AN ASSESSMENT OF CSR REPORTING PRACTICE IN CHINA'S MINING AND MINERALS INDUSTRY

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ABSTRCT

Mining all over the world is risky and dangerous activity. The mining and minerals industry is not only a fundamental part of today's world, providing essential energy and raw materials for global development but also a vital sector in China's economic and social development. However, the industry fuels various social and environmental issues. China's mining and minerals industry is generally fragmented with low levels of efficiency, poor safety record and the stagnant flow of information. To achieve the sustainable development of the industry, 'Development of a Green and Sustainable Mining Industry' has been set as one of the major objectives in China's new development programme – The 12th Five-Year Plan (2011-2015) approved by China's National People's Congress on 14 March 2011. In pursuing long-term sustainable development, the industry is required to improve utilization rate of resources, reduce environmental pollution, coordinate overall development of employees, industry, economy and society, and improve information transparency and accountability. As a key component of the CSR implementation package and for building a harmonious Chinese society, sustainability reporting is rising to the top of Chinese companies' agendas, with increasingly more companies producing sustainability or CSR reports. However, in the current Chinese context, sustainability reporting, it is still in its early stage but developing at unprecedented rate among Chinese companies. During the period 2001 – 2009, the number of sustainability reports released in China has increased from just one to more than 600. Although there is burgeoning literature that examines the sustainability reporting practice in western countries, and the mining and minerals industry in particular, the literature which focuses on the Chinese context is still in its infancy.

This study, taking into account the specific contextual peculiarities of Chinese companies, assesses the current status of sustainability reporting practice in China's mining and minerals industry during 2007 – 2010. A sample of 176 mining and minerals companies listed on China's domestic stock exchanges – Shanghai and Shenzhen stock exchanges is selected. Content analysis has been conducted to extract disclosure quantity, quality and contents from both corporate annual reports and sustainability reports. The corporate reports are then benchmarked against the domestic sustainability reporting framework – 'Chinese CSR Report Preparation Guide (CASS-CSR 1.0)', which is developed by the Chinese Academy of Social Science in 2009 as the first full-coverage CSR reporting guidebook for Chinese companies and the cornerstone of the CSR reporting system in China. The study identifies that overall there is a dramatic increase in the number of disclosing companies; disclosure quantity; and disclosure quality in China's mining and minerals industry during the study period. The result is well coincident with the third phase[2] in historical development of sustainability reporting in China – the rapid development of sustainability reporting practice during the period of 'building a harmonious society' (mid 2000s – 2010). Year 2008 is identified to be a peak of reporting because of the active promotion by the Chinese governments and stock exchanges. Over the study period, the increasing rate of quality of disclosures is found to be slower than the number of disclosing companies and quantity of disclosures. None of the corporate reports achieves a quality score of 50% or more, indicating the immaturity stage of sustainability reporting practice in China. The traditional annual reports are still the most commonly used reporting means by Chinese companies while stand-alone sustainability reports are found to be more informative than other information media, indicating its potential value as the key information media in the future years. Compared to the global trend, the study identifies that Chinese mining and minerals companies not only disclose some basic information, such as the human resources, and environmental matters but also disclose some unique items, reflecting the Chinese characteristics, such as the support of governmental policies – The 12th Five Year Plan (2011 – 2015); provision of sustainability fund; and responding to circular economy policies. Overall, the current status of sustainability reporting in

[2] The historical development of sustainability reporting practice in the Chinese context can be characterized by four main time periods – negligence of CSR (1979 – late 1990s), emergence of CSR concept and sustainability reporting practice as an external push (early 2000s – mid 2000s), rapid development of sustainability reporting practice during the period of 'building a harmonious society' (mid 2000s – 2010), and expected stable growth of sustainability reporting and convergence with international trends during the period of 12th five year plan (2011 onwards).

China's mining and minerals industry can be classified into the stage of *'follower'* based on the Chinese Academy of Social Science's classification criteria in 2009.

Overall, the study concludes that sustainability reporting has been put on the agenda of mining companies in China as shown by the increasing number of reporting companies via different reporting medium. However, the quantity and quality of disclosures need considerable improvement. The current sustainability reporting practice in China's mining and minerals industry could be characterized as a high level concern with the issue but a low level engagement with improving the reporting substance. Therefore, it is doubtful that the ascertained level of disclosures could satisfy the information demands of various stakeholders. As the Chinese state government's advocacy of CSR as the key component of constructing a 'harmonious society' and China's entry into the world economic market, the current institutional environment provides an opportunity for Chinese companies' improvement of awareness and the high level of engagement with adopting sustainability reporting practice. In the current Chinese context, sustainability disclosures are largely used by Chinese companies as way of maintaining legitimacy in the eyes of the global community and responding to institutional pressures. However, other internal stakeholders, such as employees and shareholders, still have weak power to influence sustainability reporting practice in China's mining and minerals industry. Therefore, to improve the comprehensiveness and usefulness of sustainability reporting, the lower level municipal governments, which act as the state's agents, local communities, and internal organizational factors, such as corporate governance procedures, supervisory board, managers' attitudes and corporate resources, should play significantly complementary roles.

Keywords: *China, Mining and Minerals Industry, CSR Reporting, Content Analysis, Benchmarking*

1. INTRODUCTION

The term 'Sustainable Development' was coined by the United Nations which convened the Brundtland Commission (formally the World Commission on Environment and Development) in 1987. In the Brundtland report, *Our Common Future,* 'sustainable development' is defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs.' At the core, the principle of sustainable development aims to promote harmony among humans and between humanity and nature. The integration of the three components – economic development, social development and environmental protection has been promoted as interdependent and mutually reinforcing pillars of sustainable development (United Nations 2002). The concept of sustainable development often overlaps with the concept of Corporate Social Responsibility (CSR), which specifically describes the important role of the private sector in contributing to sustainable development (Gill et al., 2008). Since the creation of the World Business Council for Sustainable Development (WBCSD) at the Rio Earth Summit in 1992, the business community has acknowledged its responsibility to contribute to the dialogue concerning economic, environmental and social issues through systematic public reporting on their environmental and social performance, together with economic performance (ISO 2004). Effective communication with stakeholders towards economic prosperity, environmental quality and social justice has been recognized as a defining characteristic of corporate responsibility in the 21st century (Wheeler and Elkington 2001).

In pursuing sustainable development and social responsibilities of private sectors, specific sectoral issues should be addressed for better integration of policies dealing with the various dimensions and sectors (United Nations 2002). The industry-specific information is perceived to be more relevant to stakeholders assessing sustainable performance in a specific industry (Dong and Burritt 2010). The extraction and depletion of non-renewable resources in the mining and minerals industry has been a major concern in debates about sustainability development due to the finite nature of non-renewable, and negative social and environmental legacies within the industry (Cowell et al., 1999; MMSD 2002). To secure the long-term financial viability and the 'social license' to operate, mining companies yearn to be recognized as 'sustainable' by measuring, assessing their sustainability performance, and demonstrating continuous improvement over the long term (Azapagic 2004; Jenkins 2004). In the global context, mining companies are approaching sustainability initiatives with greater rigour than in the past, leading to streamlining and improving sustainability reporting practice to meet spiralling stakeholder demands (Deloitte 2012).

In the last decade, one of the most important developments in the global mining industry has been the rapid development of China by virtue of the sheer volume of minerals it is using, importing, and exporting to meet its massive demand for resources (MMSD 2002). According to statistics of the World Bank (2008), China is the largest coal consumer and producer in the world, accounting for over 70% of growth in world coal consumption. China's mining and minerals market had total revenue of $825 billion in 2009, representing a compound annual growth rate (CAGR) of 18.2% during 2005-2009, compared to the Japanese and Indian markets which grew with CAGRs of 1.6% and 13.2% respectively over the same period (Datamonitor 2010). Its coal mine production capacity has grown by over 1.5 Billion Metric Tons (Bt) since 2000, achieving an output of 2.52 Bt in 2007 (Li 2007; World Bank 2008). In recent years, China has been investing in mineral-rich countries across all continents to secure minerals for its long-term domestic economic development and growth (China Mining Report 2011). According to figures by the World Bureau of Metal Statistics (WBMS), the country has become a net importer, absorbing up to 11% of global lead imports, 40% of global nickel imports, 19% of global zinc imports and has recently become a net importer of tin. In the last twelve months leading to mid-summer 2010, China had made 128 outbound deals in the mining sector around the globe, compared with 61 deals in computer and electronics, and 36 deals in the oil and gas sector (China Mining Report 2011). Although there is development of the renewable sector as well as increased energy efficiency, as declared by the Chinese government, carbon-intensive fossil fuel, such as coal, crude oil and natural gas, is still the fundamental energy source, accounting for 90% of China's energy supply in the future years (KPMG 2011).

China's mining and minerals industry contributes significantly to the national economy, people's livelihood and helps shape the mining industry globally for investment, acquisitions, fund-raising and other major strategic initiatives (KPMG 2006). However, the industry also fuels various social and environmental issues. There is a historical legacy of environmental degradation associated with the mining industry, including the restoration of abandoned mine sites, waste tips, polluted water courses and subsided land (World Bank 2008). During the 10th Five-Year Plan (2006 – 2010), China missed its target for reducing emissions of pollutants by 2 percent and failed to achieve 8 out of 14 targets for improving environmental standards due to higher than expected growth in the economy and the subsequent use of more coal than planned (KPMG 2011). The coal mining, in particular, is criticized as the most dangerous worldwide, placing the industry under international scrutiny (Li 2007; China Mining Report 2010). China's mining accident rates sharply contrast with those of other countries around the world, and currently account for approximately 80 percent of the total deaths in coal mine accidents worldwide (Homer 2009). The stagnant flow of information has always been a problem in China's mining and minerals industry (China Mining Report 2011). A chronic lack of transparent information, at many levels, combined with poor statistical measures probably underestimates the severity of challenges in China's mining and minerals industry, and impedes stakeholders' evaluation of corporate performance in a sustainable manner (Tu 2007).

Given China's long-term dependence on its mining and minerals industry for economic growth, energy demands and the social development, it is imperative for the industry not only to meet the country's demand for mineral resources in the years ahead but ensures the mineral resources supply for global sustainable development. According to MMSD (2002), disclosure issues are acute in the mining sector, particularly in the developing world where the mining sector faces its biggest test – applying the same standards of practice and performance, of ethics and behavior that would be applied in the corporation's home country. Therefore, Chinese mining companies are increasingly expected to exercise their full responsibilities and show evidence of good practices by demonstrating observance of emerging international standards on good mining practices (Li 2007). However a number of large-scale companies are still deficient in the disclosures of information, such as oil spills in the Dalian Xingang oil port in July 2010, the pollution incident of the Zijin Mining Group in July 2010, and the delay of public disclosures by China National Offshore Oil Corporation (CNOOC) for its 'Bohai Bay Oil Spill' in July 2011. In pursuing long-term sustainable development, the industry is required to improve utilization rate of resources, reduce environmental pollution, coordinate overall development of employees, industry, economy and society, and improve information transparency and accountability (World Bank 2008). 'Towards Green and Sustainable Mining' has been emphasized at the 9th China Mining Congress & Expo hosted by the Ministry of Land and Resources in 2007 (Xinhua 2007). The Congress declares that the industry should embrace their social responsibilities, conserve natural resources, protect environment, and demonstrate its harmonious development at environmental social and economic pillars (The Ministry of Land and Resource 2007).

As a highly environmentally sensitive industry, the mining and minerals industry has been studied frequently in the literature of social and environmental accounting in western countries and examined in a number of surveys in the global context. However none of the studies has provided a comprehensive investigation into the context of the emerging economy – China. For example, both the MMSD project (2002) and KPMG (2008) have excluded China from their investigations. As KPMG (2008, p.61) states, 'although China was not included in the survey, it will be interesting to watch developments there.' Given the different culture and history from the west, the distinctive roles for government and regulation and its recent integration into the global economy, contextually anchored country specific research on CSR and its reporting practice in China have been advocated by a number of researchers (Matten and Moon 2008; Ip 2008; Gao 2009; Belal and Momin 2009; Moon and Shen 2010; Noronha et al., 2012). It is, therefore, the motivation of this study to add substantially to the existing literature, the focus of which is in developed countries, by extending the investigation of sustainability reporting practice into China, specially its mining and minerals industry. This study aims to provide an assessment of the status of sustainability reporting practice in China's mining and minerals industry over the period 2007-2010. Content analysis has been conducted to extract disclosure quantity, quality and content from both corporate annual reports and stand-alone

sustainability reports. The corporate reports are benchmarked against the domestic sustainability reporting framework for Chinese companies – *'Chinese CSR Report Preparation Guide (CASS-CSR 1.0)'*, which is developed by the Chinese Academy of Social Science in 2009 as the first full-coverage CSR reporting guidebook for Chinese companies and the cornerstone of the CSR reporting system in China (The Chinese Academy of Social Science 2009)[3]. It is generally recognized that CSR issues in developing countries need to be carefully examined as the use of CSR categorization for developed countries might not reflect the specific socio-cultural and political context (Belal and Momin 2009). By adopting a domestic sustainability reporting framework capturing the Chinese context, this study could shed light on what unique items are reported by Chinese companies. Therefore, an in-depth investigation of sustainability reporting practice in this particular industry is expected to provide important insight into how China's mining and minerals industry discharges its social responsibilities, improves its social and environmental performance, and contributes to the goal of sustainable development through open, transparent information production and dissemination throughout the corporate life-cycle.

2. LITERATURE SURVEY

2.1 Sustainability Reporting in the Mining and Minerals Industry: A Global Perspective

The mining and minerals industry has been identified as one of the leading sectors in reporting either environmental performance or sustainability for years. In the early work of Dierkes and Preston (1977), discussing the initial reporting attempts of firms from the extractive industries, the petroleum industry was found to provide the most comprehensive environmental information at that time. Adams et al., (1998) examined environmental, employee and ethical disclosures in annual reports of Western European countries and identified that companies in the Oil and Gas industry reported most extensive social and environmental information. Kolk et al., (2001) conducted an analysis of discrete environmental reports of the Fortune Global 250 and found that mining, petroleum refining and metals companies scored highest in the provision of environmental reports. Moreover, the petroleum companies produced a high percentage of verified environmental reports, paid particular attention to issues of climate change, and disclosed various internal management standards, such as ISO 14001. Frost et al., (2005) adopted GRI as the benchmark to evaluate the nature and extent of sustainability reporting practice by Australian companies. The study also identified that those companies in the mining, oil and gas sector disclosed more GRI indicators, compared to other sectors. The recent work by Cowan et al., (2010) investigated environmental reporting practice by the five largest US companies in each of 26 industrial sectors and revealed that 87% of companies engaged in oil and gas operations had the most comprehensive environmental sustainability programs. A number of international surveys, particularly the triennial surveys by KPMG, have traced the development of sustainability reporting practice at the global level, shedding light on the mining and minerals industry in particular. As shown in Table 1, the triennial surveys by KPMG (1999, 2002, 2005, and 2008) revealed that there had been a significant increase in the number of companies issuing sustainability reports at both the global and national levels, from 35% of Global 250 (G250) and 24% of National Top 100 (N100) in 1999, compared to 79% and 45% in 2008 respectively. Seen at the industrial level, 100% of mining companies within G250 produced sustainability reports while 76% of oil and gas companies issued sustainability reports in 2008. Seen at the level of national 100 companies, 52% of mining companies produce sustainability reports in 2005, compared with 47% in 1999. In 2008, 100% of mining companies within the G250 addressed the business risks of climate change in their sustainability reports, compared with 76% of oil and gas companies. Moreover, verification of sustainability reports has become common practice in the global mining and minerals sector. Both mining and oil and gas companies have significantly increased their commitment to assurance since 2005, jumping from 50% to 100% of mining companies, and 42% to 59% of oil and gas companies respectively. The Global Mining Reporting Survey (2006) examined 44 major mining companies from 9 countries and reported that 59% of the mining companies surveyed published separate

[3] A revised and upgraded version 'Chinese CSR Report Preparation Guide (CASS-CSR 2.0)' is released by the Chinese Academy Social Science in Mar 2011.

sustainability reports while 91% of mining companies surveyed included information on their sustainability performance in their annual reports. The survey results highlight the mainstream of sustainability reporting practice in the mining and minerals industry, indicating the increasing efforts made by mining and mineral companies to satisfy stakeholder requests for accountability and reporting of sustainable mining practices (KPMG 2006).

Table 1: Percentage of Global 250 (G250), National Top 100 (N100), Mining and Oil and Gas Companies Issuing Stand-Alone Sustainability Reports during 1999 – 2008

Year	1999	2002	2005	2006	2008
No of Countries included	11	19	16	9	22
Companies from BRICs	n.a	n.a	n.a	yes	yes
G250 (Cross-sector)	35%	45%	52%	n.a	79%
Mining (G250)	100%	100%	n.a	59%	100%
Oil and Gas (G250)	63%	58%	80%	n.a	76%
N 100 (Cross-sector)	24%	23%	33%	n.a	45%
Mining (N100)	47%	33%	52%	n.a	43%
Oil and Gas (N100)	53%	38%	52%	n.a	53%
Verification					
G250 (Cross-sector)	19%	29%	30%	n.a	40%
N100 (Cross-sector)	18%	27%	33%	n.a	39%
Mining (N100)	n.a	50%	60%	52%	100%
Oil and Gas (N100)	n.a	42%	41%	n.a	59%

Source: KPMG 1999, 2002, 2005, 2008; Global Mining Reporting Survey 2006

Although the mining and minerals industry has made great efforts in reporting either environmental information or sustainability issues, there is still a quantity-quality discrepancy and a country gap in the industry's sustainability reporting practice (Deloitte 2002; KPMG 2002, 2005, 2008; Jenkins and Yakovleva 2006; Guenther et al., 2007; The Roberts Environmental Centre 2010).

Deloitte Touche Tohmatsu (2002) evaluated sustainability reporting practice in the metals and minerals industry during 2000-2001. The study analysed 15 reports from 14 major metals and minerals companies based on 30 items drawn from the *Deloitte Sustainability Reporting Scorecard.* Deloitte's study identified that while a number of metals and minerals companies delivered a high-quality sustainability report, reporting quality and degree of maturity differed greatly within the industry, revealing significant differences between the leaders and those at the lower end. According to Deloitte (2002), the reports made by the sampled mining and minerals companies could be characterized as failing to capture the 'bigger picture' of how the industry is to become sustainable overall, with little emphasis on value/supply chain issues, engagement with stakeholders within the value chain.

Jenkins and Yakovleva (2006) explored trends in the reporting of social and environmental disclosures in the global mining industry and identified various factors driving the development of such disclosure. Jenkins and Yakovleva (2006) concluded that whilst there was an increasing sophistication in the development of social and environmental disclosure in the mining and minerals industry, the maturity of reporting content and styles of these companies varied from 'mature reporter' to 'infant reporter'.

Guenther et al., (2007) analysed the status quo of environmental reporting practice of global mining, oil and gas companies, by examining 48 reports against 35 GRI indicators of environmental performance. The study identified that on average, the global mining, oil and gas companies each reported approximately 11 indicators, accounting for 30% of the total GRI indicators on environmental performance. However, only 8% of total environmental indicators were reported with

both high quantity and high quality by the sampled mining, oil and gas companies. Guenther et al., (2007) analyzed the current status quo of environmental reporting of mining and oil and gas industries for 2005, employing 35 environmental indicators proposed by the Global Reporting Initiative (GRI) as a benchmark. A total of 48 stand-alone CSR reports were analyzed using analysis of quantitative and qualitative content, including 19 reports for oil and gas companies. The study identified that on average, the companies' environmental reports covered approximately 31% of GRI indicators (11 out of a total of 35 indicators). However, amongst the indicators disclosed, only one indicator, 'total water use' was reported completely by more than 50% of the companies. The quantity–quality gap was identified as the most obvious problem for those wishing to collect CSR indicators.

The Roberts Environmental Centre of Claremont McKenna College in the USA (2010), using the *Pacific Sustainability Index (PSI)*, investigated the sustainability reporting practice of the 34 largest mining, crude-oil production companies within the Fortune Global 500 and Fortune 500 Mining, Crude-Oil Production sector lists. The study found that that reporting practice varied significantly within the sector, ranging from the top score 62.14 to the lowest score 5.98. Scores for environmental reporting and performance were particularly low for the mining sector. Less than 25% of companies addressed issues, such as hazardous waste released, emissions contaminating soil, total suspended solids, recycling rate, ozone depleting substances from refrigerants, logistics emission, packaging materials used, and chemical oxygen demand. While most companies in the sector discussed remediation efforts to some extent, few companies were found to report current quantitative data for remediation expenses or the amount of land reclaimed.

2.2 Sustainability Reporting in China's Mining and Minerals Industry

Breaking down sustainability reporting practice by country reveals the diversity of practices across different countries. As shown by KPMG (2005, 2008), almost 80% of the G250 companies in nearly all 22 developed countries issued sustainability reports while in BRICs, such as China, only 33% of companies disclosed sustainability information. Seen at the industrial level, Global Mining Reporting Survey (2006) found that in total, 60% of mining companies at the global level presented sustainability information in a detailed manner, disclosing performance data and achievement against relevant targets, compared with only 43% of mining companies from BRICs providing detailed sustainability disclosure. In 2010, 26 mining companies out of the top 100 Chinese companies have released sustainability reports. However the average scores for reporting quality and completeness in the industry is only around 25.9% (32.7% in 2009), lagging behind retailing, banking, and the IT industry (Guo et al., 2010). The Roberts Environment Centre of Claremont McKenna College in the USA (2010) investigated sustainability reporting by the largest companies on the Fortune Global 500 and Fortune 500 Mining, Crude-Oil Production sector lists, shedding light on the diversity of mining companies' reporting practice across different countries. The study identified that overall, the mining companies from Switzerland, Brazil, and Australia led sustainability reporting while the Chinese mining company obtained the lowest score. Compared with western countries, Chinese mining companies lagged others in disclosures of both environmental and social performance.

The CSR Research Center of the Chinese Academy of Social Sciences released 'China Top 100 Companies CSR Development Index' in 2011, which measured the top 100 Chinese companies' sustainability reporting practice in terms of responsibility management system, economic, social and environmental performance. The mining and minerals industry was identified as the leading sector in the practice of sustainability reporting, followed by the utility and financial industries. 6 mining companies were classified to be reporting 'leaders' and 'followers'. However, only 17 mining companies were included, accounting for only 5.67% of total sample. Therefore, the results cannot reveal a complete picture for the whole mining and minerals industry in China.

3. RESEARCH DESIGN

3.1 Selection of Sample and Study Period

The China Securities Regulatory Commission (CSRC) has issued Guidelines for the Industry Classification of Listed Companies in order to improve information quality in the stock market and standardize industry classification information about Chinese listed companies (CSRC 2006). According to CSRC's industry classification, listed companies in the mining and minerals industry can be divided into five subsectors based on their major business activities as coal mining and dressing, petroleum and natural gas extraction, ferrous metal ore mining, non-ferrous metal ore mining; and non-metallic mineral mining and mining service. The mining and minerals industry plays a significant role in China's economy. An initial check of China's two domestic stock exchanges revealed a small number of large mining and minerals companies listed on the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE). As at 16 Dec 2011, the total market capitalization of the listed mining and minerals companies was RMB 3.2 trillion, accounting for 17.5% of the total market capitalization of the SSE-listed industries. This study encompasses all the mining and minerals companies listed on Shanghai and Shenzhen stock exchanges by the end of 31 Dec 2010, comprising 176 firm-year observations in total. This study focuses on examining the sustainability reporting practice of Chinese mining companies over the period 2007-2010, which coincides with increasing sustainability reporting by Chinese companies and the release of several guidelines promoting CSR and sustainability reporting by Chinese governments, industry associations and stock exchanges. The latest annual reports and sustainability reports available by the end of 31 Dec 2010 were included.

3.2 Content Analysis

Content analysis has been widely employed in previous studies on corporate disclosures (e.g. Guthrie et al., 2004), particularly the disclosures of CSR information (e.g. Guthrie and Parker 1989; Deegan and Gordon 1996; Deegan et al., 2002; Campbell 2003; Haniffa and Cooke 2005; Campbell et al., 2006; Magness 2006; de Villiers and van Staden 2006). Content analysis is defined by Krippendorff (1980) as a research technique for making replicable and valid inferences from texts to the context of their use. Relying on the scientific method, content analysis is a systematic, objective, quantitative analysis of message characteristics, paying attention to objectivity-intersubjectivity, a prior design, reliability, validity, generalizability, replicability and hypothesis testing (Neuendorf 2002). Since there is no usable industry-specific index to indicate the level of environmental reporting or sustainability reporting by Chinese companies, the disclosure data needs to be extracted manually from corporate reports through content analysis to achieve the research objectives, including obtaining the level and content of disclosures; and then characterizing the current state of reporting practice in terms of both quantity and quality.

3.2.1 Construction of Classification Scheme: the Choice of Reporting Benchmark

To perform content analysis, a classification scheme with well defined disclosure categories and decision rules was developed based on the previous grounded literature and broadly accepted sustainability reporting guidelines (Gray et al., 1995; Hackston and Milne 1996; GRI 2006; Chinese Academy of Social Science 2009). The disclosure categories were designed to be mutually exclusive in order to avoid confounding of the subsequent statistical analysis. Therefore each disclosure category was precisely defined to allow an item to be allocated to a particular category (Deegan et al., 2002). According to the Research Centre of Corporate Social Responsibility of the Chinese Academy of Social Science, the development of Chinese CSR needs a CSR system suitable for Chinese companies (Chinese Academy of Social Science 2009). With this recommendation, in December 2009, the 'Chinese CSR Report Preparation Guide (CASS-CSR 1.0)' was released by the Chinese Academy of Social Science as the first full-coverage CSR reporting guidebook in China. It fuses on market, social and environmental responsibilities and emphasizes the need for greater management responsibility. As the director general of Research Bureau of State-Owned Assets Supervision and Administration Commission, Huagang Peng states, the publication of 'Chinese CSR Report Preparation Guide' plays an important guiding role in practice of Chinese CSR information disclosure. It is viewed as a cornerstone of the practice of Chinese CSR information disclosure CSR reporting system and could help China to gain discourse power in the international CSR field

(Chinese Academy of Social Science 2009). By employing an indigenous reporting guide, some unique items reported by Chinese companies could be captured. The classification scheme developed based on the Guide is shown in Appendix.

3.2.2 The Choice of Unit of Analysis: Use of Sentence

The identification of codable units is of great importance in content analysis (Neuenforf 2002). There is debate about the "unit" that should be used in content analysis. Selection of the unit of analysis is a matter of judgment and individual researchers must exercise a subjective choice in selecting units of analysis (Krippendorff 2004). Consistent with previous studies, this study uses sentences for both the coding and measurement units to produce complete, reliable and meaningful data for further analysis (Milne and Adler 1999; Unerman 2000). The reliable identification of a disclosure requires understanding of the meaning of each disclosure and hence as a basis for coding, the sentence is far more reliable than any other unit of analysis because meanings and contextualization of disclosures can be conveyed by sentences (Gray et al., 1995; Unerman 2000; Raar 2002; Bouten et al., 2011). Moreover, a sentence is easily identified and is less subject to inter-coder variation than other measures, such as phrases, clauses or themes (Ingram and Frazier 1980). Using words as the unit of analysis could cause serious disagreement between different coders to decide which individual words are counted as a disclosure and which are not. As a measurement unit, sentences can be quantified with less judgement and thus less measurement error than measuring by proportions of a page (Unerman 2000). Use of sentences removes the need to account for or standardize the number of words and overcomes the problem of pages when print size, column size and page sizes may differ from one report to another (Hackston and Milne 1996). Therefore, using the sentence as the unit for analysis allows more specific analysis of specific issues and themes (Deegan et al., 2002). According to the classification scheme developed based on the Chinese CSR Report Preparation Guide (CASS-CSR 1.0) for content analysis, a company's report uses coding by sentence. The coding procedures consistent of two dimensions: (1) meaning and content, which enables grouping of the sentences into appropriate categories based on the Chinese CSR Report Preparation Guide (CASS-CSR 1.0); and (2) quantity and information type, which facilitates measuring the quantity and quality of disclosures based on the number and types of sentences.

3.2.3 Disclosure Quality Index

It is generally recognized that the quantity of disclosure does not indicate what is actually being disclosed. Therefore, sole emphasis on disclosure quantity could result in information loss and be mitigated by examining the quality and type of data communicated (Guthrie et al., 2004). The use of a quality index allows for integration of different types of information into a single figure that is comparable across firms in terms of relevance (Cormier and Gordon 2005). A distinction was made between general categories of disclosure and disclosures made on performance indicators. The quality of general disclosures was assessed based on different types of information (narrative; non-monetary; monetary) and substance of information (value and commitment; initiatives and policies; performance and achievement). The disclosures of performance indicators were rated based on the scheme developed by Clarkston et al., (2008). For each category of disclosure, a maximum score 6 was assigned. As shown in the classification scheme developed based on the 'Chinese CSR Report Preparation Guide' (Appendix), a total 14 items were included as general categories of disclosures and in addition, 61 performance indicators were included. Therefore the overall maximum score for the disclosure index was equal to 450. The Disclosure Quality Index is shown in Table 2, which combines different types of information and could be used as a valuable tool for assessing overall quality of a company's reporting practice (Bouten et al., 2011).

Table 2: Disclosure Quality Index

Categories of Disclosures	Types of Information	Score Assigned
General Categories (max score 6)		
	Not disclosed	0
	Disclosed as narrative	1
	Disclosed as non-monetary	2
	Disclosed as monetary	3
	Value and Commitment	1
	Initiatives and policies	2
	Performance and achievement	3
Performance Indicators (max score 6)	Not disclosed	0
	Disclosed	1
	Disclosed relative to peers/rivals or industry	2
	Disclosed relative to previous period	3
	Disclosed in absolute and normalized form	4
	Disclosed relative to target	5
	Disclosed at disaggregated level (i.e., plant, business unit, geographic segment).	6

4. RESULTS

4.1 Overall Result: The Number of Disclosing Companies

The quantity of disclosures is firstly presented as the number of companies disclosing corporate social responsibility information. A number of previous studies rely on the incidence rate [4] as the measurement of reporting quantity (e.g. Kolk et al., 2001; Peck and Sinding 2003; Frost et al., 2005; KPMG 2006; Jenkins and Yakovleva 2006; Perez and Sanchez 2009; Tang and Li 2009; Cowan et al., 2010). Table 3 presents the number of Chinese companies adopting sustainability reporting during the study period 2007-2010. Overall, in terms of the number of disclosing companies, there is a dramatic increase during the study period. In 2007, 44% of total companies made sustainability disclosures in annual reports, increasing to 98% of companies in 2010. In terms of the sustainability reports, 9% of companies released stand-alone sustainability reports in 2007, compared with 44% in 2010. The results are further presented by different reporting media (annual reports *vs* stand-alone sustainability reports) and companies listed on different stock exchanges (Shanghai *vs* Shenzhen Stock Exchange). As shown by the different stock exchanges, 59.3% of companies listed on Shanghai Stock Exchange made sustainability disclosures in the annual report in 2007, compared to 100% in 2010. While in 2007, 15% of SSE companies published sustainability reports, increasing to 48.1% in 2010. For companies listed on Shenzhen, the number of companies publishing sustainability reports increased from zero in 2007 to 42.1% in 2010. During 2007 – 2010, sustainability reporting practice developed rapidly in the Chinese context, as the period coincides with China promoting the concept of a 'harmonious society' since the mid 2000s. A number of initiatives have been introduced during this period to encourage Chinese companies to embrace the concept of CSR into their operations, address interests of various stakeholders and encouraged the regular issue of information about their CSR performance. As shown in Table 3, 2008 was a peak for the adoption of sustainability reporting practice by Chinese companies, with the number of companies publishing stand-alone sustainability reports increasing from 9% in 2007 to 37% in 2008. Since then an increasing trend is evident. The peak for reporting in 2008 could be because of the active promotion of CSR and sustainability reporting by the Chinese government and stock exchanges in 2008.

[4] The incident rate measures whether an item is disclosed or not (Hackston and Milne 1996).

Table 3: The Number of Companies Disclosing Sustainability Information during 2007-2010

	Annual Report				Sustainability Report			
Year	2007	2008	2009	2010	2007	2008	2009	2010
Shanghai Stock Ex	16	23	26	27	4	14	13	13
% of Total SSE Sample	59.3%	85.2%	96.3%	100%	15%	51.2%	48.1%	48.1%
Shenzhen Stock Ex	4	10	14	18	0	3	8	8
% of Total SZ Sample	21%	52.6%	73.6%	94.7%	0	15.8%	42.1%	42.1%
Total Disclosing Companies	20	33	40	45	4	17	21	20
% of Total Sample	44%	71%	87%	98%	9%	37%	46%	44%

4.2 Overall Result: The Number of Companies Using Different Reporting Media

The section presents the number of disclosing companies using different reporting media. As the main objective of this study is to provide empirical evidence of the current sustainability reporting practice of companies in China's mining and minerals industry over a four-year period, from 2007 to 2010, only stand-alone sustainability reports and corporate annual reports are employed as the major sources of information. The results are shown in Table 4. In total, 98% of Chinese mining companies disclosed sustainability reporting practices through annual reports during 2007 – 2010, while 44% of companies used sustainability reports. The results reveal that in the Chinese context, traditional annual reports are still the most commonly used reporting means on sustainability. The stand-alone sustainability reports have not become the major stream, indicating the immature stage of sustainability reporting in China. The result is also consistent with studies in developed countries. For example, Branco and Rodrigues (2008) investigated the CSR disclosures of Portuguese listed companies and found they attributed greater importance to annual reports as a disclosure medium than to the internet because annual reports are directed at investors and it is natural for investors to be interested in financial performance (p. 699).

Table 4: The Number of Companies Using Different Reporting Media

No of Disclosing Companies/ Total Sample (%)	Annual Report	Sustainability Report
Shanghai Stock Ex	100%	48.1%
Shenzhen Stock Ex	94.7%	42.1%
Total	98%	44%

4.3 Overall Result: The Absolute Measurement of Quantity

Relying only on the number of disclosing companies may be misleading in the sense of 'the incidence rate treats a company, which makes one disclosure, as equal to a company which discloses fifty' (Hackston and Milne 1996, p.89). Therefore, the incidence rate does not indicate how much emphasis is given to a particular subject area (Zeghal and Ahmed 1990). Therefore, in this section, the results for the absolute measurement of disclosure quantity by number of sentences is provided in terms of total disclosures, disclosures in annual reports and disclosures in stand-alone sustainability reports. The presentation of disclosure quantity as the number of sentences might show a different picture from that which emerges using the incidence rate. The results are presented in Table 5. At the aggregate level, the average amount of sustainability disclosures is 53 sentences, ranging from the minimum of 2 sentences to the maximum 369 sentences. By looking at the annual reports and sustainability reports separately, the results tend to show a different picture. The average amount of disclosures in annual reports is 16 sentences, ranging from 1 to 47 while the average amount of disclosures in sustainability reports is 86 sentences, ranging from the minimum of 12 to the maximum 352 sentences. Therefore, the results reveal that although annual reports are the most commonly used information media for Chinese mining companies to communicate sustainability performance. The

extent of sustainability information provided in annual reports is much lower than in the stand-alone sustainability reports. Therefore annual reports are found to be less informative than stand-alone sustainability reports in communicating sustainability performance in China's mining and minerals industry because for Chinese companies, annual reports are still used as a major disclosure medium to communicate the vision and strategy of the company, profile, financial performance and corporate governance structure for shareholders.

Table 5: Quantity of Disclosure during 2007-2010

No of Sentences	Total Disclosure Quantity	Annual Report Quantity	Sustainability Report Quantity
Mean	53	16	86
Median	25	14	55
Minimum	2	1	12
Maximum	369	47	352

4.4 Overall Result: Disclosure Quality

The excellence of a sustainability report does not simply depend on the amount of data disclosed, but rather on the quality of the information disclosed (Guo et al., 2009). Therefore this section presents the results for the quality of sustainability reporting by Chinese mining companies. To assess the quality of sustainability disclosures made by Chinese companies, the 'Chinese CSR Report Preparation Guide (CASS-CSR 1.0)' has been adopted as the benchmark. In accordance with previous studies, a disclosure index for reporting quality has been developed based on the specific content of disclosures (Chinese CSR Report Preparation Guide), the evidence of information (narrative, non-monetary, monetary), and type of information (value/commitment, initiatives/policies, performance/achievement). The results of disclosure quality are presented in Table 6 and Table 7 provides a comparison between the percentage of increase of disclosure quantity and quality during the period 2007-2010. As shown in Table 6, overall, the quality score of sustainability disclosures ranges from the minimum 2 to the maximum 194. In annual reports, quality ranges from 2 to 54 while in separate sustainability reports, the quality score ranges from 8 to 180. The results indicate great variations in the reporting quality both in total and in different reporting media. The sustainability reports have greater qualitative information than annual reports in communicating sustainability. Table 7 reveals the percentage rate of increase between disclosure quantity and quality during the period 2007 – 2010. In terms of disclosure *quantity* as measured by number of sentences, the overall increase in rate is 2.22, while the *quality* of sustainability disclosures made by the mining companies increased by 1.8 times. The results indicate that the rate of disclosure quality increase is much slower than that of disclosure quantity, confirming a quantity-quality gap, as described by Guenther et al., (2007). Although the topics suggested by the 'Chinese CSR Report Preparation Guide' are addressed by Chinese companies, none of the reports achieve a quality score of 50% or more. A few companies provide complete information disclosure but displayed obvious examples of selective bias, such as China Coal Energy, ZhongJin Gold Corporation, and Shanxi International Coal Energy Group. Despite the existence of numerous sustainability report-writing guidelines, these companies intentionally neglect topics that would force them to discuss sensitive topics such as anti-corruption and human rights. The disparity between information quantity and quality has been recognized as a chronic problem in sustainability reporting in China (Guo et al., 2009).

Table 6: Wide Variety in the Quality of Sustainability Reporting during 2007-2010

	Total Disclosure Quality	Annual Report Quality	Sustainability Report Quality
Mean	61	23	89
Median	38	21	79
Minimum	2	2	8
Maximum	194	54	180

Table 7: Comparing Percentage of Increase between Disclosure Quantity and Quality during 2007-2010

Number of Sentences over 2007-2010		
Total	Annual Report	Sustainability Report
2.22	0.23	5.53
Quality of Disclosures over 2007-2010		
Total	Annual Report	Sustainability Report
1.8	0.04	5.6

4.5 Reporting Content

This section presents the results relating to the sampled contents of sustainability disclosures of Chinese mining companies during the 2007-2010 period 'The development of a green and sustainable mining industry' was emphasized as the most important goal for the industry in the 9th China Mining Congress & Expo held in 2007. The goal was further echoed by China's 12th five-year development plan approved by the Nation's People's Congress on 14 March 2011. Therefore, it is expected that sound sustainability reporting practice by Chinese mining and minerals companies should manifest such a vision. Content analysis has been conducted in accordance with the 'Chinese CSR Report Preparation Guide (CASS-CSR 1.0)' released by the Chinese Academy of Social Science in 2009. A mapping between the Chinese reporting guideline and international reporting guideline – GRI (G3), has been undertaken in order to identify what particular items are encouraged to be reported in the Chinese context but not included in GRI (Appendix).

Vision, Strategy and Governance

Table 8 presents the results of the assessment of disclosure contents by quantity and quality. Overall, according to the *Chinese CSR Report Preparation Guide*, sustainability disclosures made by Chinese companies could be analyzed in five main categories, i.e., *Visions and Strategy*, *Governance and CSR Management*, *Stakeholder Engagement*, *Market Performance*, *Social Performance* and *Environmental Performance*. As shown in Table 8, in terms of quantity, two main categories - *Social Performance* and *Visions and Strategy*, are the themes most reported by Chinese mining companies, accounting for 35.71% and 20.05% of the total disclosures respectively, followed by environmental performance at 15.81%. In total, *Strategy, Governance and CSR Management* account for 27.82% of total disclosures. The greater level of disclosures of strategy and governance structure could be caused by the release of *the Code of Corporate Governance* by the China Securities Regulatory Commission (CSRC) in 2002. In addition to maintaining the listed company's financial performance and maximizing the benefits to shareholders, the company needs to be concerned with the welfare, environmental protection and public interests of the community in which it resides, and needs to pay attention to the company's social responsibilities (Article 86). In addition to disclosing mandatory information, a company shall also disclose in a voluntarily and timely way all other information that may have a material effect on the decisions of shareholders and stakeholders, and equal access to

information will be ensured for all shareholders (Article 88). The result is consistent with Rowe's (2010) study which compares sustainability reporting practice by top Chinese companies and Australian companies. Rowe (2010) identifies that the category *Governance and CSR Strategy* is awarded the highest score for Chinese companies.

A different picture is found for the quality of disclosures, as revealed in Table 8. The social performance category also obtains the highest score, which accounts for 30.61% of the total quality of disclosures, followed by market performance (19.78%), which includes the specific items reported of investors, customers and products, research and development and supply chain. The highest scores of social performance in both quantity and quality could be contributed by the mining companies' great emphases on production safety and employees (as shown in the following sections). A comparison between the quantity and quality of disclosures sheds light on the quantity-quality discrepancy within the disclosure categories. Although market performance accounts for 44% of the total disclosure, it obtains a higher quality score, implying more monetary information is provided in this category. The disclosure of strategy, CSR management and environmental performance lag in terms of information quality. The disclosures about stakeholder engagement reveal low scores in terms of quantity and quality.

Table 9 presents the specific items disclosed with the broad category of *Visions, Strategy and Governance*. Within the broad category of *Visions, Strategy and Governance*, mining companies disclose large amount information about the value/mission statement and CSR management, such as the establishment of a CSR committee, a safety supervisory committee and governance body, and subscribe to international or indigenous standards/initiatives. The development of comprehensive and mature governance structures and CSR management systems, such as ISO 1400 and ISO 9001, has been recognized as the latest progress of the CSR movement in Chinese companies (The Chinese Academy of Social Science 2010, p.35). This could be reflected in the sustainability disclosures made by the sample companies, although the information is largely disclosed as narrative and as value statements. The results indicate that Chinese companies started integrating CSR into their corporate governance, following the global trend, as identified by Kolk (2008). The category of stakeholder engagement is the least reported area, accounting for 6.22% of the total disclosures, implying the lack of stakeholders' consultations and public participation regarding the social and environmental matters of in this industry (e.g. Li 2007; Dong and Burritt 2010). This is also consistent with the findings of the MMSD project (2002). Most mining companies in developing countries are reluctant to engage the local community in full dialogue and consultation over the potential for a mine until late in the process of discovery and evaluation, in order to avoid building false expectations.

Table 8: Assessment of Reporting Contents by Quantity and Quality

Category	% of Total Disclosure Quantity	% of Total Disclosure Quality
Vision and Strategy	20.05	15.14
Governance and CSR Management	7.77	8.8
Stakeholder Engagement	6.22	6.33
Market Performance	14.44	19.78
Social Performance	35.71	30.61
Environmental Performance	15.81	19.25
Total	100	100

Table 9: Vision, Strategy, Governance and CSR Management

Strategy, Governance and CSR Management	% of Total Quantity	% of Total Quality
Value/Vision	38.68	21.47
Sustainability Analysis	15.67	12.94
Summary of Key Performance	9.11	12.12
Award	8.6	13.41
Governance and CSR Management System	27.94	33.98
Total	100	100

Disclosure of Social Performance

The social dimension of sustainability concerns an organization's impacts on the social systems that it operates. Social performance can be gauged through an analysis of the organization's impacts on stakeholders at local, national and global levels. In some cases, social indicators influence the organization's intangible assets, such as its human capital reputation (GRI 2006). According to the Chinese CSR Report Preparation Guide (CASS-CSR 1.0), production safety, employees (including employee health and safety), community and government are included in the category of social performance. As shown in Table 8, the disclosures of social performance obtain the highest score in terms of quantity and quality, which account for 35.71% and 30.61% of total disclosures respectively. As shown in Table 10, overall, Chinese mining companies provide comprehensive disclosures related to production safety, accounting for 38.24% of total disclosures, followed by information disclosed to the regulatory bodies.

Table 10: Disclosure of Social Performance

Social Performance	% of Total Quantity	% of Total Quality
Production Safety	38.24	28.37
Government	34.31	39.42
Employee	18.11	27.52
Community	9.34	4.69
Total	100	100

Production Safety

Compared with previous evidence sampled in western countries, although mining companies provide comprehensive disclosures on safety, such disclosures do not take the lead in the overall sustainability disclosure rankings (e.g. Dong and Burritt 2010). The opposite pattern is found in Chinese companies. The dominant disclosure in the social performance category is production safety, followed by human resource information. Such a difference could be attributed to the fact that China's mining accident rates in comparison with other countries around the world attract international scrutiny (Li 2007; Tu 2007; Homer 2009; China Mining Report 2010). Given the lack of technology and capital, many companies still rely on manpower alone to extract metals and minerals from the ground. China's mining industry faces many opportunities to improve safety and productivity in order to match

international safety standards (KPMG 2006). The average fatal accident rates in China's coal mines were still two orders of magnitude higher than those in Australia and the USA in 2006, even though the situation is improving (World Bank 2008). An insight into the disclosure of production safety indicates that the mining companies disclose comprehensive information related to the concept of safety, goal of 'zero fatality', implementation of safety management system, safety culture, education and training. However, Chinese mining companies tend to focus on reporting the existence and objectives of such systems with less emphasis on reporting how the system is implemented and integrated into operations. Moreover, the implementation of a risk-control system in emergency situations is a core indicator for the mining company for which APPEA (2006) encourage disclose. However, less than half of the sampled companies report this item, reflecting the fact that companies fail to respond immediately to safety as shown in the recent 'Bohai Bay Oil Spill' accident in July 2011. Furthermore, the industry is constrained by the lack of accurate statistics of injury and fatality (World Bank 2008). The official figures are also under-reported relative to the actual figures (Li 2007). This could be manifested in the disclosures of rates of injuries and fatalities, which account for 5.1% of total safety disclosures. Although the sample companies report their 'Zero Fatality' goal, only a number of large mining companies report the rate of injury and fatality in a quantified, comprehensive and comparable way, such as trend graphs, bar charts and tables.

Government

Chinese companies often frame their relationship with the central government in terms of their observance of governmental policies and regulations (Tang and Li 2009). According to the Chinese CSR Report Preparation Guide, the responsibilities to the government include the response to governmental policies, tax contribution and support of employment. Table 11 provides a summary of information disclosed by the mining companies to governmental bodies over the study period. The State Government is declared to be the most important stakeholder by the mining companies. For example, PetroChina, one of the leading companies within the industry declares in their sustainability report, 'the sustainable development of the company cannot be achieved without governmental support' (2010, p.43). More than 80% of the total companies address their goals, strategies or operational targets towards governmental policies, such as the 12th five-year plan (2011-2015). The new national development programme emphasizes the development of a green and sustainable mining industry, the building of safe mines, the improvement of resource saving and the rationalization of resource usage, acceleration of mine reclamation and rehabilitation (China Daily 2011). However, most companies only focus on reporting one of the aspects as suggested by the 12th five-year plan rather than explaining how to integrate the plan into overall governance and long term strategies. As Yanzhou Coal Mining Group (YZCMG), a famous, large scale coal-mining company in China, states in its 2010 annual report, 'to achieve the goals of 12th five year plan, we aim to strength our safety management, improve risk control in emergency, and ensure the stable and sustainable environment (p.18)'.

Table 11: Summary of Disclosures to Government

Governmental Policies	Information Types	Content
The State Administration of Coal Mine Safety	Financial Information	Mining Safety Production Fee: $12 / ton of coal production
The Ministry of Finance	Financial information	Mine Maintenance Fee: $ 8.5/ ton of coal production
State Government	Vision Statement	a. Make economic contribution to the country' and local government b. Respond to governmental policies (e.g. Construction of a harmonious society; Support green economy) c. Mutual development with the government and society
	Policy	11th Five Year Plan; 12th Five Year Plan
	Achievement	Research and development project
Local Governments	Vision Statement	'Make contribution to local economy'
	Achievement	Meet % of emission reduction target set by local government
	Financial Information	Sustainability Development Fund; Mine Environment Rehabilitation Fund
State and Local Governments	Stakeholder Engagement	Stakeholder Identification and communication (e.g. government as the key stakeholder; regular report to local government; subject to government supervision and inspection)

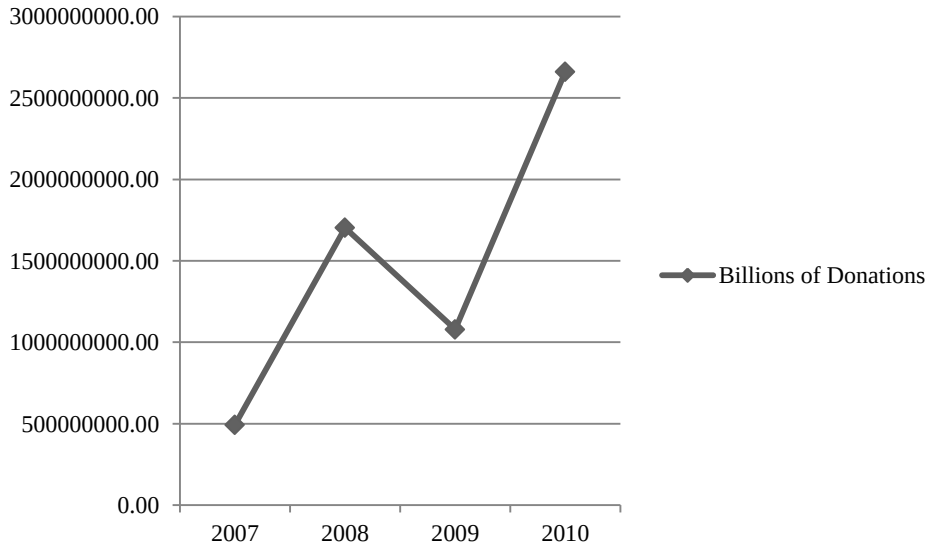
Employee Information

The construction of a 'harmonious society' was declared by the PRC government during the 6th plenum of the 16th Central Committee of the Communist Party of China (CCP) in October 2006 (See 2009). Recognizing that increasing inequalities could have significant negative social and economic consequences, a 'harmonious society' aims to improve social cohesion and stability, economic growth, and realize the country's long term prosperity (Lin et al., 2008). Harmonious labor relations have been emphasized as one of the key dimensions of the concept of harmonious society in China (Ieong 2007). At the aggregate level, employee-related disclosures account for 18.11 % of the total disclosures of social performance for the Chinese mining companies. These disclosures are often formalized through companies' policies. Within this category, two items are encouraged in the Chinese context-compliance with the employment contract and social pensions. The fair treatment of employees, including attention to employees' health and safety in production, fair wages, opportunities for career development through training, and equal opportunities provided to all employees is perceived by Chinese managers as ethical business practice (Tang and Li 2009) and increasing. As one of the key stakeholder groups, employees are the most valuable capital for the companies and their satisfaction could translate into organizational efficiency (IPIECA and API 2005). Therefore, companies have to respond to employees' concerns in order to reduce employee turnover, retain talent employees and achieve the ongoing survival. The dominance of disclosures about employees is also consistent with a number of studies in western countries (e.g. Roberts 1991; Hackston and Milne 1996; Dong and Burritt 2010).

Community and Philanthropic Disaster Response

CSR is about balancing the diverse demands of communities for the mining industry, perhaps more as the industry is often operated in remote locations with indigenous peoples and their potential negative social and environmental impact is significant (Jenkins 2004). Therefore, it requires those companies to respond to community demands and expectations, and develop good relationships with the communities. However, in the context of China's mining industry, community disclosures only account for a small proportion of total disclosures within the category of social performance. As shown in Table 10, in terms of reporting quantity, community disclosures account for 9.34% of total disclosure of social performance, emphasizing items such as education, sports, recreation, art, cultural events, disaster relief, donations, sponsorship and volunteering. In terms of reporting quality, community disclosures only account for 4.69% of total quality scores, revealing a tendency of disclosures of disaster relief mainly through monetary donations within this category. Figure 1 presents trends in charitable donations made by the sampled companies during 2007-2010. The charitable donations follow a fluctuating trend, increasing from 2007 and achieving a peak in 2008 as the year witnessed a series of catastrophic natural disasters in China. Many companies initiated a number of rescue operations, donations and designated whole chapters of sustainability reports to describing their efforts. However, after the disasters in 2008, the amount of donations slightly decreased. The result is also consistent with the study of Rowe (2010) which identifies that compared with Asian counterparts, Chinese companies have a sound level of disclosures in the 'Community and Development' area. The tendency towards disclosures of charitable donations by Chinese companies could reflect China's socialist legacy as the contribution to the welfare of society is considered to be 'ad hoc philanthropy' by Chinese companies (Tang and Li 2009). Therefore, the peak disclosures of charitable donations during times of disaster could be viewed as a corporate strategy seeking legitimacy in the eyes of the community.

Figure 1: Charitable Donations during 2007 – 2010



Disclosures about Environmental Performance

Table 12 provides the descriptive results of specific environmental items disclosed by Chinese mining and minerals companies. As shown in Table 12, the top three such items disclosed by the mining and minerals companies are environmental management and policy, emission reduction, and energy saving. The disclosures of environmental management and policies achieve the highest scores in comparison to the disclosures of GHG emissions and other climate change issues, indicating the current lack of sufficient understanding and 'know-how' of disclosures of such issues by Chinese companies (Guo et al., 2009). Although the Chinese government has developed a series of environmental measures for the sustainable development of the coal mining sector, such as compensation and restoration schemes, water resource protection and improved governance of coal mining waste, the measures do not explicitly mention GHG emissions reduction (World Bank 2008 p.14). This is reflected in the content analysis, which reveals the limited and sporadic GHG emissions disclosures by Chinese companies. Although some reports contain information on GHG emissions, most of this information is disclosed as narrative statements about values and goals rather than the total weight of emissions and reduction achieved in terms of total CO_2 equivalent and individual types of emissions. The results are consistent with study of Gao (2011). Based on a content analysis of 81 sustainability reports released by listed companies in both Shanghai and Shenzhen Stock Exchanges, Gao's (2011) study identifies that the most frequent environmental issues addressed by Chinese listed companies include environment policy, energy saving and the circular economy.

As the most populous nation on earth, with an insatiable appetite for natural resources to boost its economic growth, China should take a prominent role in solving global environmental challenges (Diener and Rowe 2007; Rowe and Guthrie 2010). Since the early 1980s, a series of laws, regulations, and national standards concerning environmental protection have been promulgated in China. The first law on environmental protection was formally promulgated in 1989 and further revised in 1995 (Guo 2009). However, such legal systems mainly are concerned with environmental protection and provide frameworks that require enterprises to report to the government when pollution occurs, where projects have negative environmental impacts, or where any operating change that affects the environment occurs (Guo 2005). Therefore, the voluntary corporate environmental reporting to the general public (through CSR reporting/sustainability reporting) is a relatively recent event in China (Li and Anbumozhi 2009). As shown previously in Table 8, overall, environmental disclosures account for 15.81% of the total quantity of disclosures, ranking behind disclosures of vision, strategy and governance, and social performance. In terms of reporting quality, environmental performance accounts for 19.25% of the total quality of disclosures, ranking behind disclosures of vision, strategy and governance, and disclosures of market performance and social performance. The results indicate that public reporting of environmental information appears to be marginal and most companies tend to disclose only a small fraction of the information required to assess environmental performance.

Environmental Management System, Certification and Policy

Disclosure of information about environmental systems demonstrates how companies apply a systematic and consistent approach to managing various operations and business activities which impact on, or have the potential to impact on, the environment (IPIECA and API 2005, p.32). As shown in Table 12, the existence of environmental management systems, particularly ISO 14001 certification, accounts for 22.51% of the total environmental disclosures, indicating Chinese mining companies' concerns about meeting international standards and improving the long-term environmental performance. The Chinese central government is testing coal industry sustainable development policies in Shanxi Province and a sustainable development fund has been established to which all coal mines contribute. Hence, the 'Sustainability fund' is disclosed by mining companies in Shanxi Province. The proceeds are apportioned between social and environmental projects. Various environment-related charges have been levied on coal mines in the past, but until recently there has been too little accountability of the use of the funds (World Bank 2008, p.13).

Energy Saving – 'Circular Economy'

In China, the 'Circular Economy' (World Bank 2009, p.4) approach is a core component of its sustainable development strategy and is adopted by the government as a new paradigm for economic and industrial development in order to improve resource use efficiency and protect the environment. Circular Economy is a general term covering activities that reduce, reuse, and recycle materials in production, distribution, and consumption processes in order to reduce harmful impacts of economic activities on the environment by minimizing impacts throughout the production life cycle (World Bank 2009). In industrial sectors, 'Circular Economy' is perceived by Chinese managers as one of the key components towards activities being environmentally benign (Peng et al., 2005). As shown in Table 12, the companies sampled favorably declare their values and policies in support of the circular economy, performance of energy saving, waste reduction, recycling and reuse of water in their production processes, which accounts for 10.77% of total environmental disclosures in terms of volume. Public environmental disclosures can increase public consciousness, enhancement of public opinion, and increased public participation and supervision of the development and application of environmental regulations (Li et al., 2008). However, in the current Chinese context, disclosures of environmental performance by the mining and minerals companies are still limited particularly in corporate annual reports, and lag disclosures of vision, strategy and governance, market performance and social performance (Table 8). Such a finding is consistent with a number of previous studies (e.g. Liu and Anbumozhi 2009; Guo et al., 2009, 2010; Rowe 2010).

Table 12: Environmental Performance Disclosures

Environmental Performance	% of Total Quantity	% of Total Quality
Environmental Policy	22.51	18.65
Energy Saving	22.22	20.22
Emission	18.80	18.50
Circular Economy	10.77	8.49
Water, Dust and Waste	13.32	17.19
Environmental Investment	3.39	7.08
Clean Energy	2.86	2.27
Biodiversity	2.23	2.11
Reclamation and Rehabilitation	1.66	2.54
Environmental Impact Assessment	1.36	2.16
Land	0.6	0.8
Total	100	100

5. DISCUSSION AND CONCLUSION

Sustainability reporting, as the systematic public reporting on environmental and social performance, together with economic performance, is perceived to give a voice to the previously silent system to improve information transparency; demonstrate full corporate responsibilities; build public trust; and further the goal of sustainable development (GRI 2006). Development of a green and sustainable mining industry in China requires overall coordinated development of the employees, industry and society, gradually to improve safety capacity and occupational health and safety conditions, and to take the path of securing safety, a high utilization rate of resources, less environmental pollution and

better economic benefits, and the path towards sustainable development of the mining industry (Word Bank 2008). However, this study identifies that the current sustainability reporting practice in China's mining and minerals industry only partially reflects these dimensions.

Through benchmarking with the Chinese CSR Report Preparation Guide (CASS-CSR 1.0), overall, there is a dramatic increase in number of disclosing companies; disclosure quantity; and disclosure quality in China's mining and minerals industry during the period 2007-2010. The result is well coincident with the phase in historical development of sustainability reporting in China – the rapid development of sustainability reporting practice during the period of 'building a harmonious society' (mid 2000s – 2010). Year 2008 is seen as a turning point for Chinese companies' increasing adoption of sustainability reporting practice and parallels active promotion by the Chinese governments and stock exchanges. The traditional annual reports are still found to be the most commonly used reporting means by Chinese companies, indicating the initial stage of sustainability reporting in China while the stand-alone sustainability reports are found to be more informative than other information media, indicating its potential value as the key information media in the future years.

In terms of disclosure quality and content, the Chinese mining and minerals companies do not report completely on their CSR behavior as none of the reports achieved a quality score of 50% or more. On average, quality score for sustainability disclosure made by Chinese mining companies is only 13.33%[5], indicating incomplete information disclosure and display obvious examples of selective disclosure. Therefore, it is doubtful that the ascertained level of disclosure will satisfy the information demands of stakeholders. Despite the existence of numerous sustainability report writing guidelines, some companies intentionally neglect topics that would force them to discuss sensitive issues such as anti-corruption and human rights. Two main categories of disclosure – *Vision, Strategy, and Governance*, and *Social Performance* are identified as the most reported areas by Chinese mining and minerals companies, accounting for 35.71% and 27.82 % of the total disclosures respectively. This is followed by disclosures of Environmental Performance, accounting for 15.81% of total disclosures (Table 8). The highly disclosed information relating to vision, strategy and governance structure, including the establishment of the CSR management system, could well reflect the increasing integration, or mainstreaming, of the concept of CSR into corporate governance structures by Chinese companies, following global practice (Kolk 2008). Moreover, to improve long-term environmental performance, a number of large mining and minerals companies have adopted environmental management system ISO 14001 to meet international standard, such as China Coal Energy, PetroChina, and China Shenhua Energy. Contrary to previous evidence in western countries (e.g. Dong and Burritt 2010), the mining and minerals companies in China provide comprehensive disclosures related to production safety, taking the absolutely dominant position in overall disclosures about sustainability. Such a difference could be attributable to the fact that China's mining and minerals industry is criticized as being the most highly polluting industry (Tu 2007). Mining accident rates sharply contrast with those of other countries around the world, sand are subject to international scrutiny (Li 2007; Homer 2009; China Mining Report 2010). Therefore, those companies tend to disclose greater levels of information regarding safety, demonstrating good mining practice with international standards and thereby maintaining the legitimacy of their operations. Based on the Chinese Academy of Social Science's classification criteria, the mining and minerals companies could be classified into the stage of 'follower' (Table 13).

[5] The figure is calculated as: average quality score 60/average maximum quality score in total 450 = 13.3%

Table 13: Classification of Sustainability Reporting Status in Chinese Companies

Status	Characteristics		
Reporter	Comprehensive and mature CSR management system in place; Complete and comprehensive reporting; Excellent CSR performance		
Leader	Establish CSR management system in progress; Relatively comprehensive reporting; Leading CSR performance		
Follower	Promote CSR management; Limited reporting; Participate CSR activities	⇦	Companies in China's Mining and Minerals Industry
Starter	Lack of CSR management; Infant stage of CSR activities; Scattered, incomplete reporting		
Hoarder	Significant lack of reporting	⇦	Cross-sector Top 100 Chinese Companies

Source: The Chinese Academy of Social Science (2010, p.13)

Overall, the thesis concludes that although sustainability reporting has been put on the mining companies' agenda as shown by the increasing number of disclosing companies, the quantity and comprehensiveness of disclosures require considerable improvement. Current reporting practice in China's mining and minerals industry could be characterized as a high level concern with the issue but a low level engagement with improving the reporting performance. The results are consistent with previous studies, such as Guo et al., (2009) who conclude that the imbalance between information quantity and quality has been recognized as a chronic problem in sustainability reporting in China. As the Chinese state government's advocacy of CSR as the key component of constructing a 'harmonious society' and China's entry into the world economic market, the current institutional environment in China provides an opportunity for Chinese companies' improvement of awareness and the high level of engagement with adopting sustainability reporting practice. In the mining and minerals industry, sustainability disclosures are largely used by companies as way of maintaining legitimacy in the eyes of the global community and responding to institutional pressures from the central government. However, to improve the comprehensiveness and usefulness of sustainability reporting, the lower level municipal governments, which act as the state's agents, local communities, and internal organizational factors, such as corporate governance procedures, supervisory board, managers' attitudes and corporate resources, should play significantly complementary roles.

In a developing country context, such as China, the notion of CSR has the potential to aid much-needed social progress for a large and important part of the population however the central issue is to generate a real change in corporate behaviour and virtuous benefits for members of Chinese society (Wharton 2010). Therefore, sustainability reports are not the destination but a stepping- stone towards greater awareness and comprehensive understanding of socially responsible behaviour, and achieving accountability of corporate behaviour. For China's mining and minerals industry, sustainability reporting could act as both internal and external tool for the industry to communicate and demonstrate its good practice towards the goal of sustainable development. However, reporting is only one aspect, and indeed a common criticism holds that there is too much emphasis on reporting and too little on performance (Hamann 2003). The results of this study provide a comprehensive picture of the current status of Chinese mining and minerals companies' sustainability reporting practice and could be used as a springboard for the further research. The central question in the future study is, to what extent public reporting practice could move China's mining and minerals industry towards a more equitable, open, harmonious and greener sector.

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APPENDIX

The Classification Scheme Developed Based on 'Chinese CSR Report Preparation Guide (CASS-CSR 1.0)'

CASS-CSR Disclosure Category	Map to G3	Items Reported In Chinese Context	Industry Specific Items Reported
GENERAL CATEGORIES			
STRATEGY AND ANALYSIS			
Statement from the most senior decision maker of the organization (e.g. CEO, chair, or equivalent senior position) about the relevance of sustainability to the organization and its strategy	2.1.1 Statement from management		
Value/Mission/Goal	2.1.1; 4.8		
核心 CSR 议题		√	
Awards received in the reporting period	2.2.10 Award		
Summary of key performance	2.1.2 Description of key impacts, risks and opportunities		
CSR model		√	
GOVERNANCE AND MANAGEMENT			
CSR management procedures and progress of governance body for overseeing the organization's identification and management of economic, environmental and social performance	4.9		
CSR management system (e.g. CSR department, personnel, certification, implementation)	4.8; 4.12		
		√	
Subscription to international standards; initiatives; Membership in associations (e.g. industry association, national and international advocacy organization)	4.13		
		√	
CSR training and education (e.g. CSR seminars, conferences, courses, programs, etc)			
责任融合			

推动专项工作转变		√
推动下属企业 CSR 工作		√
推动供应链伙伴履行 CSR 工作		√
责任绩效		
构建 CSR 指标体系		√
依据 CSR 指标体系进行绩效评估		√
CSR 优秀评选		√
STAKEHOLDER ENGAGEMENT		
Key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to, including through its reporting	4.17	
	4.16	
Approach to (internal and external) stakeholder engagement and communication		
		√
Senior management participation in internal and external stakeholder engagement and communication		
责任调研		
开展 CSR 课题研究		√
与教研机构开展 CSR 合作		√
参加国内外 CSR 标准制定		√
PERFORMANCE INDICATORS		
MARKET PERFORMANCE (M)		
M1 Investor		
M1.1 Management system of investor relations	Management approach	
M1.2 Growth capability (e.g. sales, growth rate)	EC1 Direct economic value	
M1.3 Profitability (e.g. profit, percentage of growth)	EC1	
M1.4 Financial health (e.g. debt/equity ratio)	EC1	
M1.5 Investor related negative information		√
M2 Customer and Product		
M2.1 Policy / Management of customer relations	Management approach	

M2.2 After sales service system		√
M2.3 Customer complaint solved	PR8	√
M2.4 Customer privacy	PR8	√
M2.5 Practice related to customer satisfaction, including results of surveys measuring customer satisfaction	PR5 Customer satisfaction	
M2.6 Management system/Certifications of product quality	Management approach	
M2.7 产品合格率		√
M2.8 Research and Development / 支持产品创新的新制度(e.g. 研发人员； 新增专利；新产品销售；重大创新；innovative product, personnel, investment)		√
M2.9 Non-compliance/negative information concerning product quality and safety	PR2 Non-compliance concerning product health and safety	
M3 Supply Chain		
M3.1 供应链 CSR 评估和调研		√
M3.2 战略共享机制		√
M3.3 Policies for responsible purchasing		√
M3.4 Rate of responsible purchasing		√
M3.5 Strategies for anti-trust	S07	
M3.6 Strategies for anti-competitive	S07	
M3.7 诚信经营和公平竞争培训		√
M3.8 信用评估等级		√
M3.9 合同履行率		√
M3.10 Supply chain related negative information		√
SOCIAL PERFORMANCE (S)		
S1 Government		
S1.1 守法合规体系 Internal control and risk management system	core S02-4 corruption	
S1.2 守法合规措施，培训 Explanation of the precautionary approach	4.11	
S1.3 Non-compliance: significant fines and non-monetary sanctions for non-compliance with laws and regulations	EN28, S08, PR9	
S1.4 Responding to governmental policies		√
S1.5 Payment to government (Tax contribution)	EC1	
S1.6 Tax related negative information 偷税漏税		√
S1.7 Support employment		√
S1.8 吸纳就业人数		√

S2 Employee		
S2.1遵守国家劳动法律法规		√
S2.1 Compliance with employment contract		√
S2.2 Social pension provided		√
S2.3 参加工会的员工比例		√
S2.4 禁止强迫劳动		√
S2.5 保护雇员个人信息和隐私		√
S2.6 确保体面劳动的制度和措施		√
S2.7 社会对话机制和集体谈判机制		√
S2.8 兼职、临时工和分包商员工权益保护		√
S2.9 向员工提供有竞争力的薪酬		√
S2.10 每年人均带薪休假天数		√
S2.11 Equal opportunity employment	LA13	
S2.12 Ratio of basic salary of men to women by employee category	LA14	
S2.13 Composition of governance bodies and breakdown of employees per category according to gender, age group, minority group membership, and other indicators of diversity	LA13	
S2.14 残疾人雇佣率或雇用人数		√
S2.15 Employee turnover	LA2	
S2.16 Employee training and education for career development	LA10-12	
S2.17 Employee communication and feedback	4.4	
S2.18 Employee satisfaction		√
S2.19 Employee negative		√
S2.20 困难员工帮扶投入		√
S2.21 为特殊人群（如孕妇、哺乳妇女等）提供特殊保护		√
S2.22 确保工作生活平衡		√
S2.23 Education, training, counselling, prevention, and risk-control programs in place regarding occupational health and safety 职业病防治制度	LA6	
S2.24 职业安全健康培训	LA8	
S2.25 Rates of injury, occupational diseases, lost days, and absenteeism, and number of work related fatalities by region职业病发生次数	LA7	
S2.26 员工心理健康制度/措施		√
S2.27 体检及健康档案覆盖率		√
S3 Production Safety		

S3.1 安全管理体系		√
S3.2 安全应急机制		√
S3.3 安全生产技术创新		√
S3.4 安全生产投入		√
S3.5 Safety related negative information		
S4 Community		
S4.1 Impact of nature, scope, and effectiveness of any programs on community	S01 Community	
S4.2 支持社区成员（尤其是弱势群体）的教育和学习		√
S4.3 Local hiring 员工本地化政策	EC7 Market presence	
S4.4 Local based supplier	EC6 Market presence	
S4.5 Charity and donation	EC1 Economic performance	
S4.6 Community related negative information		√
ENVIRONMENTAL PERFORMANCE (E)		
E1 Environmental management		
E1.1 Environmental management system	Management approach	
E1.2 Training and awareness/ 环保培训, 宣传力度	Management approach	
E1.3 Environmental impact assessment		√
E1.4 Environmentally friendly production and product (e.g. R&D, equipment, technology)	EN26	
E1.5 Total environmental protection expenditures and investment	EN30	
E1.6 Biodiversity protection / 厂区及周边生态环境治理	EN12, MM2	
E1.9 环保公益		√
E1.10 环境事故应急机制		√
E1.11 绿色采购		
E1.12 Environment related negative information		
E2 Energy saving		
E2.1 Energy saving policies, initiatives and technologies	Management approach	
E2.2 Energy consumption/saving	EN3-5	
E2.3 Water consumption/saving	EN8	
E 2.4 Usage of renewable energy	EN6	
E2.5 使用可再生能源政策		√
E2.6 可再生能源使用率或使用量		√

E2.7 Circular economy policy		√
E2.8 能源循环利用率或利用量		√
E2.9 Green office policies		√
E2.10 节能建筑和营业网点		√
E2.11 减少公务旅行节约的能源		√
E3 Emission		
E3.1 Policies, initiatives and technologies of reducing greenhouse gas emissions 温室气体	EN18	
E3.2 温室气体排放量及减排量	EN16,17	
E3.3 Policies, initiatives and technologies of reducing other air emission waste 废气		√
E3.4 Total weight of other air emission and reduction achieved 废气排放量及减排 量	EN19, 20	
E3.5 Policies, initiatives and technologies of water discharge 废水		√
E3.5 Total water discharge 废水排放量及减排量	EN21	
E3.6 Policies, initiatives and technologies of waste disposal 废物		
E3.7 Total weight of waste (by type and disposal method)	EN22	
E3.8 Waste recycled		√
E3.9 Noise 噪音治理	EN26	
E3.10 积极应对气候变化		√