen to measure corporate financial performance and ROE was used as a substitute indicator for robustness testing.

The final test sample included 296 observations in total from 148 A-share listed companies for the years 2017 and 2018. The data for the dependent variable came from the results of this thesis (i.e., the CET index). In contrast, the data for the independent and control variables was downloaded from the CSMAR database. The test results showed that there is a negative relationship between CET and corporate financial performance. In the short term, higher environmental transparency implies higher environmental resource allocation, which affects resource inputs in the production process and thus has a negative impact on profits (Zhao & Murrell, 2016). However, the negative impact of CET on corporate financial performance is not invariable and it requires continuous investment over a longer period to achieve sustainability (Lu et al., 2018).

9.2.4 Objective 4: Driving forces of CET

The fourth research objective was to collect stakeholders' perceptions of the factors that influence (improve and reduce) CET in the Chinese context. To achieve this objective as well as attempting to seek in-depth explanations related to the findings indicated by the questionnaire and the empirical test, two specific methods—semistructured interview and thematic analysis—were used to collect qualitative data and to examine themes or patterns of meaning within the qualitative data. According to the research design, the qualitative investigation was divided into three stages: interview preparation, interview implementation, and thematic analysis.

Stage 1: Interview preparation

This stage included mainly the design of interview questions and the selection of interviewees. The design of the interview questions was partially informed by the results of the open-ended questions in the stakeholder survey. The results of these questionnaires not only presented stakeholders' initial perceptions of CET in China, but also revealed potential areas that require more in-depth understanding. Appendix H lists all the interview questions used in this research. All interview questions were reviewed by Waikato Management School Human Research Ethics Committee and an ethical approval was granted for this research (See Appendix D). The selection of interviewees was made with reference to the group of respondents to the questionnaire survey; adopting this approach had the advantage of ensuring consistency in the interviewees' understanding of the research topic. Also, as highly qualified stakeholder representatives, they could provide greater in-depth insights into the research questions. After two rounds of invitation, 29 stakeholders in total responded to the researcher's interview request. Finally, 12 interviewees from six industries of different nature were selected based on further screening.

Stage 2: Interview implementation

Two pilot interviews were conducted by the researcher before the formal interviews. The two interviewees come from two different banks. One is the director of the securities department and a member of the bank's board of directors. The other is the chief financial officer. The researcher gained some insights from the pilot

interviews. For example, he learned that it would be helpful to have an interview outline on hand; it is best to start with general and broad questions; it is necessary to have some knowledge of the interviewee's organisation and industry prior to the interview, etc. Overall, the initial experience gained from the pilot interviews not only helped the researcher to rule out possible unknowns in the formal interviews in advance, but also ensured that the structure, conversation, and timing of the formal interviews were manageable.

All 12 formal semistructured interviews took place at the Beijing National Accounting Institute and were conducted face-to-face. When conducting semistructured interviews, the researcher usually starts with topics related to the environmental achievements of the interviewee's organisation in order to relax the interviewees and to get them used to answering the interview questions. The formal interviews in this study ranged from 17 to 34 minutes and were recorded using a digital recorder. Overall, the researcher was fortunate because all 12 face-to-face interviews were conducted in June 2019. After January 2020, face-to-face interviews overseas were almost impossible due to the disruption to international travel caused by COVID-19 and the contact restrictions imposed by many countries.

Stage 3: Thematic analysis

Through direct communications with the interviewees, the researcher collected a large amount of interview data. Therefore, transcription of the interview data began upon the researcher's return to New Zealand. All the interviews were conducted in Chinese, so the transcription work was divided into two steps. First, the voice recordings were transcribed into a Word document in the Chinese language. The interviews were transcribed twice by the researcher independently. The researcher then cross-checked the two sets of transcriptions to ensure that no omissions or errors had been made. Second, the thematic analysis of the transcriptions was carried out by the researcher. The analysis was based on the Chinese transcribed texts. The reasons for taking this approach were, first, to ensure an accurate interpretation of the original text to avoid misinterpretation due to translation, and second, to increase efficiency and avoid spending too much time on translating the original recorded text.

In summary, through the thematic analysis, this research uncovered additional evidence of the internal and external factors driving CET in the Chinese context. From the perspective of internal factors, the main motivation for companies to promote CET is to discharge their environmental accountability to society and to manage the public's impression of the company. Whether and to what extent the board of directors influences the CET was a controversial issue among the interviewees. From the perspective of external factors, the interviewees suggested that CET-related practices are driven by a wide range of external pressures ranging from compliance with regulatory requirements to stakeholder pressure. In addition, some advice on promoting CET in the Chinese context was provided by the interviewees.

9.2.5 Objective 5: Policy recommendation

The last research objective was to make recommendations for environmental policy-makers. In the process of achieving the first four research objectives, this research revealed some practical implications. For example, chapter 6 proposes that (1) environmental penalty information should be included as one of the items for mandatory environmental disclosure policy as soon as possible; (2) the existing sophisticated environmental policy mix should be adjusted, improving the current CCRs (e.g., environmental administrative penalty policy) and expanding the scope of MBIs (e.g., environmental tax policy, emissions trading policy) and IBAs (e.g., mandatory environmental information disclosure policy). Chapter 7 suggests (1) establishing a reward and penalty mechanism to ensure the effectiveness of the mandatory environmental disclosure policy; (2) refining the specific content of environmental disclosure items as well as providing guidance; and (3) improving the role of audit assurance in corporate environmental disclosure. Chapter 8 offers advice on strengthening environmental regulation and enforcement by regulators. To achieve the last objective of this research, section 9.4.2 systematically presented the practical implications of the main findings of this thesis and summarised all policy recommendations that emerge from the thesis.

9.3 Main Findings

This section summarises the main findings of the quantitative and qualitative investigations in turn and demonstrates the linkages between the quantitative and qualitative results.

9.3.1 Quantitative research findings

9.3.1.1 Environmental transparency of Chinese listed companies

In general, the environmental transparency of Chinese listed companies does not at this stage meet the expectations of policy-makers. Specifically, the mandatory environmental disclosure policy is not well implemented; listed companies are suspected of concealing information about significant environmental administrative penalties; and stakeholder groups are distrustful of corporate environmental disclosure. These conclusions are all derived from the following research findings.

First, this research finds a clear trend of polarisation in the environmental disclosure practices of Chinese listed companies. Nearly 12% of companies had no environmental disclosure at all in 2017, and only 40% of companies disclosed all 12 environmental items required by the CSRC. This trend became more pronounced in 2018, with about 16% of companies having no environmental disclosure at all, while 46% of companies disclosed all 12 environmental items required by the CSRC. In addition, the polarisation is more pronounced among privately owned companies.

Second, this research finds that a year after the implementation of the mandatory environmental disclosure policy, Chinese listed companies began to shift their attention from specific disclosure items on meaningful and challenging issues (e.g., pollutant discharge information) to general and vague environmental disclosure items (e.g., pollution prevention information, and company policies and procedures). This finding is consistent with those of de Villiers and van Staden (2011) and Islam and Van Staden (2016), who argued that even in the case of mandatory disclosure management still has the discretion to decide what information and what level of detail to provide.

Third, this research finds that state-owned companies outperform privately owned companies in terms of environmental disclosure practices. This finding is generally consistent with findings in the previous literature on CSR disclosure practices. However, it is worth noting that state-owned companies may have an advantage of company size in China.

Fourth, this research finds a decreasing trend of environmental violations among Chinese listed companies. However, the transparency of environmental violations remains low. Although the level of disclosure of significant environmental administrative penalties by Chinese listed companies in 2018 improved significantly compared to those for 2017, the level of disclosure is still inadequate. In addition, information on significant environmental administrative penalties of listed companies is insufficiently accessible to stakeholders and investors and is currently only available through the database of environmental authorities.

Fifth, this research finds that environment news headlines account for a relatively stable proportion of all news headlines at close to 10%. The low percentage of unfavourable environmental news may limit the effective role of the media in revealing environmental risks and monitoring environmental performance. In addition, about 40% of the sample companies have no environment-related news. These sample companies are on the KPEs list, which means that they are the key polluters of concern to environmental authorities. The scope of environmental news coverage clearly does not meet the requirement of stakeholders and investors or regulators.

Sixth, this research finds that in terms of environmental information released by different channels, the media has the highest accessibility, but the clearest and most reliable information comes from the government. This finding is based on a questionnaire survey on different stakeholder groups. The results of the survey suggest that corporate environmental disclosure is second only to the media in terms of the accessibility, but is the least clear and reliable, reflecting a strong sense of mistrust among stakeholder groups towards corporate environmental disclosure. This finding also adds new evidence to the controversy around whether or not corporate environmental disclosure can represent transparency (Coslor, 2016; Dando & Swift, 2003; Moneva et al., 2006; Roberts, 2009).

9.3.1.2 CET and corporate financial performance

This research finds a significant negative relationship between CET and corporate financial performance in the Chinese context. The finding is based on an empirical test of sample companies. The research sample included 296 observations of 148 A-share listed companies between 2017 and 2018. CET was measured by the CET index of sample companies, while corporate financial performance data and other relevant market data were obtained from the CSMAR database. Robustness tests indicated that the results are reliable.

On the one hand, this thesis supports the judgment that corporate environmental disclosure is used as a legitimacy tool. Belkaoui (1976), Aerts et al. (2008), Iatridis (2013), Plumlee et al. (2015), and others pointed out that high-quality corporate environmental disclosure will send positive signals about the company to the capital market, thus contributing to improvement in corporate financial performance. This research however finds that the so-called high-quality corporate environmental disclosure does not represent a company's true environmental transparency, let alone confirm its true environmental inputs. In the short term, greater environmental transparency implies higher environmental resource allocation, which affects resource inputs in the production process and thus negatively affects profits (Hassel et al., 2005; Zhao & Murrell, 2016). This finding is consistent with Cho and Patten (2007) finding that corporate environmental disclosure is often used as a tool by companies to promote their environmental legitimacy due to the higher costs of undertaking environmental responsibility and the insignificant short-term economic benefits.

On the other hand, the finding of this research is similar to those of Bird et al. (2007), Filbeck and Gorman (2004), Hassel et al. (2005), and Lioui and Sharma (2012). Bird et al. (2007) showed a negative correlation between the excess earnings of companies and their environmental information quality, which lags 1 year behind. Lioui and Sharma (2012) found that environmental information quality is negatively related to corporate financial performance because investors perceive environmental measures as potential costs or penalties. However, while they support the idea that environmental information quality is negatively related to corporate financial performance, they do not point out that environmental

information quality not only refers to the quality of corporate environmental disclosures, but also incorporates the quality of information released by other channels. The findings of this research confirm this relationship from a more comprehensive and objective perspective (i.e., an environmental transparency perspective).

9.3.2 Qualitative research findings

The objective of the qualitative investigation was to collect stakeholders' perceptions of the driving forces behind CET in the Chinese context. This research finds that these perceptions can be categorised as internal and external factors related to company operations. Before presenting the qualitative findings, it should be acknowledged that the small size of the interview sample (12 interviewees) and the nature of the qualitative research methodology (Sreejesh et al., 2014) inevitably limit the generalisability of the qualitative findings. However, the exploratory nature of the qualitative investigation in this research, despite its limitations, means that it is able to generate insights and complementary interpretations of the quantitative findings.

9.3.2.1 Internal driving forces behind CET

Accountability

First, interviewees believed that the awareness of corporate environmental accountability to society is both a starting point and an influencing factor in the CET-related practices. Accountability is clearly an influential force, at least in the view of the interviewees, and positively affects CET in the Chinese context. This finding extends the empirical evidence that listed companies are more likely to engage in environmental disclosure practices to discharge their environmental accountability (Deegan, 2002; Gray et al., 1995b) than other companies are. However, although interviewees from listed companies indicate that the impact of environmental accountability on their companies is overwhelming, some interviewees admitted that CET-related practices are only relevant to their perceptions of environmental accountability, implying that the impact of environmental accountability is limited. They further suggested that the disconnection between CET-related practices and economic benefits in China has

led to a diminishing impact of environmental accountability on CET. Considering that the overall environmental transparency of Chinese listed companies is not ideal, this finding is consistent with Parker (2005) view that accountability has limited impact as a reactive mechanism, which implies that CET in China lags behind social expectations.

Impression management

In addition, another observation that emerged from the interviews is that the CET-related practices in China seem to have the task of managing the public's impression of the company's operations. Echoing Neu et al. (1998) and Criado-Jiménez et al. (2008), some interviewees from listed companies admit that the disclosure of pollution emissions and 'bad' news in annual reports makes the company vulnerable to external criticism. The finding is in line with Diouf and Boiral (2017) argument that companies make use of environmental disclosure to seek for some form of window dressing; as a result, stakeholders' impression of the environmental consequences of companies' operations could be managed.

Board of directors

There is no consensus among interviewees regarding the role of the board of directors in influencing CET-related practices. While some interviewees acknowledged that their boards could see that there is a public demand for environmental transparency in their operations, others mentioned that CET is not a priority for their boards. However, interviewees also admitted that the presence of a special environmental committee on the board would encourage management to be more active in CET-related practices. In addition, interviewees also indicated that having the environmental committee at the top management level rather than on the board of directors would also promote CET because it would mean that top management would give special attention to CET and be more likely to commit adequate resources to it. As noted by Barros et al. (2013), the presence of an environmental committee on the board or at top management level may lead to effective monitoring, which may put pressure on management to improve its CET.

9.3.2.2 External driving forces behind CET

Regulation

Some of the results of the internal factors show that corporate awareness of environmental accountability depends not only on voluntary choices, but also on clear regulatory requirements. Almost all of the interviewees linked the CET-related practices to government regulations. In China, lax regulation of listed companies does not seem to facilitate a high level of CET, a conclusion which is based on the findings of existing studies (Shan & Taylor, 2014; Taylor & Shan, 2007; Wang et al., 2013). Interviewees suggested that Chinese regulators should provide more specific guidance on the mandatory environmental disclosure policy and strengthen enforcement against companies that violate the requirements. It is important to note that, although there are no consistent findings in the previous literature regarding the relationship between regulation and CET, this research's investigation of the environmental transparency of Chinese listed companies also supports the idea that increased regulation is more likely to promote the level of CET (Adams, 2002). It is reasonable to assume that stringent regulation and strict enforcement may increase the disclosure of specific items on meaningful and challenging issues (e.g., pollutant discharge information) by Chinese listed companies.

Stakeholder pressure

Regarding the influence of stakeholder groups on CET in the Chinese context, the interviewees focused on investors, the public, third parties, NGOs, and peer pressure.

Some interviewees indicated that they do not believe there is a strong demand from investors for a company to ensure CET as opposed to financial transparency. These assertions are consistent with the arguments of the local government officials interviewed who asserted that, given the hitherto immaturity of the Chinese financial market, Chinese listed companies have been unable to respond properly and quickly to environmental transparency by Chinese listed companies, despite the fact that investors in the Chinese financial market are increasingly concerned about the environmental consequences of company operations. The immature state of the

Chinese financial market is likely to have dampened the enthusiasm of listed companies to conduct CET-related practices.

A small number of interviewees believed that public concern may be an influential factor related to CET. However, it is very likely that there is some link between this factor and the company's motivation to engage in impression management. As the public becomes more concerned about environmental issues, it is increasingly convenient for listed companies to manipulate their image in the eyes of the relevant public by highlighting positive aspects of environmental operations (i.e., 'good news') while obfuscating negative outcomes (i.e., 'bad news'). This finding is consistent with Cormier and Gordon (2001) and O'Donovan (2002). They found that companies manage their legitimacy gap by being transparent to the relevant public about their environmental performance and activities.

Most interviewees believed that a higher level of CET can be achieved by having a third party verify the environmental information disclosed by the company. Interviewees explicitly stated that renowned accounting firms like the Big 4 seem to be more concerned about and to place more importance on CET. When the Big 4 or other renowned accounting firms are engaged in providing assurance services to annual reports of Chinese listed companies, the potential for spillover effects on their CET is greater.

In addition, interviewees indicated that in the Chinese context, the power of NGOs is not yet sufficient to influence CET. The CET strategies from industry competitors may exert pressure on Chinese listed companies and potentially determine the extent and nature of environmental information disclosed in their annual reports. However, more empirical evidence is needed to support this assertion.

9.3.3 Linkages between quantitative and qualitative results

Based on the pragmatism methodology, this research adopts a mixed methods research design that includes both quantitative and qualitative investigations. Although the two investigations are conducted separately (i.e., separate data collection and separate data analysis), their results are closely linked.

First, both quantitative and qualitative results support the idea that corporate environmental disclosure is an important component of transparency (Guo et al., 2021), but that it cannot represent environmental transparency alone (Coslor, 2016; Roberts, 2009). Quantitative findings indicate that the reliability of corporate environmental disclosures remains low, and qualitative investigation finds that stakeholders perceive corporate environmental disclosure as a corporate strategy for impression management, which hardly reflects the true environmental input of the company.

Second, both quantitative and qualitative results point to the existence of a significant negative relationship between CET and corporate financial performance. The quantitative finding is confirmed through multiple regression tests. The qualitative investigation finds that stakeholders believe the promotion of CET in the short term will have a negative impact on corporate financial performance and will manifest as an increased financial burden and create difficulty in bringing financial returns on investment.

Finally, both the quantitative and qualitative results affirm the role of regulation in promoting CET in the Chinese context. The quantitative findings suggest that the mandatory environmental disclosure policy is not well followed in a lax regulation environment and that the transparency of environmental violations in Chinese listed companies remains low. The qualitative investigation finds that stakeholders believe that it is the government and the regulatory policies it sets that have an overwhelming influence on CET in the Chinese context.

9.4 Research Implications

9.4.1 Theoretical implications

The main findings of this thesis have theoretical implications. First, this thesis supports and extends the legitimacy and signalling theories in the field of environmental disclosure. Legitimacy and signalling theories have been widely used to explain corporate environmental disclosure behaviour over the past 20 years (Zijl et al., 2017). In the context of mandatory disclosure, environmental disclosure is often seen as a signal of legitimacy from the company to the outside world (Patten,

1991). This research finds that Chinese listed companies increase the disclosure of general and vague environmental items while decreasing the disclosure of specific items on meaningful and challenging issues, suggesting that these companies not only use environmental disclosure as a legitimacy tool, but also want to seek for window dressing of their environmental accountability to society.

Second, this thesis enriches the scope of the application of stakeholder theory. Common applications of stakeholder theory in the existing literature occur in isolation in qualitative or quantitative research studies. This thesis creatively applies the theory to both scenarios (i.e., conducting both a questionnaire survey and interviews with stakeholders under one research topic). The results show that, with a rigorous and careful design, it is possible to integrate both methods into one research topic so as to exploit their respective strengths.

Finally, this thesis suggests that government intervention theory may have strong explanatory power in the current Chinese context. In contrast to other theories, government intervention theory has rarely been used as a theory to explain ongoing economic phenomena in environments where market mechanisms are relatively well developed (Mises, 2011). Although some studies in economics have affirmed the role of government intervention in correcting market failures caused by environmental externalities and information asymmetries (Droste et al., 2016; Stiglitz, 2013), strong criticism of its limitations has prevented academics from developing it into a theory (Ikeda, 2002). However, this theory has been repeatedly put to use and improved upon in regions where market mechanisms are relatively underdeveloped (e.g., mainland China) (Shao et al., 2015; Wang et al., 2021). The findings of this thesis suggest that environmental violations by Chinese listed companies have decreased significantly as a result of government intervention. Although the corporate environmental transparency remains unsatisfactory in China, it has improved modestly. Moreover, stakeholder groups have expressed broad support for promoting CET through further-enhanced government intervention in China. The researcher suggests that future relevant studies based on the Chinese context cannot ignore the existence of government intervention theory.

9.4.2 Practical implications

Transparency is considered to be an important prerequisite for legitimacy, policy efficiency, and good governance in policy-making practice. Given the current situation revealed by this thesis, improving CET in China still faces a huge challenge. The main findings of this thesis have many practical implications for environmental policy-makers; these can be summarised in the following six points.

First, mandatory environmental disclosure is necessary, but the regulation and legal system for corporate environmental disclosure should be improved. Since CET can have a negative impact on corporate financial performance in the short term, companies do not benefit from making reliable environmental disclosures and therefore lack the internal incentive to do so. In addition, the current regulation lacks clear provisions on the form and content of corporate environmental disclosure. Although it has been made mandatory for listed companies in heavily polluting industries to disclose 12 environmental items, companies have considerable autonomy when it comes to choosing the content and level of disclosure items, something which makes the current environmental information disclosure less transparent. Therefore, legal requirement for mandatory environmental disclosure should be considered, and the current mandatory environmental disclosure policy should be improved.

Second, it is recommended that the guidelines for environmental disclosure items in the annual reports are improved. From the perspective of the effectiveness of the mandatory environmental disclosure policy, this thesis finds that the environmental disclosure practices of Chinese listed companies have not met the expectations of the policy-makers. The disclosures on some items in the annual reports are still not clear enough, especially items relating to pollution prevention information, company policies, and procedures, which are usually described generally and vaguely. Therefore, the existing provisions need to be further improved to clarify the content of each item, especially those that are more ambiguous. In addition, the environmental disclosure items should be adjusted to reduce general and vague items and increase meaningful and challenging items, such as environmental tax and carbon emission information, that better reflect the actual environmental performance of the company.

Third, it is suggested that environmental penalty information should be one of the mandatory environmental disclosure items in annual reports. According to the findings of this thesis, more than 90% of companies did not disclose this information as required in 2017, and about 75% failed to do so in 2018. Currently, the relevant regulations require listed companies to disclose only information on ‘significant’ environmental penalties. Since each province has its own criteria for large fines, this situation has resulted in some listed companies not disclosing this information as required on the pretext that they cannot determine the criteria for large fines due to cross-provincial operations. This thesis suggests that the criteria for large fines for significant environmental administrative penalties should be abolished, and all environmental penalty information should be included in the scope of mandatory environmental disclosure. In addition, the mandatory requirements should cover a wider range of industry sectors including both heavily polluting industries and nonheavily polluting industries.

Fourth, it is recommended that a reward and penalty mechanism is established. The findings in stakeholder survey show that an important reason for the unsatisfactory level of CET in China is that the cost of noncompliance is low. Therefore, the thesis suggests that policy-makers develop a reward and penalty mechanism for the mandatory environmental disclosure policy. For one thing, companies that disclose environmental information in a timely and comprehensive manner should be rewarded and supported and their experience promoted in order to boost the overall CET level. Furthermore, warnings and penalties should be given to companies with untimely and incomplete disclosures and focused follow-up monitoring should be carried out to urge them to improve their CET through specific targeted penalty clauses.

Fifth, it is recommended that the research and development of environmental information assurance or auditing standards is accelerated and that they play the role of third parties in promoting CET as early as possible. The findings in stakeholder interviews indicate that verification of environmental disclosures by third parties can help improve the level of CET. However, the difficulty that currently limits the role of these bodies is the lack of a unified disclosure standard and verification standard. With the establishment of the ISSB, progress in setting

global environmental disclosure standards has accelerated. It is recommended that Chinese policy-makers follow this trend and develop in a timely manner environmental disclosure standards and assurance standards that converge with international standards.

Last, optimising green finance policies is recommended. The quantitative findings of this thesis suggest that higher environmental transparency actually implies higher environmental resource allocation, which will inevitably increase the costs of companies and negatively impact profits. Lu et al. (2018) argued that this negative impact is not static and that it requires constant investments over a longer period of time to achieve sustainable development. Therefore, companies with high levels of CET need financial support from banking institutions. This thesis suggests that these companies should be given priority in the development of green finance policies (e.g., ‘green credit’, ‘green securities’ and ‘green insurance’) to help them through the short-term financial difficulty. In addition, the use of green finance as a means of resource allocation can help to guide companies to improve their environmental transparency, eliminate outdated industries that pollute the environment, and optimise industrial upgrading.

9.5 Research Contributions

This thesis has contributed to knowledge in the following areas:

First, this thesis contributes new evidence to the debate on whether corporate environmental disclosure can be considered to equate to transparency (Coslor, 2016; Dando & Swift, 2003; Moneva et al., 2006; Roberts, 2009). Early study suggested that regulators should require companies to expand environmental disclosures to promote corporate environmental transparency in a way that is similar to the regulating of financial transparency (C. A. Williams, 1999). Critical research (e.g., Roberts, 2009) pointed out that, while transparency involves “giving a full account of ourselves”, a fully open and honest account of oneself is considered impossible. The results of this thesis show that corporate environmental disclosure is part of transparency, but that it cannot be considered as such. CET is a complex concept, and there are other channels, such as government websites, media news reports, etc., in addition to corporate environmental disclosure that can make corporate

environmental information transparent to the public. In addition, in many instances, the term ‘quality’ has been used interchangeably with the term ‘transparency’, yet with both concepts being elusive (Liesen et al., 2015; Tello et al., 2016). This study’s detailed explanation of the CET conceptual framework helps to increase the distinction between and definition of these two concepts.

Second, this thesis responds to calls in the literature (Coslor, 2016; Forssbaeck & Oxelheim, 2014; Gold & Heikkurinen, 2018; Roberts, 2009) for more studies that review existing research on transparency and explore its meaning and significance in the environmental accounting field. Due to the lack of mandatory environmental disclosure regulations and standardised environmental disclosures, CET is considered a complex concept that has defied definition so far (Coslor, 2016; Gold & Heikkurinen, 2018; Roberts, 2009). Under immense environmental pressure, China has experimented with mandatory environmental disclosure policies since 2017. Relatively standardised environmental disclosures have been developed within the context of the key pollutant discharging entities, which provides a great setting for studying the concept of transparency. By constructing a conceptual framework for CET, this thesis fills the research gaps in existing literature on transparency.

Third, the results of this thesis extend academic knowledge of CET in emerging economies. In the main, prior CET studies have focused on developed countries and little academic attention has been paid to emerging economies, such as China. In this particular context, the current status of CET in China is critically assessed; its consequence is empirically tested; and its determinants are explained in depth. All these efforts will help future researchers to build an in-depth and comprehensive understanding of the CET practices in emerging economies and in the specific context of China.

Fourth, this thesis pays special attention to the relationship between CET and corporate financial performance. For this purpose, this thesis conducted separate quantitative and qualitative investigations. The quantitative investigation found a significant negative relationship between the two and an explanation for this finding was gained through the qualitative investigation. The results of the empirical test in this thesis extend the existing findings on the relationship between CET and

corporate financial performance, thus making an important contribution to knowledge.

Finally, this thesis contributes a measure for corporate environmental transparency. It is worth noting that the measure is currently applicable within the Chinese context and its applicability to other contexts has yet to be explored. However, the measure adopted in this thesis establishes a critical way of thinking for future research. When studying environmental transparency in a specific context, it is necessary to consider not only corporate environmental disclosure, but also other channels that can make corporate environmental information transparent to the public in this context.

9.6 Research Limitations and Future Research Potential

9.6.1 Research limitations

As with any other research, this thesis also has some limitations that should be humbly acknowledged. The limitations are as follows.

First, the 133 stakeholder questionnaires collected for this thesis may have some limitations. The challenge that prevents researchers conducting stakeholder-related studies is the difficulty of selecting sufficient and appropriate respondents. Stakeholders are often selected through researchers' personal networks rather than on the principle of randomisation. Although the researcher in this thesis developed strict criteria for stakeholder selection, the field research conducted at the Beijing National Accounting Institute is inevitably related to the researcher's personal experience. In addition, this thesis has been affected by the travel restrictions caused by the COVID-19 pandemic. Originally, the researcher planned to make use of the annual vacation to obtain more respondents in China, but this idea had to be abandoned since the researcher has been asked not to undertake any overseas travel after January 2020. The current 133 responses are the only available questionnaire data for this thesis.

Second, there are limitations to the interviewees' perceptions gathered in this thesis. As interviewees have different personal preferences and information sensitivities, it is inevitable that some of those influences would be brought to the final findings.

Although the selected interviewees in this thesis cover different stakeholder groups including listed companies, government agencies, banks, and accounting firms, different perspectives may still emerge when different interviewees are selected. Therefore, while the current qualitative findings should be considered as providing a potential explanation for the driving forces behind CET in China, their generalisability cannot be fully confirmed until future studies can replicate this study.

Finally, other studies should be cautious in applying the empirical findings of this thesis. Except for the CET index, data for the other variables were downloaded from the CSMAR database. It should be noted that Chinese listed companies in the sample operate in a specific and relatively distinctive regulatory environment compared to listed companies in other countries. Since the financial market and regulatory environment in China are both somewhat different from those in other countries, the recommendations for policy-makers based on the empirical results of this study may be more applicable to countries and regions with similar characteristics than to those in other environments.

9.6.2 Future research potential

The main findings of this thesis shed light on future research and several potential opportunities have been identified.

First, with the establishment of the ISSB at COP26 (IFRS, 2021), there will be a clear trend to develop global sustainability disclosure standards. One promising direction would be to explore what current experiences can be referred to in the future development of China's sustainability disclosure standards and how China's standards converge with international standards. Future work should be devoted to deeper investigations into the practices related to corporate sustainability disclosure and corporate sustainability transparency in both the Chinese context and other regions.

Second, another promising area of future research is to focus on what consequences CET can have for companies over a longer period of time. This thesis confirms that in the short term there is a negative association between CET and corporate financial performance. Lu et al. (2018) argued that this influence is not constant,

and companies need to continue to invest in sustainability over a longer period of time. It is therefore not certain whether there will still be a negative association between CET and corporate financial performance in the long run. Moreover, since a higher level of CET implies a higher level of resources allocation (Zhao & Murrell, 2016), the green transformation of the company and the industrial upgrading will also take a longer time to achieve. Future research on the long-term impact of CET will help to understand the true mechanisms of CET's effect on companies.

Third, more control variables could be employed to improve the robustness of the regression analysis for future research purpose. There is a rich literature on the association between CSR disclosure and corporate financial performance (de Villiers & Lubbe, 2001; Halme & Huse, 1997; Liao et al., 2015; Rankin et al., 2011; Rao & Tilt, 2016). Thus, researchers could consult the existing literature to construct a regression model that includes more corporate governance variables (e.g., board independence, CEO duality, and board size), company specific variables (e.g., leverage ratio and company age), and ownership types of variables (e.g., state ownership, institutional ownership, and foreign shareholdings). In addition, future research could also explore some region-specific factors such as regional GDP, regional legal enforcement, etc.

Finally, the researcher acknowledges that the qualitative investigation in this thesis is exploratory and tentative, and its results are far from conclusive. From the results of the qualitative investigation, there are several unknown issues that require further academic attention, especially if more qualitative research tools are adopted. These questions include, but are not limited to, whether and to what extent boards of directors influence CET-related practices; and how exactly peer pressure affects a company's CET strategy. In addition, this thesis finds that impression management may hold significant explanatory power for CET in China. Future research should pay particular attention to this area and develop a purposeful research design to critically investigate the applicability and true explanatory power of the impression management perspective.

9.7 Chapter Summary

This chapter is a review and summary of the whole thesis. The concept of transparency has attracted a lot of attention from accounting academics, especially in the field of environmental accounting. However, this concept has not yet been systematically studied, and there is controversy in the existing literature over whether corporate environmental disclosures can represent environmental transparency. In order to fill the identified research gap, this thesis sets out five specific research objectives.

This chapter begins with a review of the five specific research objectives. Based on the sequence, this chapter provides a general description of how this thesis achieved each of the objectives. It is worth noting that the choice of research methods for this thesis is driven by the research objectives and questions. Since the research objectives in this thesis involve not only empirical results (e.g., correlations), but also explanations that provide insight into causal mechanisms, this thesis ultimately follows the pragmatism stance. Pragmatism is considered to provide the philosophical and theoretical elements of mixed methods research design that lend mixed research argumentative coherence and validity (Morgan, 2014). In accordance with the mixed methods research design, this chapter provides two summary statements of the main findings from the quantitative and qualitative investigations respectively and introduces the linkages between the two.

Overall, the findings of this thesis are highly instructive for both theory and practice. This chapter therefore summarises these important research implications. In addition, the chapter also demonstrates the main contributions of this thesis to existing knowledge. Finally, the researcher acknowledges that there are certain limitations of this thesis. Based on the foundation laid by the current study, future research potentials are elucidated.

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Appendix A. The List of 148 Sample Companies

No.	Stock Code	Name	Key pollutants				
			Air pollutants	Water pollutants	Solid wastes	Noises	others
1	000423	Dong-E E-Jiao Co., Ltd.		√			
2	000550	Jiangling Motors Co., Ltd.	√	√	√		
3	000553	ADAMA Ltd.	√				
4	000565	Chongqing Sanxia Paints Co., Ltd.		√			
5	000589	Guizhou Tyre Co., Ltd.		√			
6	000635	Ningxia Yinglite Chemicals Co., Ltd.		√	√		
7	000707	Hubei Shuanghuan Science and Technology Stock Co., Ltd.	√	√			
8	000708	CITIC Pacific Special Steel Group Co., Ltd.	√		√		
9	000751	Huludao Zinc Industry Co., Ltd.	√		√		
10	000782	Guangdong Xinhui Meida Nylon Co., Ltd.		√			
11	000799	Jiugui Liquor Co., Ltd.	√	√			
12	000815	Zhongye Meiliyun Industrial Investment Co., Ltd.	√	√			
13	000898	Angang Steel Co., Ltd.	√				
14	000913	Zhejiang Qianjiang Motorcycle Co., Ltd.		√	√		
15	000923	Xuanhua Construction Machinery Co., Ltd.	√				
16	000953	Guangxi Hechi Chemical Co., Ltd.	√	√			
17	000957	Zhongtong Bus Co., Ltd.		√	√		
18	000962	Ningxia Orient Tantalum Industry Co., Ltd.		√			
19	000982	Ningxia Zhongyin Cashmere Co., Ltd.		√			
20	000989	Jiuzhitang Co., Ltd.		√			
21	002025	Guizhou Aerospace Electronics Co., Ltd.					√
22	002043	Dehua TB New Decoration Material Co., Ltd.			√		
23	002056	Hengdian Group DMEGC Magnetics Co., Ltd.	√	√			
24	002086	Shandong Oriental Ocean Sci-tech Co., Ltd.		√			
25	002111	Weihai Guangtai Airport Equipment Co., Ltd.	√				
26	002112	Sanbian Sci-Tech Co., Ltd.		√			
27	002126	Zhejiang Yinlun Machinery Co., Ltd.		√			
28	002131	Leo Group Co., Ltd.		√			
29	002134	Tianjin Printronics Circuit Corporation		√	√		
30	002135	Zhejiang Southeast Space Frame Co., Ltd.	√				
31	002136	Anhui Annada Titanium Industry Co., Ltd.	√	√	√		

No.	Stock Code	Name	Key pollutants				
			Air pollutants	Water pollutants	Solid wastes	Noises	others
32	002144	Hongda High-Tech Holding Co., Ltd.		√			
33	002158	Shanghai Hanbell Precise Machinery Co., Ltd.			√		
34	002206	Zhejiang Hailide New Material Co., Ltd.	√		√		
35	002254	Yantai Tayho Advanced Materials Co., Ltd.		√			
36	002262	Jiangsu Nhwa Pharmaceutical Co., Ltd.	√	√	√		
37	002273	Zhejiang Crystal-Optech Co., Ltd.		√	√		
38	002286	Baolingbao Biology Co., Ltd.	√	√			
39	002287	Tibet Cheezheng Tibetan Medicine Co., Ltd.	√	√			
40	002333	ZYF Lopsking Aluminum Co., Ltd.		√	√		
41	002338	Changchun Aopu Photoelectric Technology Co., Ltd.		√	√		
42	002365	Qianjiang Yongan Pharmaceutical Co., Ltd.		√			
43	002393	Tianjin Lisheng Pharmaceutical Co., Ltd.		√	√		
44	002424	Guizhou Bailing Enterprise Group Pharmaceutical Co., Ltd.	√	√			
45	002428	Yunnan Lincang Xinyuan Germanium Industrial Co., Ltd.	√				
46	002430	Hangzhou Oxygen Plant Group Co., Ltd.			√		
47	002443	Zhejiang Kingland & Pipeline Technologies Co., Ltd.			√		
48	002460	Jiangxi Ganfeng Lithium Co., Ltd.	√	√			
49	002481	Yantai Shuangta Food Co., Ltd.	√	√			
50	002486	Shanghai Challenge Textile Co., Ltd.		√			
51	002487	Liaoning Dajin Heavy Industries Co., Ltd.	√				
52	002494	Huasi Holding Company Limited		√	√		√
53	002532	Tianshan Aluminum Group Co., Ltd.		√	√		
54	002557	Chacha Food Co., Ltd.		√			
55	002562	Brother Enterprises Holding Co., Ltd.		√	√		
56	002584	Xilong Scientific Co., Ltd.					√
57	002597	Anhui Jinhe Industrial Co., Ltd.	√	√	√		
58	002599	Beijing Shengtong Printing Co., Ltd.	√				
59	002604	Shandong Longlive Biotechnology Co., Ltd.	√	√			
60	002615	Zhejiang Haers Vacuum Containers Co., Ltd.	√	√	√		

No.	Stock Code	Name	Key pollutants				
			Air pollutants	Water pollutants	Solid wastes	Noises	others
61	002643	CECEP Valiant Co., Ltd.		√	√		
62	002693	Hainan Shuangcheng Pharmaceuticals Co., Ltd.		√			
63	002705	Guangdong Xinbao Electrical Appliances Holdings Co., Ltd.			√		
64	002725	Zhejiang Yueling Co., Ltd.		√			
65	002741	Guangdong Guanghua Sci-Tech Co., Ltd.			√		√
66	002753	Shanxi Yongdong Chemistry Industry Co., Ltd.			√		
67	002756	Yongxing Special Materials Technology Co., Ltd.			√		
68	002805	Shandong Fengyuan Chemical Co., Ltd.	√		√		
69	002810	Shandong Head Co., Ltd.			√		
70	002863	Zhejiang Jinfei Kaida Wheel Co., Ltd.		√	√		
71	002868	Lifecome Biochemistry Co., Ltd.	√	√	√		
72	300041	Hubei Huitian New Materials Co., Ltd.			√		
73	300046	Hubei Tech Semiconductors Co., Ltd.		√			
74	300083	Guangdong Create Century Intelligent Equipment Group Corporation Limited		√			
75	300088	Wuhu Token Science Co., Ltd.		√	√		
76	300121	Shandong Yanggu Huatai Chemical Co., Ltd.	√	√	√		
77	300132	Fujian Green Pine Co., Ltd.	√	√			
78	300224	Yantai Zhenghai Magnetic Material Co., Ltd.		√			
79	300225	Shanghai Kinlita Chemical Co., Ltd.	√				
80	300239	Baotou Dongbao Bio-tech Co., Ltd.		√			
81	300256	Jiangxi Firstar Panel Technology Co., Ltd.		√			
82	300257	Zhejiang Kaishan Compressor Co., Ltd.	√		√		
83	300375	Tianjin Pengling Group Co., Ltd.	√				
84	300405	Liaoning Kelong Fine Chemical Co., Ltd.		√			
85	300446	Baoding Lucky Innovative Materials Co., Ltd.	√				
86	300452	Anhui Shanhe Pharmaceutical Excipients Co., Ltd.		√			
87	300554	Nanjing Sanchao Advanced Materials Co., Ltd.		√	√		
88	300558	Betta Pharmaceuticals Co., Ltd.			√		
89	300641	Jiangsu Zhengdan Chemical Industry Co., Ltd.	√		√		
90	300657	XiaMen HongXin Electron-tech Co., Ltd		√	√		

No.	Stock Code	Name	Key pollutants				
			Air pollutants	Water pollutants	Solid wastes	Noises	others
91	600066	Zhengzhou Yutong Bus Co., Ltd.		√			
92	600103	Fujian Qingshan Paper Industry Co., Ltd.	√	√			
93	600190	Jinzhou Port Co., Ltd.	√	√			
94	600207	Henan Ancai Hi-Tech Co., Ltd.	√	√			
95	600235	Minfeng Special Paper Co., Ltd.	√	√			
96	600316	Jiangxi Hongdu Aviation Industry Co., Ltd.	√	√	√		
97	600317	Yingkou Port Liability Co., Ltd.					√
98	600319	Weifang Yaxing Chemical Co., Ltd.		√			
99	600353	Chengdu Xuguang Electronics Co., Ltd.		√	√		
100	600360	Jilin Sino-Microelectronics Co., Ltd.		√			
101	600379	Shaanxi Baoguang Vacuum Electronic Apparatus Co., Ltd.			√		
102	600399	Fushun Special Steel Shares Co., Ltd.	√		√		
103	600426	Shandong Hualu-Hengsheng Chemical Co., Ltd.	√	√	√		
104	600448	Huafang Co., Ltd.	√	√			
105	600493	Fujian Fynex Textile Science and Technology Co., Ltd.		√			
106	600501	Aerosun Corporation		√			
107	600513	Jiangsu Lianhuan Pharmaceutical Co., Ltd.		√	√		
108	600519	Kweichow Moutai Co., Ltd.		√			
109	600529	Shandong Pharmaceutical Glass Co., Ltd.	√				
110	600550	Baoding Tianwei Baobian Electric Co., Ltd.		√			
111	600581	Xinjiang Bayi Iron & Steel Co., Ltd.	√		√		
112	600587	Shinva Medical Instrument Co., Ltd.			√		
113	600618	Shanghai Chlor-Alkali Chemical Co., Ltd.	√	√	√		
114	600678	Sichuan Jinding Group Co., Ltd.	√				
115	600727	Shandong Lubei Chemical Co., Ltd.	√		√		
116	600746	Jiangsu SOPO Chemical Co., Ltd.	√	√			
117	600750	Jiangzhong Pharmaceutical Co., Ltd.	√	√			
118	600779	Sichuan Swellfun Co., Ltd.		√			
119	600793	Yibin Paper Industry Co., Ltd.	√	√			
120	600809	Shanxi Xinghuacun Fen Wine Factory Co., Ltd.		√			

No.	Stock Code	Name	Key pollutants				
			Air pollutants	Water pollutants	Solid wastes	Noises	others
121	600815	Xiamen XGMA Machinery Co., Ltd.			√		
122	600841	Shanghai Diesel Engine Co., Ltd.	√				
123	600847	Chongqing Wanli New Energy Co., Ltd.	√	√			
124	600992	Guizhou Steel Rope Co., Ltd.					√
125	601011	Baotailong New Materials Co., Ltd.	√		√		
126	601106	China First Heavy Industries		√			√
127	601113	Yiwu Huading Nylon Co., Ltd.	√				
128	601388	Ye Chiu Metal Recycling (China) Co., Ltd.		√			
129	601969	Hainan Mining Co., Ltd.		√	√		
130	603027	Qianhe Condiment and Food Co., Ltd.	√	√			
131	603033	Zhejiang Sanwei Rubber Item Co., Ltd.	√	√	√		
132	603113	Jinneng Science & Technology Co., Ltd.	√	√	√		
133	603165	Zhejiang Rongsheng Environmental Protection Paper Co., Ltd.	√	√			
134	603208	Jiangshan Oupai Door Industry Co., Ltd.	√				
135	603238	Hangzhou Nbond Nonwovens Co., Ltd.		√			
136	603328	Guangdong Ellington Electronics Technology Co., Ltd.		√	√		
137	603337	Jack Sewing Machine Co., Ltd.		√			
138	603338	Zhejiang Dingli Machinery Co., Ltd.			√		
139	603369	Jiangsu King's Luck Brewery Joint-Stock Co., Ltd.	√	√			
140	603589	Anhui Kouzi Distillery Co., Ltd.		√			√
141	603686	Fujian Longma Environmental Sanitation Equipment Co., Ltd.			√		
142	603728	Shanghai Mingzhi Electrical Appliance Co., Ltd.			√		
143	603822	Zhejiang Jiaao Enprotech Stock Co., Ltd.	√		√		
144	603878	Jiangsu Wujin Stainless Steel Pipe Group Co., Ltd.			√		
145	603919	Jinhui Liquor Co., Ltd.		√			
146	603920	Olympic Circuit Technology Co., Ltd.		√	√		
147	603926	Zhejiang Tieliu Clutch Co., Ltd.			√		
148	603998	Hunan Fangsheng Pharmaceutical Co., Ltd.		√			

Appendix B. The Scoring Rules for 12 Items

Item	Detailed scoring rules
1 <i>Names of major pollutants and specific pollutants</i>	Specify the name of the pollutant. If only the emission factors (exhaust gas, waste water, noise, etc.) are published, no score will be given. If only in the disclosure of other information (such as environmental protection facilities operating status, etc.) mention the name of pollutants, no score will be given.
2 <i>Way of discharge</i>	Point can be scored when referring to any of the pollutants' organised (unorganised) discharge, continuous (intermittent) discharge, discharge destination (connected to urban sewage pipe network, directly discharged into rivers, etc.) If there is a 'general discharge' statement, it is also considered a published discharge (directly into the river).
3 <i>Amount of discharge outlets</i>	Must specify quantity, with specific figure. Only the total number of discharge outlets is disclosed, or disclosure is divided into subsidiaries, pollutants, pollution factors, etc., point can be scored. The publication of monitoring sites does not count as the number of published outlets.
4 <i>Distribution of discharge outlets</i>	If the distribution of the discharge outlet in the factory (such as the south side of the factory, the roof of building x, etc.) or the geographical location (xx river) is given, the score will be obtained. If there is only a general explanation such as 'within the factory', also point can be scored.
5 <i>Concentration of discharge and total discharge volume</i>	The concentration and the total discharge volume of major or specific pollutants can be scored by any published item, and there must be a specific concentration or quantity. The concentration must publish the corresponding pollutant name; total discharge volume can also be scored based only on pollutant factors (such as air pollutants emissions). No scores for disclosure of total CO ₂ emissions or total solid waste only.
6 <i>Excess discharge</i>	A score is given for meeting, exceeding, meeting, not exceeding, or similar statements. If only "invest more in environmental protection to ensure emissions meet standards" or other similar, more empty statements, the report will not be regarded as published.
7 <i>Execution standards for pollutant discharge</i>	Specific standards must be published to score points, such as the <i>Comprehensive Discharge Standards for Water Pollutants</i> and the <i>Discharge Standards for Air Pollutants from Boilers</i> . Published name or number of the standard can also be scored. Statements like 'according to the national standard' does not score. Score can also be obtained if specific documents are not published, but standard limits are published.
8 <i>Permitted total discharge volume</i>	Must be specific to the pollutant. No points for disclosure of total approved emissions (such as air pollutants emissions) by the pollutant factors only.
9 <i>Construction and operation of pollution prevention facilities</i>	A score is awarded for the disclosure of the construction and operation of pollution prevention facilities. As long as the company has built pollution prevention and control facilities (pollution treatment facilities, environmental protection facilities, online monitoring equipment or other similar expressions), or related equipment upgrade (such as sewage treatment renovation project), it is deemed to disclose the construction of pollution prevention and control facilities; Any reference to the normal operation of environmental facilities (or other similar statements) is regarded as revealing the operation of pollution prevention facilities. In addition, if it is mentioned that the company reduces the generation and emission of pollutants through technology upgrading, production line transformation and other means (such as boiler coal-to-gas switch project, the introduction of advanced processing lines to reduce emissions, etc.), it will also be awarded point.

Item	Detailed scoring rules
10 <i>EIA of construction projects and PDP</i>	Points will be awarded for stating that the company has carried out the required EIA approval, received EIA acceptance or published the specific project name or PDP acceptance document.
11 <i>Emergency plans for unexpected environmental incidents</i>	Points will be awarded if the company has prepared an environmental emergency plan or filed it with the environmental protection authorities or provided details such as the introduction of risk sources or filing number.
12 <i>Environmental self-monitoring programmes</i>	Specify the monitoring program or the time of monitoring or the location of the monitoring sites. Points will also be awarded for a statement that a self-monitoring programme has been established.

Appendix C. Criteria for Large Fines in China

Name (Province, district, city)	Criteria for large fines (RMB 1,000)	Regional provisions
Beijing	30	Article 2 of the <i>Measures for the Implementation of Administrative Penalty Hearing Procedures in Beijing</i>
Tianjin	10	Article 2 of the <i>Circular of the Tianjin Municipal People's Government on the Determination of the Criteria of 'Large Fine' in Cases of Hearing of Administrative Penalties</i>
Shanghai	50	Article 4 of the <i>Shanghai Administrative Penalty Hearing Procedures Regulations</i>
Chongqing	20	Article 3 of the <i>Chongqing Municipal Administrative Penalty Hearing Procedures Regulations</i>
Guangdong	100	Article 5 of the <i>Measures for the Implementation of Administrative Penalty Hearing Procedures in Guangdong Province</i>
Hainan	100	Article 2 of the <i>Provisions on Procedures for Hearing Administrative Penalties in Hainan Province</i>
Inner Mongolia	30	Article 2 of the <i>Procedural Provisions on Hearing of Administrative Penalty in the Inner Mongolia Autonomous Region</i>
Xinjiang	20	Article 3 of the <i>Measures for the Implementation of Administrative Penalty Hearing Procedures in the Xinjiang Uygur Autonomous Region</i>
Tibet	10	The <i>Regulations of the People's Government of the Tibet Autonomous Region on the Criteria for Large Fines in the Scope of Hearing of Administrative Penalties</i>
Ningxia	20	Article 24 of the <i>Regulations on Administrative Hearing Procedures of the Ningxia Hui Autonomous Region</i>
Guangxi	10	Article 42 of the <i>Provisions on Administrative Law Enforcement Procedures of the Guangxi Zhuang Autonomous Region</i>
Heilongjiang	10	Article 8 of the <i>Measures for Supervision of Administrative Penalty in Heilongjiang Province</i>
Jilin	5	<i>Regulations of the People's Government of Jilin Province on the Amount of 'Large Fines' in the Scope of Hearing of Administrative Penalties</i>
Liaoning	10	Article 3 of the <i>Provisional Provisions on Administrative Penalty Hearing Procedures in Liaoning Province</i>
Shanxi	30	Article 6 of the <i>Notice of the People's Government of Shanxi Province on the Implementation of the Law of the People's Republic of China on Administrative Penalty</i>
Shandong	20	Article 2 of the <i>Measures for the Implementation of Administrative Penalty Hearing Procedures in Shandong Province</i>
Hebei	10	The <i>Notice of the People's Government of Hebei Province on the Large Fines in the Scope of Hearing of Administrative Penalties</i>
Henan	10	Article 20 of the <i>Measures for the Implementation of the Regulations on the Enforcement of Law by Administrative Organs in Henan Province</i>
Hunan	20	Article 7 of the <i>Provisions on Procedures for Hearing Administrative Penalties in Hunan Province</i>
Hubei	10	Article 2 of the <i>Rules for Hearing of Administrative Penalties in Hubei Province</i>
Zhejiang	50	The <i>Letter from the Legal Affairs Office of the People's Government of Zhejiang Province on Clarifying the Criteria</i>

Name (Province, district, city)	Criteria for large fines (RMB 1,000)	Regional provisions
Sichuan	50	<i>for Applying Hearing Procedures to the Imposition of Administrative Penalties for Large Fines</i> Article 4 of the <i>Regulations on Procedures for Hearing Administrative Penalties in Sichuan Province</i>
Jiangxi	20	Article 2 of the <i>Procedural Provisions on Hearing of Administrative Penalty in Jiangxi Province</i>
Qinghai	10	Article 2 of the <i>Provisional Rules on Procedures for Hearing Administrative Penalties in Qinghai Province</i>
Guizhou	10	The <i>Provisions of the People's Government of Guizhou Province on the Criteria for Large Fines for Administrative Penalties</i>
Yunnan	30	Article 25 of the <i>Code of Procedures for Administrative Penalty in Yunnan Province</i>
Gansu	30	Article 3 of the <i>Interim Provisions on Administrative Penalty Hearing Procedures in Gansu Province</i>
Anhui	10	Article 3 of the <i>Provisions on Procedures for Hearing Administrative Penalties in Anhui Province</i>
Jiangsu	20	Article 2 of the <i>Rules of Procedure for Hearing Administrative Penalties in Jiangsu Province (for Trial Implementation)</i>
Shenzhen	50	Article 47 of the <i>Shenzhen Administrative Hearing Measures</i>
Nanjing	20	Article 3 of the <i>Rules on Procedures for Hearing Administrative Penalties in Nanjing</i>
Shijiazhuang	10	Article 2 of the <i>Measures for the Implementation of Administrative Penalty Hearing Procedures in Shijiazhuang</i>
Urumqi	20	Article 2 of the <i>Urumqi Administrative Penalty Hearing Procedures Regulations</i>
Hangzhou	30	Article 2 of the <i>Regulations on the Implementation of Procedures for Hearing Administrative Penalties in Hangzhou</i>
Zhengzhou	10	Article 4 of the <i>Procedural Provisions on Hearing of Administrative Penalties in Zhengzhou</i>
Guiyang	20	Article 3 of the <i>Procedural Measures for Hearing Administrative Penalties in Guiyang (for Trial Implementation)</i>
Fushun	10	Article 3 of the <i>Notice of the General Office of the Fushun Municipal People's Government on Further Strengthening the Review of the Filing of Significant Administrative Penalties (Fuzhengbanfa [2017] No. 24)</i>

Appendix D. Ethical Approval

WAIKATO MANAGEMENT SCHOOL
TE RAUPAPA



Waikato Management School
The University of Waikato
Private Bag 3105
Hamilton 3240
New Zealand

Amanda Sircombe
WMS Research Office
Phone +64 7 838 4376
Email: amandas@waikato.ac.nz
www.management.ac.nz

Wei Cai
1 Kennedy Lane
Hamilton East
Hamilton 3216

13 May 2019

Dear Wei

*Ethical Application WMS 19/34
Corporate environmental transparency in China*

The above research project, as outlined in your submitted application, has been granted Ethics Approval for Research by the Waikato Management School Human Research Ethics Committee.

Please note: should you make changes to the project outlined in the approved ethics application, you may need to reapply for ethics approval.

Best wishes for your research.

Regards,

Amanda Sircombe

Amanda Sircombe
WMS Research and Postgraduate Manager

Appendix E. Participant Information Sheet

Participant Information Sheet

Waikato Management School

Te Raupapa



THE UNIVERSITY OF

WAIKATO

Te Whare Wānanga o Waikato

PLEASE READ ME FIRST

This research aims to foster a better understanding of the corporate environmental transparency in China. By doing so, this research may expand environmental research in accounting and provide insights for policy-makers to further improve environmental governance.

This research is conducted by Wei Cai and will contribute to the completion of a Doctoral of Philosophy (PhD - Accounting) in the Waikato Management School at the University of Waikato. This project is being supervised by Howard Davey and Min Bai.

If you have any questions about this research project, you can contact the researcher (Wei Cai) at +64-021-230-0550 or +86-176-0165-1067, and e-mail at wc109@students.waikato.ac.nz. Also, the supervisor of this project can be contacted by email (howard.davey@waikato.ac.nz).

If you agree to be involved in this research project, you will be invited to be interviewed. The interview, with your consent, should only take approximately 30 minutes of your time.

All the materials collected from you will be only used for research purpose. The primary output is to complete the thesis of the researcher's doctoral program. Other outputs of this research may be used for future publications or presentations at conferences. In other words, the outputs might be seen by different institutions or individuals, for example, the sponsoring organisations, academic conference audiences, and journal article readers.

Please notice, your name and personal identity are not required for the completion of the interview. Moreover, only the researcher and the supervisors have access to the data from the interview. The data is only saved and analysed for this research, and it will be destroyed after ten years when this research project is completed.

If you take part in this research project, you will have the right to:

- Refuse to answer any questions and withdraw any information you have provided from the research on 31st July 2020.
- Ask any further questions about the research that occurs to you during your participation.
- Be given access to a summary of the findings from the research when it is concluded.

Please make sure you have signed the consent form first before your participation.

参与者须知

Waikato Management School

Te Raupapa



THE UNIVERSITY OF

WAIKATO

Te Whare Wānanga o Waikato

请在参与本研究项目前仔细阅读以下须知：

本研究项目的主题是有关中国的企业环境透明度。通过开展本项研究，可以进一步拓展会计领域的环境研究，以及为政策制定者改善环境治理提供见解和参考。

本研究项目的主要实施者是蔡伟，研究成果将被用于完成研究者在新西兰怀卡托大学管理学院的会计博士项目。霍华德·戴维是本项目的指导老师。

如果您对本研究项目有任何疑问，可以直接电话联系项目实施者蔡伟，+64-021-230-0550（新西兰），或 +86-176-0165-1067（中国大陆）。或者通过邮件方式联系 wc109@students.waikato.ac.nz。此外，您还可以以邮件方式联系项目导师（howard.davey@waikato.ac.nz）。

如果您同意参与本研究项目，您将会被邀请参加一个访谈。整个访谈过程大约 30 分钟。

所有从您这里获取的信息只能被用于研究目的。本研究项目的主要成果将用于研究者的博士项目毕业设计，其他成果也可能被用于学术出版物的发表或在学术会议中展示。因此，潜在的信息使用者可能为机构或者个人，例如：资助者所在的组织、学术会议的听众、学术出版物的读者等。

为了保护您的隐私，访谈不要求您提供姓名和个人身份信息。此外，只有研究者与其导师有权使用访谈中获取的信息，这些信息只能被应用于本研究项目的分析和存储。在本研究项目结项后十年所有访谈信息将被销毁。

如果您决定参与本研究项目，您将享有以下权利：

- 拒绝回答访谈中的任何问题，在 2020 年 7 月 31 日前向研究者要求收回您所提供的任何信息。
- 在访谈过程中询问任何与您相关或与研究项目相关的问题。
- 在本研究项目结项以后要求一个有关研究成果的简要陈述。

请确保您在参与本研究项目之前签署了《参与者授权书》。

Appendix F. Consent Form for Participants

Consent Form for Participants

Waikato Management School
Te Raupapa



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Corporate environmental transparency in China

Consent Form for Participants

I have read the **Information Sheet for Participants** for this study and have had the details of the study explained to me. My questions about the study have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I also understand that I am free to withdraw from the study before *31st July 2020*, or to decline to answer any particular questions in the study. I agree to provide information to the researchers under the conditions of confidentiality set out on the **Information Sheet**.

- I agree for this interview to be audio recorded
- I agree to participate in this study under the conditions set out in the **Information Sheet** form.

Signed: _____

Name: _____

Date: _____

Researcher's Name and contact information:

Wei Cai

Mobile number (New Zealand): (+64) 021 230 0550

Mobile number (China Mainland): (+86) 176 0165 1067

E-mail address: wc109@students.waikato.ac.nz

Supervisor's Name and contact information:

Howard Davey

E-mail address: howard.davey@waikato.ac.nz

参与者授权书

Waikato Management School
Te Raupapa



中国企业环境透明度

参与者授权书

我已阅读过本研究项目的《参与者须知》并且被告知研究详情。我对本研究项目的疑问得到了满意的答复，我明白我拥有在任何时间继续提出疑问的权利。

此外，我已知悉在本研究项目中，我有权拒绝回答任何问题，并且有权在2020年7月31日前收回我所提供的任何信息。我同意在《参与者须知》中保密条款被履行的前提下，向研究者提供本研究项目所需要的信息。

- 我同意在这次访谈的过程中使用录音设备。
- 我已知悉《参与者须知》的全部内容，自愿参加本研究项目。

本人签字： _____

参与人： _____

日期： _____

研究者的姓名和联系方式:

蔡伟

手机号码（新西兰）： (+64) 021 230 0550

手机号码（中国大陆）： (+86) 176 0165 1067

电子邮箱： wc109@students.waikato.ac.nz

研究者导师的姓名和联系方式:

霍华德·戴维

电子邮箱： howard.davey@waikato.ac.nz

Appendix G. Questionnaire for Stakeholder Survey



WAIKATO MANAGEMENT SCHOOL TE RAUPAPA

Kia Ora,

welcome to this research project. Please read the instructions and answer the questions.

This research is conducted by Wei Cai and will contribute to the completion of his doctoral thesis (Accounting PhD) in the Waikato Management School at the University of Waikato. This project is being supervised by Howard Davey and Min Bai. If you have any questions about this research project, you can contact the researcher (Wei Cai) at +64-021-230-0550 or +86-176-0165-1067 or e-mail at wc109@students.waikato.ac.nz. All the materials collected from you will be only used for research purpose. The primary output is to complete the thesis of the researcher's doctoral program. Other outputs of this research may be used for future publications or presentations at conferences. In other words, the outputs might be seen by different institutions or individuals, for example, the sponsoring organisations, academic conference audiences, and journal article readers. Please notice, your name and personal identity are not required for the completion of the questionnaire. Moreover, only the researcher and the supervisor have access to the data from the questionnaire. The data is only saved and analysed for this research, and it will be destroyed after five years when this research project is completed. If you take part in this research project, you will have the right to:

- Refuse to answer any questions and withdraw any information you have provided from the research on 31st July 2020.
- Ask any further questions about the research that occurs to you through the above contact information.
- Be given access to a summary of the findings from the research when it is concluded. It will take about 5-10 minutes to complete this questionnaire.

1. Environmental Disclosures by Companies

1.1 Have you ever browsed any annual reports issued by any A-share listed companies?

Yes

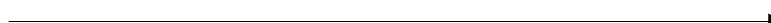
No

1.2 Are you aware that the annual report contains environmental disclosures?


Yes

No


1.3 In terms of accessibility, to what extent do annual reports help you to access corporate environmental information? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

1.4 In terms of clarity, to what extent do you think that the mandatory environmental information disclosures by listed companies are clear and easy to understand? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

1.5 In terms of reliability, to what extent do you think that the mandatory environmental disclosures by listed companies can reflect the real situation? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

2. Environmental Administrative Penalties by Governments

2.1 Have you ever viewed any administrative penalties of listed companies from government websites?

Yes


No

2.2 Are you aware that some administrative penalties are environmental administrative penalties?


Yes

No


2.3 In terms of accessibility, to what extent do government websites help you to access corporate environmental information? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

2.4 In terms of clarity, to what extent do you think that the environmental administrative penalties imposed by government authorities are clear and easy to understand? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

2.5 In terms of reliability, to what extent do you think that the environmental administrative penalties imposed by government authorities can reflect the real situation? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

3. Environment News Headlines by Media

3.1 Have you ever watched or read any news headlines on listed companies from media channels?

Yes

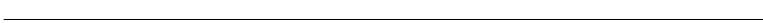
No

3.2 Are you aware that some news headlines are related to the environment?


Yes

No


3.3 In terms of accessibility, to what extent do media channels help you to access corporate environmental information? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

3.4 In terms of clarity, to what extent do you think that the environment news reported by media are clear and easy to understand? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

3.5 In terms of reliability, to what extent do you think that the environment news reported by media can reflect the real situation? (Please select one number)

1	2	3	4	5	6	7	8	9	10
Low  High									

4. Corporate Environmental Transparency

Please provide short answers for the following questions (Multiple answers possible).

4.1 What factors can increase the environmental transparency of an A-share listed company? _____

4.2 What factors can reduce the environmental transparency of an A-share listed company? _____

4.3 What are the possible effects of a high level of environmental transparency of an A-share listed company? _____

4.4 What are the possible consequences of a low level of environmental transparency of an A-share listed company? _____

5. Additional Demographic Information

You have completed the survey. Completing the following section allows us to understand how different groups of people feel about different issues. Only averaged results will be reported, and you will not be identified as an individual respondent.

5.1 Age group?

0-19

20-29

30-39

40-49

50-59

- 60-69
- Above 70

5.2 Gender?

- Male
- Female
- Other _____

5.3 Highest educational attainment?

- Middle school or less
- High school
- Bachelor or Diploma
- Master or above
- Home schooling
- Other _____

5.4 The median average of employees' annual revenue in May 2019 in China is around RMB 60,000. Would you describe your annual revenue as being?

- Significantly below average
- Below Average
- Average
- Above average
- Significantly above average

5.5 What types of employers are you working for?

- Self-employed
- Nongovernmental organisations
- Privately owned companies
- Government agencies or institutions
- State-owned companies
- Other _____

Appendix H. Questions for Semistructured Stakeholder Interview

1. Do you think Chinese listed companies are transparent about their environmental performance?

- If the interviewee responds yes, then: what makes you feel that they are transparent?
 - If the interviewee mentions one reason from external contextual factors, internal contextual factors, or organisational characteristics, the follow-up questions would be: why do you think this factor makes them transparent, and how do you think this factor exerts its influence?
- If no or unsure, then: what makes you feel that they are not transparent enough?
 - If the interviewee mentions one reason from external contextual factors, internal contextual factors, or organisational characteristics, the follow-up questions would be: why do you think this factor prevents them from being transparent, and how do you think this factor exerts its influence?

2. Do you think environmental policies have a significant impact on the environmental transparency of Chinese listed companies?

- If the interviewee responds yes or mentions at least one policy, then: why and how do you think environmental policies impact a company's CET?
- If no or unsure, then: what makes you feel that environmental policies play a very limited role in this regard?

3. Do you think stakeholder groups, such as, governments, consumers, competitors, and communities, have a significant impact on environmental transparency of Chinese listed companies?

- If the interviewee responds yes or mentions at least one stakeholder group, then: why and how do you think stakeholder groups impact a company's CET?

- If no or unsure, then: what makes you feel that stakeholder groups play a very limited role in this regard?
4. Do you think corporate decision makers, such as, managers, executives, and directors on the board, have a significant impact on environmental transparency of Chinese listed companies?
- If the interviewee responds yes or mentions at least one corporate decision maker, then: why and how do you think corporate decision makers impact a company's CET?
 - If no or unsure, then: what makes you feel that corporate decision makers play a very limited role in this regard?
5. Do you think the level of environmental transparency of Chinese listed companies can be improved?
- If yes, then: why, and by what means do you think it could be promoted?
 - If no or unsure, then: what makes you feel that it is difficult to change the level of environmental transparency of Chinese listed companies?
6. What do you think the relationship between a company's CET and its financial performance is? And why?

Appendix I. Stakeholders' Answers for Close-ended Questions

Item	Questions	Yes		No		Total									
		Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)								
1.1	Have you ever browsed any annual reports issued by any A-share listed companies?	105	78.95	28	21.05	133	100								
1.2	Are you aware that the annual report contains environmental disclosures?	93	69.92	40	30.08	133	100								
2.1	Have you ever viewed any administrative penalties of listed companies from government websites?	69	51.88	64	48.12	133	100								
2.2	Are you aware that some administrative penalties are environmental administrative penalties?	58	43.61	75	56.39	133	100								
3.1	Have you ever watched or read any news headlines of listed companies from media channels?	118	88.72	15	11.28	133	100								
3.2	Are you aware that some news headlines are related to the environment?	100	75.19	33	24.81	133	100								
Item	Information Source	Attribute	Score										Total	Mean	Std.Dev.
			1	2	3	4	5	6	7	8	9	10			
1.3	Corporate environmental disclosure	Accessibility	0	0	0	0	5	23	43	40	22	0	133	7.3823	1.07
1.4		Clarity	0	4	13	16	36	38	20	6	0	0	133	5.3166	1.41
1.5		Reliability	0	8	13	32	50	21	9	0	0	0	133	4.6750	1.23
2.3	Government environmental supervision	Accessibility	0	0	2	4	8	38	71	10	0	0	133	6.5175	0.94
2.4		Clarity	0	0	0	0	1	7	10	21	61	33	133	8.7506	1.12
2.5		Reliability	0	0	0	0	0	0	4	6	42	81	133	9.5014	0.72
3.3	Media environmental coverage	Accessibility	0	0	0	0	0	15	25	41	46	6	133	8.0201	1.08
3.4		Clarity	0	0	5	13	20	49	29	12	5	0	133	6.0511	1.34
3.5		Reliability	2	8	16	36	34	17	15	5	0	0	133	4.7113	1.55

Appendix J. CET Index of 148 Sample Companies

Stock Code	2017				2018			
	EDI (0-1)	SEAPI (0-1)	ENHI (-1-1)	CET (Weighted)	EDI (0-1)	SEAPI (0-1)	ENHI (-1-1)	CET (Weighted)
000423	0.9167	0.7500	0.0000	0.5663	1.0000	1.0000	0.0000	0.6917
000550	1.0000	1.0000	0.0625	0.7110	1.0000	1.0000	0.2500	0.7688
000553	0.8333	0.7500	0.0000	0.5425	0.9167	1.0000	0.0000	0.6680
000565	0.1667	1.0000	0.0370	0.4655	1.0000	1.0000	-0.3333	0.5890
000589	1.0000	0.7500	0.0000	0.5901	1.0000	1.0000	0.0000	0.6917
000635	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.2500	0.7688
000707	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	-0.0400	0.6794
000708	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
000751	1.0000	1.0000	0.0000	0.6917	0.9167	1.0000	0.0000	0.6680
000782	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	-0.1250	0.6532
000799	0.8333	1.0000	0.0000	0.6442	0.9167	1.0000	0.0000	0.6680
000815	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.4444	0.8287
000898	0.9167	1.0000	0.1111	0.7022	1.0000	1.0000	0.1111	0.7260
000913	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.2500	0.7688
000923	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	-0.3600	0.5807
000953	0.9167	1.0000	0.0200	0.6741	1.0000	0.7500	-0.1200	0.5531
000957	0.9167	0.5000	-0.1667	0.4133	0.9167	1.0000	0.0612	0.6868
000962	0.8333	1.0000	0.0000	0.6442	0.9167	1.0000	0.0000	0.6680
000982	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	0.2500	0.7688
000989	0.8333	1.0000	0.0000	0.6442	0.9167	1.0000	0.0000	0.6680
002025	1.0000	0.7500	0.0000	0.5901	1.0000	1.0000	0.0000	0.6917
002043	1.0000	0.7500	0.0000	0.5901	0.9167	1.0000	0.0000	0.6680
002056	1.0000	1.0000	0.1111	0.7260	1.0000	0.7500	-0.1250	0.5515
002086	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002111	0.8333	1.0000	0.0000	0.6442	1.0000	1.0000	0.0000	0.6917
002112	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	0.0000	0.6917
002126	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002131	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002134	0.7500	1.0000	0.0000	0.6204	0.9167	1.0000	0.0000	0.6680
002135	0.8333	1.0000	0.0000	0.6442	0.9167	1.0000	0.0000	0.6680
002136	0.9167	1.0000	0.1600	0.7173	1.0000	1.0000	-0.3600	0.5807
002144	0.9167	1.0000	0.0000	0.6680	0.9167	1.0000	0.0000	0.6680
002158	0.0000	1.0000	0.0000	0.4066	0.5833	1.0000	0.0000	0.5729
002206	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	0.0000	0.6917
002254	0.9167	0.7500	-0.0800	0.5417	1.0000	0.7500	-0.0741	0.5672
002262	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002273	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002286	0.8333	1.0000	0.0000	0.6442	1.0000	1.0000	0.2500	0.7688
002287	0.0000	1.0000	0.0000	0.4066	0.6667	1.0000	0.2500	0.6737
002333	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002338	0.9167	1.0000	0.0000	0.6680	0.9167	1.0000	0.0000	0.6680
002365	1.0000	1.0000	0.0400	0.7040	1.0000	1.0000	0.1111	0.7260
002393	0.0000	0.7500	0.0000	0.3049	0.6667	1.0000	0.0000	0.5967
002424	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002428	1.0000	1.0000	0.2500	0.7688	1.0000	1.0000	0.0000	0.6917
002430	0.0000	1.0000	0.0000	0.4066	1.0000	1.0000	0.0000	0.6917
002443	0.6667	1.0000	0.0000	0.5967	0.0000	1.0000	0.0000	0.4066
002460	0.8333	0.7500	-0.0600	0.5241	1.0000	1.0000	0.0000	0.6917
002481	1.0000	0.7500	0.0000	0.5901	1.0000	1.0000	0.0000	0.6917

Stock Code	2017				2018			
	EDI (0-1)	SEAPI (0-1)	ENHI (-1-1)	CET (Weighted)	EDI (0-1)	SEAPI (0-1)	ENHI (-1-1)	CET (Weighted)
002486	0.0000	1.0000	0.0000	0.4066	1.0000	1.0000	-0.1111	0.6575
002487	0.0000	0.7500	0.0000	0.3049	1.0000	1.0000	0.0000	0.6917
002494	0.9167	1.0000	0.0000	0.6680	0.9167	1.0000	0.0000	0.6680
002532	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	0.0000	0.6917
002557	0.0000	1.0000	0.0000	0.4066	0.0000	1.0000	0.0000	0.4066
002562	0.9167	0.7500	0.0000	0.5663	1.0000	1.0000	0.0000	0.6917
002584	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002597	1.0000	1.0000	0.2500	0.7688	1.0000	0.7500	-0.0400	0.5777
002599	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	0.0000	0.6917
002604	0.9167	1.0000	0.1600	0.5583	1.0000	1.0000	0.0625	0.5557
002615	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002643	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	0.2500	0.7688
002693	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002705	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002725	0.0000	1.0000	0.0000	0.4066	1.0000	1.0000	0.0000	0.6917
002741	0.0000	1.0000	0.0000	0.4066	1.0000	1.0000	0.4050	0.8166
002753	1.0000	1.0000	-0.2500	0.6146	1.0000	1.0000	0.1111	0.7260
002756	1.0000	1.0000	0.0100	0.6948	1.0000	1.0000	0.1837	0.7483
002805	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002810	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
002863	1.0000	1.0000	0.0000	0.6917	0.9167	1.0000	0.0000	0.6680
002868	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
300041	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.1600	0.7410
300046	0.0000	1.0000	0.0000	0.4066	1.0000	1.0000	0.0000	0.6917
300083	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.1111	0.7260
300088	0.9167	1.0000	0.0625	0.6872	1.0000	1.0000	0.1111	0.7260
300121	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	0.0000	0.6917
300132	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.2500	0.7688
300224	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	-0.2500	0.6146
300225	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
300239	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
300256	0.9167	0.7500	0.0000	0.5663	1.0000	1.0000	0.1111	0.7260
300257	0.0000	1.0000	0.0000	0.4066	0.9167	1.0000	0.0000	0.6680
300375	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	-0.1600	0.6424
300405	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
300446	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
300452	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
300554	1.0000	1.0000	0.0000	0.6917	0.9167	1.0000	0.0000	0.6680
300558	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
300641	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
300657	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
600066	0.6667	1.0000	0.4444	0.7337	0.8333	1.0000	0.3600	0.7552
600103	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
600190	0.7500	1.0000	0.0000	0.6204	1.0000	1.0000	0.0000	0.6917
600207	0.6667	1.0000	0.0000	0.5967	1.0000	1.0000	0.1111	0.7260
600235	0.0000	1.0000	0.0000	0.4066	0.8333	1.0000	0.0000	0.6442
600316	1.0000	1.0000	0.0000	0.6917	0.8333	1.0000	0.0000	0.6442
600317	0.9167	1.0000	0.0000	0.6680	0.3333	1.0000	0.0000	0.5016
600319	0.4167	0.2500	0.0000	0.2205	0.7500	1.0000	0.0000	0.6204
600353	0.8333	1.0000	0.0000	0.6442	1.0000	1.0000	0.0000	0.6917
600360	0.0833	1.0000	0.0000	0.4303	0.9167	1.0000	0.0000	0.6680
600379	0.0833	1.0000	0.0000	0.4303	1.0000	1.0000	0.0000	0.6917

Stock Code	2017				2018			
	EDI (0-1)	SEAPI (0-1)	ENHI (-1-1)	CET (Weighted)	EDI (0-1)	SEAPI (0-1)	ENHI (-1-1)	CET (Weighted)
600399	0.7500	1.0000	0.0000	0.6204	0.7500	0.5000	-0.4297	0.2847
600426	0.4167	1.0000	0.0000	0.5254	0.7500	1.0000	0.0000	0.6204
600448	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
600493	0.8333	1.0000	0.0000	0.6442	1.0000	1.0000	0.2500	0.7688
600501	0.9167	1.0000	0.0000	0.6680	0.7500	1.0000	0.0000	0.6204
600513	0.8333	1.0000	0.0000	0.6442	1.0000	1.0000	0.0000	0.6917
600519	1.0000	1.0000	0.0100	0.6948	1.0000	1.0000	0.0000	0.6917
600529	0.8333	0.7500	0.0000	0.5425	0.9167	1.0000	0.0000	0.6680
600550	0.0833	1.0000	0.0000	0.4303	0.4167	1.0000	0.0000	0.5254
600581	0.5000	1.0000	0.0000	0.5491	1.0000	1.0000	0.5625	0.8651
600587	0.6667	1.0000	0.0000	0.5967	0.7500	0.7500	0.0000	0.5188
600618	0.1667	1.0000	0.0000	0.4541	0.5833	1.0000	-0.2500	0.4958
600678	0.9167	0.7500	-0.1250	0.5278	1.0000	1.0000	0.3600	0.8027
600727	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
600746	0.7500	1.0000	0.0000	0.6204	0.9167	1.0000	0.0000	0.6680
600750	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
600779	0.8333	1.0000	0.0000	0.6442	0.7500	1.0000	0.0000	0.6204
600793	0.5833	0.7500	-0.1111	0.4370	0.7500	1.0000	0.0000	0.6204
600809	1.0000	1.0000	0.0000	0.6917	0.9167	1.0000	0.0000	0.6680
600815	0.8333	1.0000	0.0000	0.6442	0.9167	1.0000	0.0000	0.6680
600841	0.3333	1.0000	0.0000	0.5016	0.7500	1.0000	0.0000	0.6204
600847	0.1667	1.0000	0.0000	0.4541	1.0000	1.0000	0.0000	0.6917
600992	0.0833	1.0000	0.0000	0.4303	0.8333	1.0000	0.0000	0.6442
601011	0.7500	1.0000	0.0000	0.6204	0.9167	1.0000	0.0000	0.6680
601106	0.6667	1.0000	0.0000	0.5967	0.6667	1.0000	0.0000	0.5967
601113	0.3333	1.0000	0.0000	0.5016	0.7500	1.0000	0.0000	0.6204
601388	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
601969	0.0000	1.0000	0.2500	0.4836	0.8333	1.0000	0.0000	0.6442
603027	0.8333	1.0000	0.0000	0.6442	0.8333	1.0000	0.0000	0.6442
603033	1.0000	1.0000	0.0000	0.6917	0.6667	1.0000	0.0000	0.5967
603113	0.8333	1.0000	0.0000	0.6442	0.7500	1.0000	0.0000	0.6204
603165	0.1667	1.0000	0.0000	0.4541	1.0000	1.0000	0.0000	0.6917
603208	0.5833	1.0000	0.0000	0.5729	0.5000	1.0000	0.0000	0.5491
603238	0.7500	1.0000	0.0000	0.6204	0.8333	1.0000	0.0000	0.6442
603328	1.0000	1.0000	-1.0000	0.3834	1.0000	1.0000	0.0000	0.6917
603337	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
603338	0.9167	1.0000	0.0000	0.6680	0.9167	1.0000	0.0000	0.6680
603369	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
603589	0.8333	1.0000	0.0000	0.6442	1.0000	1.0000	0.0000	0.6917
603686	0.6667	1.0000	0.2500	0.6737	0.8333	1.0000	0.3600	0.7552
603728	0.0833	1.0000	0.0000	0.4303	0.7500	1.0000	0.0000	0.6204
603822	1.0000	1.0000	0.0000	0.6917	0.9167	1.0000	0.0000	0.6680
603878	0.9167	1.0000	0.0000	0.6680	0.9167	1.0000	0.0000	0.6680
603919	0.9167	1.0000	0.0000	0.6680	1.0000	1.0000	0.0000	0.6917
603920	0.8333	1.0000	0.0000	0.6442	0.9167	1.0000	0.0000	0.6680
603926	1.0000	1.0000	0.0000	0.6917	1.0000	1.0000	0.0000	0.6917
603998	0.5833	1.0000	0.0000	0.5729	0.8333	1.0000	0.0000	0.6442

Appendix K. The List of Zero EDI Score Companies

Stock Code	Company Name (Chinese)	2017 EDI score	Stock Code	Company Name (Chinese)	2018 EDI score
000559	万向钱潮	0	002443	金洲管道	0
000561	烽火电子	0	002557	洽洽食品	0
000677	恒天海龙	0	000777	中核科技	0
000710	*ST天仪	0	000801	四川九洲	0
000756	新华制药	0	002066	瑞泰科技	0
000848	承德露露	0	002079	苏州固得	0
002072	凯瑞德	0	002094	青岛金王	0
002138	顺络电子	0	002220	ST天宝	0
002158	汉钟精机	0	002259	*ST升达	0
002185	华天科技	0	002319	乐通股份	0
002202	金风科技	0	002472	双环传动	0
002287	奇正藏药	0	002492	恒基达鑫	0
002382	蓝帆医疗	0	002545	东方铁塔	0
002393	力生制药	0	002598	山东章鼓	0
002430	杭氧股份	0	002665	首航节能	0
002486	嘉麟杰	0	002722	金轮股份	0
002487	大金重工	0	002855	捷荣技术	0
002488	金固股份	0	002880	卫光生物	0
002490	*ST墨龙	0	300064	豫金刚石	0
002523	天桥起重	0	300109	新开源	0
002557	洽洽食品	0	300114	中航电测	0
002662	京威股份	0	300126	锐奇股份	0
002689	远大智能	0	300192	科斯伍德	0
002715	登云股份	0	300260	新莱应材	0
002725	跃岭股份	0	300283	温州宏丰	0
002726	龙大肉食	0	30032	同大股份	0
002741	光华科技	0	300346	南大光电	0
300046	台基股份	0	300436	广生堂	0
300094	国联水产	0	300466	赛摩电气	0
300257	开山股份	0	300765	新诺威	0
300476	胜宏科技	0	300779	惠城环保	0
300569	天能重工	0	600004	白云机场	0
600019	宝钢股份	0	600989	宝丰能源	0
600165	新日恒力	0	601369	陕鼓动力	0
600235	民丰特纸	0	603005	晶方科技	0
600303	曙光股份	0	603129	春风动力	0
600477	杭萧钢构	0	603186	华正新材	0
600586	金晶科技	0	603278	大业股份	0
600796	钱江生化	0	603315	福鞍股份	0
600883	博闻科技	0	603379	三美股份	0
601233	桐昆股份	0	603527	众源新材	0
601633	长城汽车	0	603595	东尼电子	0

Stock Code	Company Name (Chinese)	2017 EDI score	Stock Code	Company Name (Chinese)	2018 EDI score
601969	海南矿业	0	603663	三祥新材	0
603058	永吉股份	0	603699	纽威股份	0
603797	联泰环保	0	603773	沃格光电	0
			603800	道森股份	0
			603818	曲美家居	0
			603855	华荣股份	0
			603982	泉峰汽车	0