UNIVERSITY OF GHANA

COLLEGE OF HUMANITIES

ENVIRONMENTAL ACCOUNTABILITY PRACTICES AND PERFORMANCE OF MINING FIRMS IN GHANA

GEORGE TACKIE

DEPARTMENT OF ACCOUNTING

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ENVIRONMENTAL ACCOUNTABILITY PRACTICES AND PERFORMANCE OF MINING FIRMS IN GHANA

BY

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF PHD ACCOUNTING DEGREE.

DEPARTMENT OF ACCOUNTING

MARCH 2019

DECLARATION

I declare that this study is my own work and that it has not been submitted for any degree or qualification in any university, and that all the sources used have been indicated and duly acknowledged.

……..…. ……..……

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CERTIFICATION

We hereby certify that this thesis was supervised and coordinated in accordance with the guidelines of supervision of thesis laid down by the School of Graduate Studies, University of Ghana.

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ABSTRACT

Environmental issues have increased among firms especially those operating in environmental sensitive industries (ESI) such as the mining industry. This concern has led to a greater incentive for studies into environmental and social impacts, particularly as these are seen by some to have a commercial advantage. The essence for firms to report on their social and environmental impacts is a demonstration of their environmental accountability to their key stakeholders. Environmental accountability practices (EAP) entails a firm's mandatory and voluntary actions and inactions to either reduce its negative impacts or to improve the living conditions of the local communities where it operates. Is there a commercial imperative for mining firms' EAP? How can we validate the alignment of their responsibility to report on their environmental actions with their responsibility for their environmental actions? Do mining firms' EAP translate into their environmental performance (EP) or firm performance (FP)? Or rather, is their EAP driven by their level of performance? Is EP part of the EAP composition or it is an outcome that mining firms seek to achieve or it is both a composition and an outcome?

To answer these questions, the entire study employs a mixed research approach. The first two objectives of the study employed quantitative research methodology whiles the remaining two objectives were achieved using qualitative research approaches. The study employed the use of surveys and interviews to investigate the environmental accountability practices of 61 predominantly large-scale mining firms in Ghana. Principal component analysis was used to generate composite scores in measuring the three key variables. The study employed multiple regression ordinary least square (OLS) estimation technique for analysis. The study also applied structural equation methodology based on partial least squares path modelling technique to assess the moderating-mediating effect of EP on the EAP-FP link. Documentary analysis was used to examine the reporting

practices of purposively sampled eight dominant gold mining firms, using their annual reports covering 2008 to 2017. Finally, based on interview data, the study analyses the state of environmental accountability in Ghana's mining industry from the perspectives of multiple stakeholders.

The results of the study revealed a positive and significant relationship between EAP and FP, as well as between EAP and EP. The results also showed a positive and significant relationship between FP and EP. The moderation-mediation analysis revealed that EP is a more significant predictor of EAP of mining firms in Ghana. In the presence of EP, EAP is also able to drive FP although the effect size was trivial.

The study recommends that mining companies should improve on their environmental management system (EMS). EMS is a significant driver of EAP which positively impacts on EP, eventually translating into improving FP with the potential of creating value for mining firm's stakeholders. Firms in ESIs must give premium to practices that promote environmental accountability even when such practices have the tendency of negatively affecting the bottom line significantly. The negative effects of not being environmentally accountable far outweighs the positive effects of engaging in it. Mining companies must strengthen their engagement with indigenes, and not only local elites, and ensure alignment between accountability efforts and the immediate needs of the local communities. Government should adequately resource the regulatory bodies in order to strengthen their monitoring and enforcement activities. Regulatory compliance is a major driver of EAP in the mining industry. Government's efforts at combating illegal mining activities should be seriously encouraged and supported by all stakeholders, particularly community partners. One significant contribution of this study is the development of a scale for measuring EAP, EP and FP of mining firms. This scale can be applicable to research in other environmentally sensitive industries such as plastic waste management.

DEDICATION

To my wife, Gloria, and to Nii Dromo, Naa Shidaa and Junior.

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LIST OF ABBREVIATIONS

AGAL	AngloGold Ashanti Limited
ASM	Artisanal and Small-Scale Mining
AVE	Average Variance Extracted
CCCM	Community Consultative Community Meetings
CLG	Community Liaison Group
CP	Community Partners
CS	Customer Satisfaction
CSR	Corporate Social Responsibility
CSER	Corporate Social and Environmental Responsibility
EA	Environmental Accountability
EAP	Environmental Accountability Practices
EAS	Environmental Accounting Systems
EC	Environmental Consultants
ECH	Ethics Committee for Humanities
ECI	Environmental Condition Indicators
EG	Environmental Governance
EGM	Edikan Gold Mine
EIA	Environmental Impact Assessment
EL	Efficiency Level
EM	Environmental Management
EMs	Environmental Managers
EMP	Environmental Management Plan
EMPs	Environmental Management Practices
EMS	Environmental Management Systems
EP	Environmental Performance
EPA	Environmental Protection Agency
EG	Environmental Regulation
EITI	Extractive Industries Transparency Initiative
ER	Environmental Reporting
ES	Environmental Sustainability
ESG	Environmental, Social and Governance
ESF	Environmental Sensitive Firms

ESI	Environmental Sensitive Industries
ET	Environmental Technologies
FP	Firm Performance
FFP	Firm Financial Performance
GAAP	Generally Accepted Accounting Principles
GCM	Ghana Chamber of Mines
GRA	Ghana Revenue Authority
GRI	Global Reporting Initiative
GSR	Golden Star Resources
HSE	Health, Safety and Environment
IAS	International Accounting Standard
ICAG	The Institute of Chartered Accountants – Ghana
ICMC	International Cyanide Management Code
IFAC	International Federation of Accountants
IFRS	International Financial Reporting Standards
IIRC	International Integrated Reporting Council
ISO	International Organisation for Standardisation
KMO	Kaiser-Meyer-Olkin
LP	Labour Productivity
LSM	Large-Scale Mining
MA	Mining Association
MAG	Monitoring Advisory Group
MPI	Management Performance Indicators
MinCom	Minerals Commission
MCH	Mining Concession Holders
OLS	Ordinary Least Square
OPI	Operational Performance Indicators
PCA	Principal Component Analysis
PL	Profitability Level
PLS	Partial Least Squares
PLS-SEM	Partial Least Squares – Structural Equation Modelling
PO	Production Outputs
PPE	Personal Protective Equipment

PwC	PricewaterhouseCoopers
RC	Regulatory Compliance
SEA	Social and Environmental Accountability
SER	Social and Environmental Reporting
SEP	Stakeholder Engagement Practices
SIA	Social Impact Assessment
SLO	Social Licence to Operate
SMEs	Small and Medium-sized Enterprise
SP	Social Performance
SRI	Social Responsibility Investment
TBL	Triple Bottom Line
UG	University of Ghana
UGBS	University of Ghana Business School
UK	United Kingdom
UN	United Nations
US	United States of America
VIF	Variance Inflation Factor

CHAPTER ONE

GENERAL INTRODUCTION

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background of the Study

In the last fifty years, environmental issues have increased among firms, especially those operating in environmental sensitive industries (ESI) such as the mining industry. Environmental issues such as pollution, land use, waste disposal, biodiversity and destruction to water bodies have increasingly become a major public concern (Beck, Campbell, & Shrives, 2010; Gray & Bebbington, 2001; Lamberton, 2005; Milne & Gray, 2007; Alrazi, Villiers, & Staden, 2015). This concern has led to a greater incentive for studies into environmental and social impacts (Lamberton, 2005), especially as these are perceived to have a commercial advantage (Spence, 2007). In the 1990s, at the firm level, the macro level and the global level, environmental issues became a topmost agenda of nations and businesses (Okoye & Ngwakwe, 2004).

Broadly, corporate reporting of financial statements started as far back as the 1850s. During that time, social and environmental reporting were not so embedded in financial reporting. Financial statements preparation and presentation only included the financial accounting aspect of the entity. The traditional approaches to accounting by corporate entities, according to Rajapakse and Abeygunasekera (2006), only focused on financial operations, with their major activities affecting the economy through operations in the market. But today, the situation is frantically different. In the corporate annual reports of firms in these ESIs are found several pages of reports on the social and environmental effects of the activities of these entities on their social and natural habitats. The essence,

for firms to report on their social and environmental activities, practices and impacts is a demonstration of their environmental accountability to their stakeholders.

As noted by Hossain, Islam, and Andrew (2006), corporate social and environmental responsibility (CSER) has become an issue of interest to researchers. Many studies reveal a significant increase in the number of companies making social and environmental disclosure in their annual reports and other corporate communications (Deegan & Gordon, 1996; Kolk, 2003). Stakeholders have become increasingly concerned about the interaction between firms, society and the environment. Issues such as environmental protection and pollution prevention have become a major concern to stakeholders of environmental sensitive firms (ESFs) (Branco, & Rodrigues, 2008; Monteiro & Aibar-Guzmán, 2010). As a way of demonstrating their accountability, many firms have responded to stakeholder concerns through voluntary and mandatory social and environmental disclosures in annual reports or in stand-alone environmental reports (Kolk & Perego, 2010).

Moreover, the rapid global transformation has placed an increased responsibility on ESFs to operate as good corporate citizens while achieving their financial objectives. ESFs must demonstrate accountability for their environmental impacts within the communities where they operate. Due to the direct impact of the operations of the extractive industries on the environment and local communities, these ESFs have a responsibility to report (Gray, Owen, & Adams, 1996) and a responsibility for their environmental actions.

Environmental accountability (EA) in the mining sector, similar to other sectors, entails a firm's mandatory and voluntary actions and inactions to either reduce its negative impacts

or to improve the natural environment of their host communities where they operate (Westphalen, 2012). Lamberton (2005) asserts that most mining firms demonstrate their commitment to environmental accountability through investments in infrastructure, social capital, human capital, reforestation, and alternative energy supplies.

In many jurisdictions, firms which are regarded as environmentally and socially responsible corporate citizens are more likely to gain acceptability and respectability (Humphreys, 2000) and legitimacy to operate (Alrazi et al., 2015). From the perspective of gold mining firms, EA is part of the corporate strategy of ensuring minimal community-level resistance in the face of increased concerns about the environmentally and socially disruptive nature of the extractive industry. As a result, mining firms have realised that they "face significant risk if they operate without the consent of affected communities" and that they need to focus on "achieving and maintaining a social license, or freedom, to operate" (Kemp et al., 2006, p. 394).

Within the broader spectrum of studies in social and environmental accounting (SEA) (Brown & Dillard, 2013) research, the mining industry has received significant global attention due to the nature of mining firms' social and environmental responsibilities. Most mining firms have used either corporate social responsibility (CSR) or corporate social and environmental responsibility (CSER) as a demonstration of their environmental and social accountability (Govindan, Kannan, & Shankar, 2014; Viveros, 2016). In the view of Gallego-Alvarez, Segura, and Martinez-Ferrero (2015), business entities in ESIs promote greater environmental accountability to achieve higher financial performance.

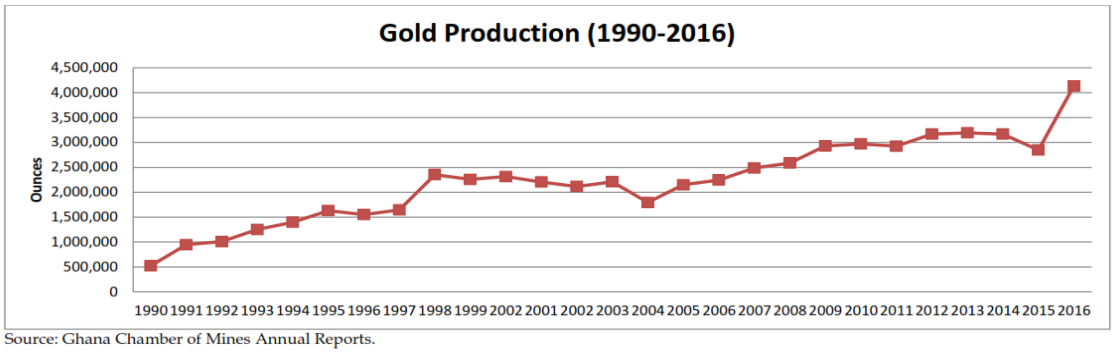
Within this arena, the questions bothering on this study are: Is there a commercial imperative for mining firms to engage in environmental accountability (EA)? How can we validate the alignment of their responsibility to report on their environmental actions with their responsibility for their environmental actions? Do the environmental accountability practices (EAP) of mining firms directly impact on their level of performance? Or rather, is their EAP driven by the level of performance? What is the role of environmental performance (EP) in these considerations? Is EP part of the EAP's composition or it is an outcome that mining firms seek to achieve or it is both a component and an outcome? Before seeking to find answers to these questions in this study, the next section presents some stylish facts on some of the issues raised. The discussion of the stylish facts sets a perfect tone for establishing the basis for this study.

1.2 Stylised Facts

1.2.1 The gold mining sector

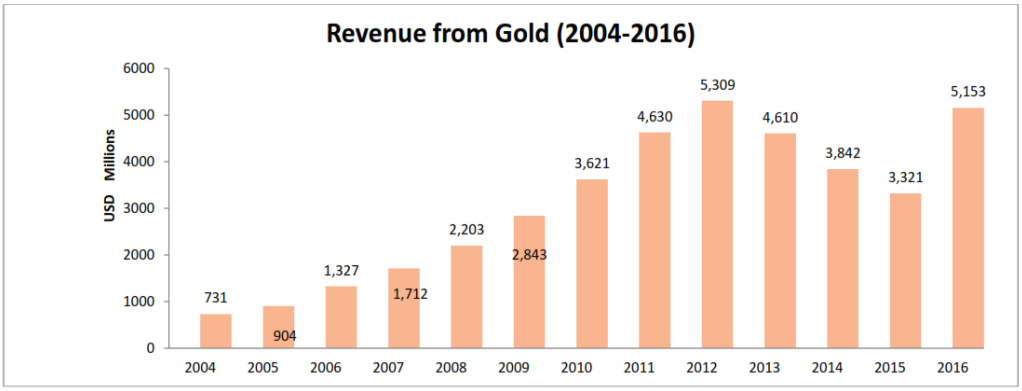
Gold is one of the few precious minerals well sought after globally. The gold mining sector is a key sector to the growth and development of many economies in the world; the Ghanaian economy is not an exception. According to Gold Fields Mineral Survey (2017), Ghana was the tenth leading producer of gold in 2016. In that same year, the cumulative average price of gold levelled at $1,250 per ounce, bringing in substantial amount of foreign exchange earnings. The industry also contributes to employment generation, mineral royalties, and creation of businesses in the gold value chain. Statistics from the Ghana Revenue Authority (GRA) reveal that, in 2016, the mining and quarrying sector generated direct domestic revenue of GH¢1.65 billion (Ghana Revenue Authority, 2017). Gold accounts for 97.3% of gross mineral revenue while the respective share of manganese, bauxite and diamond are 1.9%, 0.7% and 0.03% (Ghana Chamber of Mines,

2017). Since 1990, annual gold production in Ghana has witnessed a sturdy growth as shown in Figure 1.1 (Ghana Chamber of Mines annual report, 2017). With the exception of the period 2013 to 2015, the revenue from gold has consistently appreciated remarkably from 2004 to 2016, as depicted by Figure 1.2 (Ghana Chamber of Mines annual report, 2017). Similarly, as shown in Figure 1.3, the mining sector has consistently contributed immensely to job creation directly employing a local workforce of over 10,000 employees since 2005.



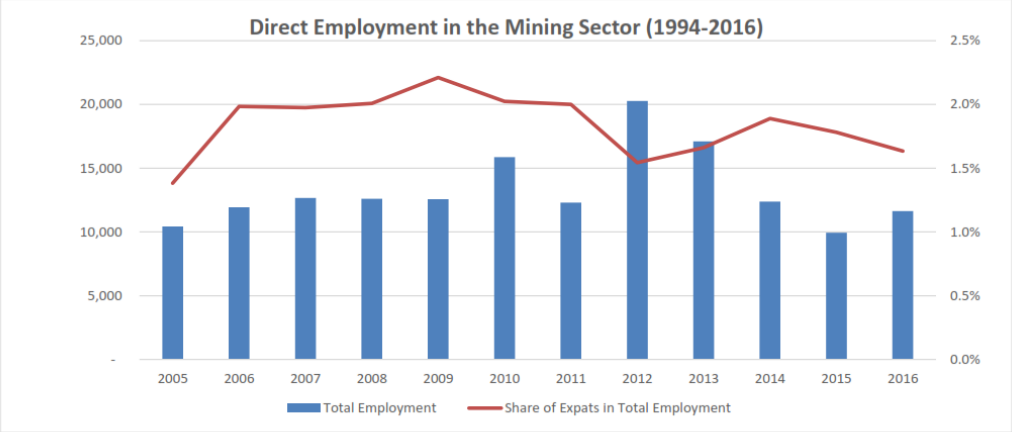
Source: Ghana Chamber of Mines Annual Reports.

Figure 1.1: Annual gold production in Ghana
Source: Ghana Chamber of Mines annual reports (2017)



Source: Ghana Chamber of Mines Annual Reports

Figure 1. 2: Revenue from gold (2004 – 2016)
Source: Ghana Chamber of Mines annual reports (2017)



Source: Ghana Chamber of Mines

Figure 1. 3: Direct employment in the mining sector (2005 – 2016)
Source: Ghana Chamber of Mines annual reports (2017)

Ghana's geological space is blessed with over twenty-eight minerals, including diverse kinds of precious minerals. However, the gold industry is the most predominant on account of the preponderant weight of gold in the basket of commercially exploited minerals (Ghana Chamber of Mines, 2017). Ghana's mining landscape can be categorised as large-scale, alluvial and small-scale mining. The methods of mining in the country are underground and open pit mining. Alluvial mining occurs in the Artisanal and Small-Scale mining (ASM) sector.

1.2.2 Environmental accountability in the mining industry

Although the mining and minerals sector is professed as a contributor to socio-economic achievement through increased economic growth (Paredes, 2016), employment and skills development, among others, the mining industry faces enormous challenges with respect to social and environmental issues (Gomes, Kneipp, Kruglianskas, da Rosa, & Bichueti, 2013). Mining firms are increasingly called upon to engage in responsible and sustainable mining by being responsible for their environmental actions.

In response, some mining companies have voluntarily implemented the International Standard ISO 14001 *environmental management systems*. The ISO 14001 is a key environmental regulation regime which when adopted demonstrates an organisation's environmental proactivity (Claver, López, Molina, & Tarí, 2007). Vintró, Sanmiquel, and Freijo (2014) found that companies which have implemented an environmental management system (EMS) engage in more accountable practices compared with those without an EMS. Further, they found a strong positive association between implementation of EMS and achieving better organisational results.

Some studies however do not find reasonable justification for mining firms to engage in EAPs beyond mining firms' socio-economic responsibilities. Tiainen (2016) proposes that with respect to accountability of firms, social and environmental considerations should be given a lower priority as compared to economic consideration. This position by Tiainen (2016) is strongly contestable considering the environmental impacts of large-scale mining activities (Estrades, Llambí, Perera, & Rovira, 2016). These inconclusive outcomes create the need for investigating the relationship between EAP and performance of mining firms in Ghana.

1.2.3 Environmental accountability and firm performance

A survey of literature reveals that, over the last two to three decades, the relationships between environmental accountability (EA) and firm performance (FP) have become of interest to scholars and industry players. Many hold the view that, the more profitable a firm is, the more likely is it for the firm to be environmentally accountable. Firms that are profitable and financially viable are seemingly more credible in meeting societal expectations. Such firms are quick to resolve the environmental and social issues they

encounter. The question is: does EA improve FP (Iwata & Okada, 2011) or does a firm's performance drive the firm's EA (Misani & Pogutz, 2015)? Many of the results from studies in these areas have been inconclusive. The debate seems unending. Obviously, an ESF does not necessarily need to find a financial performance justification before engaging in environmental accountable practices. The cost of not being environmentally accountable far outweighs the benefits of engaging in it. ESFs must give premium to practices that promote environmental accountability even when such practices have the potential of negatively affecting the bottom line significantly.

1.3 Problem Statement

1.3.1 Environmental performance and environmental reporting

While achieving their economic or financial targets, mining firms are now obligated to account for the impact of their corporate policies and practices on their social and environmental habitats (Gray, 2010). Environmental performance (EP) of entities is an essential component of assessing corporate environmental accountability. Firms must be accountable in terms of "doing the right thing" (performance), and "giving an account of it" (reporting) (Gray et al., 1996). They must account and report on their performance from all perspectives – financial, environmental and social (Mathews, 1993, 1997; Lamberton, 2005; Boiral, 2013; Edens, 2013; Gray, 2010, 2013; Biondi, 2014; Lamberton, 2015).

Cho and Roberts (2010) however found that, in an attempt to achieve environmental accountability, poor environmental performers engage in more environmental reporting using optimistic narratives. In effect, their words speak louder than their actions (Cho, Guidry, Hageman, & Patten, 2012). These contradictions suggest the possibility of examining the extent to which mining firms' environmental performance (what firms do)

relate to their environmental reporting (what firms say they do or they will do). Environmental performance and environmental reporting are two distinct but very much related constructs of environmental accountability. A number of studies have examined the relationship between the two without focusing on the practices that create the gap (Boiral, 2013; Edens, 2013). Some of these studies used disclosure index which predominantly dwell on secondary data without active engagement with the processes, structures, activities and events that determine environmental accountability. The use of a mixed research approach may provide a complete picture for examining mining firms' responsibility for their actions and the reporting on these responsibilities, in the context of a developing economy such as Ghana.

1.3.2 Environmental accountability practices and performance

The point has been well articulated that firms in ESIs (Barbu, Dumontier, Feleag, & Feleag, 2014) have been pressured by both internal and external stakeholders to report not only their financial performance but also on their social and environmental performance (Bonsón & Bednárová, 2015). Such reports are deployed through social and environmental reporting (SER) and disclosure which has been embraced as an accountability mechanism.

Environmental accountability is defined as the responsibility for an entity's environmental actions and the responsibility to report on those actions. What is the motivation for a firm to engage in SER as a way of demonstrating its social and environmental accountability? A number of studies posit a significant and positive relationship between corporate social and environmental disclosures and firm performance (Lu & Abeysekera, 2014). Literature supports the assertion that EAP can significantly and positively influence a firm's performance (Rokhmawati, Sathye, & Sathye, 2015; Muhammad, Scrimgeour, Reddy, &

Abidin, 2015). However, very few studies have extended the argument beyond EP (Gallego-Alvarez et al., 2015; Gonenc & Scholtens, 2017).

Some scholars have also established a significant link between environmental performance (EP) and firm performance (FP) (Iwata & Okada, 2011; Qi, Zeng, Shi, Meng, Lin, & Yang, (2014; Lee, Min, & Yook, 2015; Angelia & Suryaningsih, 2015). On the global front, using data from 89 international companies, Gallego-Alvarez et al. (2015) found that reduction in carbon dioxide emissions (as a proxy for environmental accountability) generates a positive impact on firm performance. Similarly, using a dataset from Chinese industrial firms, the work of Qi et al. (2014) showed that EP significantly influences FP[1]. Iwata and Okada (2011) and Gonenc and Scholtens (2017) found different effects of environmental performance on financial performance. Also, Lee et al. (2015) used an unbalanced panel data of 362 Japanese manufacturing firms to explore the relationship between EP and financial return of corporate environmental management. On the contrary, Pintea, Stanca, Achim, and Pop (2014) did not find a significant link between EP and FP, in the context of a developing region, using a panel of Romanian economic entities.

The inconclusive results from these studies, among others, have prompted the need for this study to look beyond EP and focus on EAP which incorporates EP to some extent. It is asserted that EP, as a performance measure, may not entirely reflect what the mining firm is actually up to. There may be more to it. The conclusion reached by Qi et al. (2014) confirms that environmental management strategies of firms can achieve the benefit of

[1] In this study, FP is operationalised as firm performance and not financial performance (See Appendix J for a list of operational definition of terms used in this study). Further to this, for simplicity and to avoid overlap, FP is clearly distinguished from EP although EP can also be viewed as a firm performance measure.

improving both EP and FP. A firm's EAP may include its environmental management system (EMS), environmental accounting system (EAS), CSR initiatives, actions, activities, processes, projects, and stakeholder engagements.

Some studies have extended the discussion beyond EP. Alrazi, Villiers, and Staden (2015) used EP as the focal point instead of environmental accountability (EA). In addition, most studies use financial performance as the proxy for FP, ignoring the non-financial aspect. These gaps identified in the literature broadened the scope of FP and EAP. In this study, the operational definition of EP (as a moderating-mediating variable) is isolated from EAP. Even though there are related studies in South Africa, Asia and Latin American, to the best of the researcher's knowledge, within the Ghanaian mining context, no research has examined the relationships between (1) EAP and FP; (2) EAP and EP; and (3) EP and FP.

1.3.3 Stakeholder engagements in the mining industry

Wilson (2015) proposes the active engagement of distinct groups within the community in the implementation of mining-driven community development. He asserts that exclusive powers should not be given to traditional leaders. Moreover, the belief is that mining-driven community development must be community-led rather than corporate-controlled. In some instances, community development have been undermined by the considerable amount of influence exercised by traditional authorities over community representatives and the community (Wilson, 2015).

In the interest of gaining a social license to operate (SLO), some mining firms do not follow appropriate stakeholder engagements practices. According to Freeman (1984), as cited by Parsons and Moffat (2014), stakeholders are entities who can influence or can be

influenced by the organisation's activities. Identifying who is a stakeholder of a particular firm is not quite a straightforward trait. An organisation may be saddled with the demands of numerous stakeholders. According to the stakeholder theory, one significant responsibility of managers is the ability to manage the relationships between the firm and its key stakeholders. At some point, managers may have to prioritise stakeholders depending on the financial reporting system, the managers' philosophical beliefs and the organisation's peculiar circumstances (Hall, Millo, & Barman, 2015).

The supremacy to affect a firm, the acceptability of a stakeholder's relationship with the firm and the earnestness with which the firm responds to the stakeholder's demands are all driving forces in identifying stakeholders. Studies on the stakeholder-firm relationship have focused on stakeholder influences. Very few studies have looked at the engagement approaches adopted by ESFs in addressing the concerns of influential stakeholders who can affect corporate social and environmental accountability mechanisms (Lu & Abeysekera, 2014). It is therefore important to identify those influential stakeholder groups who can determine, or may be affected by, the firm's social and environmental accountability practices, and determine how the firm meets their expectations. Indeed, identifying, prioritising and meeting the needs and expectations of stakeholders is an accountability mechanism. While examining the stakeholder engagement practices that best enhance environmental accountability, the study analyses the perspectives of stakeholders in relation to environmental accountability in Ghana's mining industry.

1.4 Objectives of the Study

The main objective of the study is to investigate the environmental accountability practices and performance of mining firms in Ghana. Specifically, the study seeks to:

1. Investigate the environmental accountability practices (EAP), environmental performance (EP) and firm performance (FP) of mining firms in Ghana;
2. Assess the moderating-mediating effect of EP on the EAP–FP relationship;
3. Examine the environmental reporting practices of gold mining firms in Ghana; and
4. Analyse the state of environmental accountability in Ghana's mining industry from the perspectives of multiple stakeholders.

1.5 Summary of Hypotheses Development

Based on the evidence gathered from literature regarding environmental accountability practices and performance in the mining industry, the researcher developed the following hypothesised relationships. The literature supporting these hypotheses and the arguments advanced thereon have been discussed in the first two empirical chapters of this study.

1. H_1: EAP of mining firms in Ghana is significantly, positively and directly associated with their EP and FP.
2. H_2: The relationship between EAP and FP is strengthened significantly in the presence of EP.
3. H_3: Variations in EAP significantly account for variations in EP.
4. H_4: Variations in EP significantly account for variations in FP.

1.6 Significance of the Study

The study sought to examine the environmental accountability practices of mining firms and how these practices impact on their environmental performance and firm performance. The study makes significant theoretical and empirical contributions to the literature, in many respects. It provides further evidence on the debate on whether environmental

accountability drives environmental performance and ultimately firm performance. It also extends the debate on whether there is a bi-causal or recursive relationship between environmental performance and firm performance.

It provides a theoretical basis for modifying the Environmental Legitimacy, Accountability, and Proactivity (ELAP) framework submitted by Alrazi et. al. (2015) by considering the holistic environmental accountability and its relationship with environmental performance and firm performance. The present study places environmental accountability as the central theme rather than solely environmental performance. The study provides a scale for measuring environmental accountability practices of mining firms. The composition and detailed nature of the scale which is an adaption of existing validated scales provides a strong footing for research in other environmentally sensitive industries.

Based on analysis of identifiable stakeholders in the mining sector and their respective interests, the study provides a multi-stakeholder classification grid that serves to delineate stakeholder interest prioritisation. The study also offers directions to environmental managers of mining firms about the key areas of impact of environmental initiatives on corporate financial performance and environmental accountability.

1.7 Scope of the Study

The study covers mainly the environmental accountability practices, environmental performance and firm performance of all companies which have been granted mineral rights by the Minerals Commission (MinCom) of Ghana. This target population of the study covers all large-scale mining companies with mining leases and/or exploration licenses. However, the field work provided an opportunity to interact and collect data from

a few small-scale mining firms. As of 10th November 2017, 108 companies which have been granted mining leases and/or exploration licenses were in active production. The research instrument was administered to all the 108 companies. However, 61 firms responded. The 61 firms constitute 81% of total gold output in Ghana, based on 2017 production statistics obtained from the Minerals Commission of Ghana.

The justification to study on the mining sector is premised on the relevance of the sector to a developing country such as Ghana. Mining firms make significant contributions to Ghana's economic development through provision of employment, payment of taxes development of transport, logistics and the financial services sector. Mining also contributes to community development for host communities and the general public. Despite these contributions, mining companies have been accused of causing environmental degradation and pollution with cyanide, mercury and other chemicals which they employ in processing gold ores. In a bid to mitigate the negative effects of their operations, they seem to engage in some form of environmental accountability practices.

The mining sector is also plagued with key challenges which tend to increase its operating costs and reduce the profitability of its operations. These include the increasing presence of illegal mining activities by small scale mining operations on company concessions; substantial land compensation; and corporate social and environmental responsibility issues. Another key challenge is the increasing cost of energy needed to power its operations in the light of Ghana's growing energy generation challenges.

The mining companies used for the study are all regulated by the MinCom. They are all required to submit periodic returns on their operations to the Commission. The data gathered from the Commission on these companies is reasonably valid.

1.8 Chapter Disposition

The study is organised into six chapters. The researcher adopted the article-based approach in presenting the research report for this thesis. The first chapter provides a general introduction to the study dealing with the background of the study, some stylish facts, problem statement, research objectives, summary of hypotheses, significance of the study, and scope limitations of the study. The second chapter which is the first empirical paper investigates the effect of environmental accountability practices on performance of mining firms in Ghana. Chapter three assesses the moderating-mediating effect of environmental performance on the relationship between environmental accountability practices and firm performance. The third empirical paper is presented in chapter four. This chapter examines the environmental reporting practices of gold mining firms using annual reports of eight dominant large-scale gold mining firms. Chapter five covers the fourth empirical paper which uses a qualitative mode of enquiry to analyse the perspectives of stakeholders in relation to environmental accountability in Ghana's mining industry. The summary, conclusions and recommendations for the entire study is presented in chapter six.

CHAPTER TWO

EFFECTS OF ENVIRONMENTAL ACCOUNTABILITY PRACTICES ON PERFORMANCE OF MINING FIRMS IN GHANA

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EFFECTS OF ENVIRONMENTAL ACCOUNTABILITY PRACTICES ON PERFORMANCE OF MINING FIRMS IN GHANA

Abstract

This study investigates the extent to which the environmental accountability practices (EAP) of mining companies significantly and positively relate to their environmental performance (EP) and firm performance (FP). A cross-sectional survey is used to gather primary data from 61 predominantly large-scale mining companies operating in Ghana. Principal component analysis (PCA) is used to generate composite scores in measuring the three key variables – EAP, EP and FP. The study employed OLS estimation to test the hypothesised relationships between (1) EAP and FP; (2) EAP and EP; and (3) EP and FP. The results of the study reveal a positive and significant relationship between EAP and FP, as well as between EAP and EP. However, only environmental management systems (EMS) shows a positive and significant relationship with EP. The relationship between stakeholder engagement practices (SEP) and FP was also positive but not significant. The results show a positive and significant relationship between FP and EP. However, only management performance indicators (MPI) show a positive and significant relationship with FP. The study recommends that mining companies should improve on their EMS. EMS is a significant driver of EAP which positively impacts on EP which eventually translates into improving FP creating value for mining firms' stakeholders. The unique contribution of this study is the development of a scale for measuring EAP, EP and FP. The scale was developed based on adopted and adapted validated scales from literature. The scale developed for measuring EAP, EP and FP can be applicable to research in other ESI such as plastic waste management.

2.1 Introduction

In the last fifty years, environmental accounting and accountability have received widespread attention in the academic literature (Gray, 1994; Gray & Bebbington, 2001; Lamberton, 2005; Gray & Laughlin, 2012; Lodhia & Hess, 2014; Vintró, Sanmiquel, & Freijo, 2014; Song, Zhao, & Zeng, 2017). Vintró, Sanmiquel, and Freijo (2014) assert that companies in environmental sensitive industries (ESIs) have dedicated themselves to environmental issues. There is a clear demonstration that these companies appreciate the environmental impacts of their activities, and they have taken steps to be responsible in the extraction and exploitation of natural resources.

Further evidence from the literature suggest that, globally, the mining sector has shown keen interest in environmental and social issues, incorporating the challenges of environmental accountability into their core business practices (Govindan, Kannan, & Shankar, 2014; Viveros, 2016). Companies, especially those in ESIs such as mining and minerals related businesses (Barbu, Dumontier, Feleag, & Feleag, 2014) have been pressured by internal and external stakeholders to report on all aspects of performance affecting the firm – financial, social and environmental (Bonsón & Bednárová, 2015). Social and environmental reporting (SER) and disclosure is an accountability mechanism. Further, most mining firms have used corporate social responsibility (CSR) or corporate social and environmental responsibility (CSER) as a demonstration of their social and environmental accountability (SEA) (Govindan, Kannan, & Shankar, 2014; Viveros, 2016). It is the view of Gallego-Alvarez, Segura, and Martinez-Ferrero (2015) that companies who demonstrate greater environmental accountability obtain higher financial performance. Many hold the view that the more profitable a firm is, the more likely is it for the firm to be environmentally accountable. Firms that are profitable and financially

viable are seemingly more credible in meeting societal expectations. Such firms are quick to resolve the social and environmental issues they encounter. The question is: does better environmental performance improve firm performance (Iwata & Okada, 2011) or does a firm's performance drive the firm's environmental performance (Misani & Pogutz, 2015)?

The starting point in this study is to assess the relationship between EAP, EP and FP by exploring some valid propositions in these relationships. The uniqueness of this study lies in keeping faith with the holistic and broader view of environmental accountability as opposed to environmental performance which has been the focus of many studies in this area. For instance, the work of Alrazi et. al. (2015) demonstrates three vital concepts of environmental performance and behaviour but considers environmental performance as the most important central theme in their framework instead of the holistic environmental accountability. The criticism is that environmental accountability is a comprehensive and superior issue of concern that environmental performance. Second, the present study moves away from just examining CSER and performance. It is believed that CSER, as an accountability mechanism (Govindan, Kannan, & Shankar, 2014; Viveros, 2016), cannot sufficiently and completely demonstrate the EA of ESFs. The objective in this paper is two-fold: First, to measure the environmental accountability practices (EAP), environmental performance (EP) and firm performance (FP) of mining firms in Ghana; and second, to determine the effects of EAP on EP, EAP on FP, and EP on FP. The aim is to develop and validate a scale that measures the EAP, EP and FP, based on some existing scales from literature which do not comprehensively measure the constructs.

The remaining sections of this chapter is structured as follows. The next section provides the theoretical and empirical literature underpinning this study, as well as the development

of hypotheses. The third section presents the research design (data sources and data collection, and measurement of constructs) employed for the study. This includes the model specification and estimation technique. Next, the results obtained in the empirical analysis are reported and discussed. Finally, the study provides the conclusions and recommendations of this paper.

2.2 Literature Review

The essence for firms to report on their social and environmental impacts is a demonstration of their environmental accountability to their stakeholders. Research in environmental accounting and accountability has evolved overtime. To provide a firm theoretical foundation for this study, this section provides a review of both the theoretical and empirical literature on EAP, EP and FP. The section begins with a discussion on the notion of accountability and an attempt to answer the question of: to whom is accountability owed? With a belief in theoretical plurialism, the study draws extensively on the traditional accountability theories: stakeholder, legitimacy and institutional theories. This section review these relevant accountability theories including social capital theory as they apply to this study.

2.2.1 Notions of accountability

As defined by Gray (1992), accountability is simply the explaining of what is being done currently and what is delivered through the provision of information. Providing a report to stakeholders as a way of giving information constitute accountability. Since organisations are accountable to society for their actions they are required to demonstrate their compliance with the law through the provision of information. The provision of general

and accounting information reflects, to a substantial extent, the accountability of organisations to individuals, groups and parties in the society.

Following Gray (1992), Gray, Owen and Adams (1996) provide that "accountability is the duty to provide an account of those actions for which one is held accountable". Thus, accountability is the responsibility to carry out certain actions (or to desist from taking actions), and be responsible to provide information relating to those actions. Accountability is synonymous with stewardship which refers to guardianship of someone's assets.

In their accountability set-up, Gray et al. (1996) offer a simple two-way relationship between an accountor and an accountee. The accountee is referred to as the principal whereas the accountor is referred to as the agent. In the corporate world, the principal could be taken to be the shareholder whereas the agent would be the director or manager, within the conventional financial accounting setting. In this regard, it can be thought that society is made up of chains of individual social contracts between societal members and the society itself that assigns responsibility and right to information. Donleavy (2016) asserts that the forgoing accountability descriptions imply three components of accountability namely:

> *"(1) the duty to provide an account by those who are accountable (i.e. the provision of information); (2) the responsibility of those who are held accountable for actions and perhaps their consequences (the accountor – agent); and (3) the provision of an account of actions and the consequences to the accountee (principal) which might serve as a basis for judgement and assessment by such an accountee, and may affect their decisions".*

Some SEA scholars have proposed that environmental accountability is delivered through the transmission of information to a wide array of stakeholders regarding social and environmental impacts of organisations (Unerman, 2000; O'Dwyer, et al., 2005; Gray, et al., 1996; Adams, 2004). In a limited sense, environmental accountability demonstrates acceptance of a company's CSER to provide relevant information (Adams, 2004).

2.2.2 Accountability and disclosure

Increasingly, with regards to the issue of corporate accountability, there is a growing awareness of the need for information disclosure. In the 1970s, within the context of financial reporting, the 'decision usefulness' approach became limited with the increase in non-financial information disclosure. Consequently, the role of corporate accountability has found its way into the decision usefulness approach to financial accounting. Theoretically, accountability is a more complicated dimension of stewardship (Gray, 1992), which admits that organisations should have a responsibility to contribute to social good and to serve the equity interests. In any case, in a well-developed regime, all organisations are accountable not only to their equity providers but also to the general society (Gray, 1992). In such a regime, all individuals have rights to relevant information (Stanton, 1997).

Many firms are startled about decisions regarding information disclosure. Decisions such as what information to disclose, to whom should the information be disclosed, what form should the disclosure take and when should the information be disclosed, are all not straightforward. Some have questioned: "who determines the terms of accountability" and "to whom is accountability owed". There are divergent views on when, how and to whom accountability is due. Some have argued that unless the 'principal' (the accountee) can

enforce accountability then there is no accountability, whereas Gray et al. (1996) take a different view and argue that "accountability can exist even if it is not enforceable". This demonstrates why sometimes companies fail to provide information even when they are mandated to do so but do provide when they are not obligated to do so. This means that accountability is not necessarily reflected by information disclosure. In this case, it could be explained that in a well-developed society, companies are under moral obligations, beyond their legal obligations, to fulfil certain tasks that are expected of them. The fact that certain concerned stakeholders do not have the power to demand information should not prevent them from demanding information they require. Information should rather be disclosed on grounds of rights to information by referring to the natural and moral rights but not only on legal grounds.

2.2.3 The stewardship function of accounting

Accounting is about measurement and valuation but it is much more about accountability (Donleavy, 2016). Accountability is synonymous with stewardship which refers to guardianship of someone's assets (Aliyu, 2005). Chapter three of the IASB's conceptual framework for financial reporting states that *"the objective of financial statements is to provide information about an entity's assets, liabilities, equity, income and expenses that is useful to users of financial statements in assessing the prospects for future net cash flows to the entity and in assessing management's stewardship of the entity's resources"* (IASB, 2010). The stewardship function of accounting is inherently an accountability mechanism.

A historical overview of accounting posits that accounting fulfills the primary objective of accountability. The managers, acting as agents, account to the shareholders (principals) through annual accounts of what they have done with the assets entrusted to them. In

primitive days, feudal lords had managers, called stewards, who were charged with accounting to their lords regarding how they had preserved his estate during the year. This is the stewardship purpose of accounts which has been observed for centuries. However, mainstream accounting has not viewed stewardship as the primary purpose of accounting since the seventies (Donleavy, 2016). Instead, it sees the primary purpose of accounting as producing information useful to decision making. Should decision makers be interested in relying on accounts to assess the stewardship function of managers or should they be interested in relying on accounts to make predictions? Both are ideal.

The revised conceptual framework (IASB, 2018) captures the ideal by saying that "investors' and creditors' expectations about future earnings depend on their assessment of the amount, timing and uncertainty of the prospects for the future net cash flows to the entity and their assessment of management's stewardship of the entity's resources". Thus, the stewardship or accountability function of accounting is still relevant.

2.2.4 Theories of accountability

2.2.4.1 Stakeholder theory

Freeman (1984) is the originator of the stakeholder theory. Agle et al. (2008) said that the stakeholder theory is an integrated normative, positive and instrumental theory. A stakeholder is anyone or group of people who affect the firm or whom the firm affects. The normative aspect of stakeholder theory posits that firms should consider the interests of all stakeholders when making decisions. The positive aspect says firms can only maximise the welfare of shareholders over time if they also improve the welfare of other stakeholders. Stakeholder theory makes all stakeholders equal subjects perhaps to their relative salience – power, legitimacy and proximity.

The stakeholder theory is concerned with the creation of value for stakeholders through integrating achievement of business objectives with societal concerns (Freeman, 1984). The argument of Garriga and Melé (2004) is that firms must detect and respond to social concerns to gain social legitimacy. This is what is commonly referred to as the managerial aspect of the stakeholder theory. To extend the stakeholder approach to value creation for all stakeholders, Freeman and Velamuri (2006) proposed the term company stakeholder responsibility.

There are assumptions that underlie the various approaches of stakeholder theory. Firms are regarded as systems that continuously interact with their external environment. The external environment comprise stakeholders who affect the firm and stakeholders who are affected by the firm's operations (Freeman, 1984). Clarkson (1995) believes that stakeholders have a moral, legal or presumed prerogative on the firm and are able to influence the decisions the firm makes. Stakeholders are often regarded as risk takers, resource providers or residual owners (Jones, 1995).

Though management research lays emphasis on internal stakeholders, external stakeholders (such as community activists, the general public, public institutions and NGOs) who have a social contract with the firm, are constantly gaining the attention of researchers due to their ability to exert pressure on firms (Eesley & Lenox, 2006). Such stakeholders also impose operational costs in the form of public relation expenses or loss of intangible resources in the form of mistrust and loss of reputation on the firm. The assumption is that the interests of all stakeholders is paramount. Stakeholders have

intrinsic value, and no set of interests is considered to have more priority over others (Philips, Freeman & Wicks, 2003).

So far as the stakeholder theory is concerned, a central feature of the organisation is its moral values. Donaldson and Preston (1995)'s proposition is that these assumptions define stakeholder theory's normative underpinning where each stakeholder's viewpoint is considered on its own merit. Though stakeholders' interests are normatively legitimised, firms try to often rationalise costly conflicting stakeholder interests. In the domain of environmental accountability in the mining industry, the general presumption is that environmental accountability strengthens a firm's relationships with stakeholders, consequently reducing transaction costs and ultimately improving the firm's performance. In this regard, as noted by King and Lenox (2000), environmental accountability can help reduce operational costs and create opportunities while acting as a safeguard from disorderly occurrences.

Environmental accountability and stakeholder theory

The managerial perspective of the stakeholder theory permits the use of environmental reporting and disclosure to control the actions of dominant stakeholders. Dominant stakeholders are those who control resources which are central to the ongoing sustenance of the firm. McWilliams and Siegel (2001) however hold the view that in many instances, it is the interests of the dominant stakeholders that are first attended to before the interests of other stakeholders are looked at. If powerful stakeholders, such as the MinCom Inspectorate Division, expect mining firms to construct sewerage drains then that will be the focus of the entity. By contract, under the normative or ethical view of the stakeholder theory, there is the belief that accountability is responsibility driven and that all

stakeholders who are impacted by the entity's operations have a right to demand accountability. In this study, the researcher draws from both the managerial and ethical perspectives of the stakeholder theory in analysing the prioritisation of the needs of dominant stakeholder groups in the mining industry.

2.2.4.2 Legitimacy theory

Legitimacy theory explains why firms engage in one form of accountability or the other. Accounting research primarily focusing on environmental accountability draws extensively on legitimacy theory (O'Donovan, 2002). Legitimacy theory implies that the firm is authorised by the society to do what it does, and the firm in turn respects and protects public interest. Legitimacy theory gives credence to the social contract to operate. Legitimacy is respectability.

Environmental accountability and legitimacy theory

Clarke and Gibson-Sweet (1999) contended that the relationship between environmental accountability and financial performance can be explained with the legitimacy theory. They add that environmental and social disclosures result from predicaments that have ensued. These disclosures are therefore used to manage a firm's reputation and to show that the firm is committed to fixing any social and environmental challenges. To some extent, the legitimacy theory postulates that a company that does not manage its reputation may witness a waning in firm performance. Clarke and Gibson-Sweet (1999) confirmed the use of this theory by companies who engage and report on their environmental accountability practices.

Deegan, Rankin and Tobin (2002) described legitimacy theory as a "system-oriented theory" and advanced the argument that accountability is essential for a firm's survival

because a negative reputation could lead to consumer protests and eventually poor financial performance.

Applying the legitimacy theory to accountability, it is imperative that firms undertake certain actions and inactions to ensure they operate in a manner consistent with community norms and expectations; thus, complying with the terms of their social contract (Wilmshurst & Frost, 2000). A mining firm's EAP can demonstrate the firm's responsibility to make an effort to legitimise the ongoing existence of the firm. Pollution control, noise reduction and land reclamation are examples of EAP that is demonstrable of a mining firm's commitment to responsible mining. Mining firms can also use EAP to communicate to the society about the firm's accountability mechanisms.

2.2.4.3 Institutional theory

The key concept in institutional theory is isomorphism which is the propensity of organisations to bear a resemblance to other organisations that operate under comparable conditions. The tendency toward emulation of dominant institutional models is sustained by a variety of mechanisms and processes that induce a degree of homogeneity of organisational forms and practices (Scott, 1987).

Isomorphism comes in three dimensions: mimetic, coercive and normative. Mimetic isomorphism is the situation whereby legitimised practices are borrowed from other superior performing institutions. Thus, one entity replicating the practices of another. Mimetic pressures are evidenced through benchmarking and recognising of best practices of leading players in a particular field of endeavour. Coercive isomorphism relates to conformance to the demands of dominant constituents and stems from a desire for

legitimacy as reflected in the political influences imposed by other members of the particular playing field. Change is enforced by an external source. If the dominant group has substantial power, change may be authorised to take place. Normative isomorphism arises as a field matures. It consists of "conforming to a privileged worldview within the organisational field where change occurs through the development and communication of this worldview by entities with common experiences" (DiMaggio & Powell, 2000).

Professional groupings such as training regimes, trade associations, and other socialising mechanisms within the organisational field, represents a source of institutional values. Normative isomorphism also occurs through the engagement of individuals from a set of educational institutions and subjecting them to rigorous socialisation. A second source of normative isomorphism is the formal professional institutions that span organisational units within the field (DiMaggio & Powell, 2000). These institutions provide leaders in the field with a means to propagate norms, stimulate the field while directing other members.

It is important to note that mimetic, coercive and normative isomorphism can occur simultaneously. If, for instance, the Mineral Commission's Inspectorate Division uses the best environmental practices in the mining industry as a benchmark to conduct a mine audit with the aim of achieving strict compliance then mimetic and coercive isomorphism are simultaneously in motion.

Environmental accountability and institutional theory

With respect to environmental accountability, institutional theory explains the reasons why organisations might want to be environmentally responsible. It is generally argued that

both the form and practices an organisational engages in can converge towards some form of homogeneity. In effect, the organisational structure and the differing practices adopted by organisations become similar to what is considered to be 'normal'. Organisations that depart from the expected normality will potentially have challenges in attaining legitimacy (Deegan et al., 2002).

2.2.5 Environmental accountability practices and performance measures

The point has been well articulated that firms in ESIs (Barbu, Dumontier, Feleag, & Feleag, 2014) have been pressured by both internal and external stakeholders to report not only their financial performance but also on their social and environmental performance (Bonsón & Bednárová, 2015). Such reports are deployed through social and environmental reporting (SER) and disclosure which has been embraced as an accountability mechanism.

Environmental accountability is defined as the responsibility for an entity's environmental actions and the responsibility to report on those actions. What is the motivation for a firm to engage in SER as a way of demonstrating its social and environmental accountability? A number of studies posit a significant and positive relationship between corporate social and environmental disclosures and firm performance (Lu & Abeysekera, 2014). Literature supports the assertion that EAP can significantly and positively influence a firm's performance (Rokhmawati, Sathye, & Sathye, 2015; Muhammad, Scrimgeour, Reddy, & Abidin, 2015; Gallego-Alvarez et al., 2015; Gonenc & Scholtens, 2017).

Some scholars have also established a significant link between environmental performance (EP) and firm performance (FP) (Iwata & Okada, 2011; Qi, Zeng, Shi, Meng, Lin, & Yang, (2014; Lee, Min, & Yook, 2015; Angelia & Suryaningsih, 2015). On the global front,

using data from 89 international companies, Gallego-Alvarez et al. (2015) found that reduction in carbon dioxide emissions (as a proxy for environmental accountability) generates a positive impact on firm performance. Similarly, using a dataset from Chinese industrial firms, the work of Qi et al. (2014) showed that EP significantly influences FP[2]. Iwata and Okada (2011) and Gonenc and Scholtens (2017) found different effects of environmental performance on financial performance. Also, Lee et al. (2015) used an unbalanced panel data of 362 Japanese manufacturing firms to explore the relationship between EP and financial return of corporate environmental management. On the contrary, Pintea, Stanca, Achim, and Pop (2014) did not find a significant link between EP and FP, in the context of a developing region, using a panel of Romanian economic entities.

The performance measures used in these studies, among others, have prompted the need for this study to look beyond EP and focus on EAP which incorporates EP to some extent. It is asserted that EP, as a performance measure, may not entirely reflect what the mining firm is actually up to. There may be more to it. The conclusion reached by Qi et al. (2014) confirms that environmental management strategies of firms can achieve the benefit of improving both EP and FP. A firm's EAP may include its environmental management system (EMS), environmental accounting system (EAS), CSR initiatives, actions, activities, processes, projects, and stakeholder engagements.

Some studies have extended the discussion beyond EP. Alrazi, Villiers and Staden (2015) used EP as the focal point instead of environmental accountability (EA). In addition, most

[2] In this study, FP is operationalised as firm performance and not financial performance (See Appendix J for a list of operational definition of terms used in this study). Further to this, for simplicity and to avoid overlap, FP is clearly distinguished from EP although EP can also be viewed as a firm performance measure.

studies use financial performance as the proxy for FP, ignoring the non-financial aspect. In this study, the operational definition of EP (as a moderating-mediating variable) is isolated from EAP. Even though there are related studies in South Africa, Asia and Latin American, to the best of the researcher's knowledge, within the Ghanaian mining context, no research has examined the relationships between (1) EAP and FP; (2) EAP and EP; and (3) EP and FP.

2.3 Research Method

2.3.1 Research design

This chapter employs a quantitative research approach using a cross-sectional survey research design to investigate the effect of environmental accountability practices on the performance of mining firms in Ghana. The quantitative approach to the primary data collection and analysis enabled the researcher to develop valid and reliable measurement scales for the latent EAP, EP and FP variables.

2.3.2 Data sources and collection

The present study is fixated on the Ghanaian mining sector. The target population for this study comprised 108 companies which have been granted mining leases and/or exploration licenses by the MinCom as of 10th November, 2017. Since mining companies operate in more than one geographical location, the unit of analysis for the study was the mine operations currently identifiable as separate legal entities. Since mine operations represent independent entities, the study focused on the respective mine operations of the mining companies, referred to in this study as mining concession holders (MCH). The research instrument was administered to all the 108 firms. However, 61 firms responded. The study

was conducted across six regions out of the ten regions in Ghana. The regional distribution of the 61 sampled firms is depicted in Table 2.1.

Table 2.1: Regional Distribution of Firms Surveyed

	Frequency	Percent
Western Region	24	39.3
Ashanti Region	11	18.0
Greater Accra Region	9	14.8
Brong Ahafo Region	8	13.1
Eastern Region	7	11.5
Central Region	2	3.3
Total	**61**	**100.0**

Source: Field Data (2017)

The study covered predominantly large-scale mining firms (88.5%) and a few small-scale mining firms (11.5%). The ownership structure of these firms cover foreign-owned (21%), Ghanaian-owned (41%) and those with both foreign ownership and local ownership (37.7%). Table 2.2 depicts analyses of the nature and ownership distributions of the mining firms surveyed.

Table 2.2: Nature and Ownership Structure of Mining Firms Surveyed

Nature of mining firms	*Ownership structure of mining firms*			***Total***
	Foreign-owned	*Ghanaian-owned*	*Both*	
Large-scale mining	13	19	22	**54**
Small-scale mining	0	6	1	**7**
Total	**13**	**25**	**23**	**61**

Source: Field Data (2017)

The primary data for the study was obtained through questionnaire administered to the environmental managers responsible for sustainability and environmental issues of the mine operations of firms used for the study. The belief is that these respondents constitute the key informants for the study. An online version of the questionnaire was created and

sent as a link via electronic mail to the environmental managers of each mining firm. A cover letter explaining the purpose of the study preceded the questionnaire. To increase the response rate, key informants of the surveyed firms were initially contacted via telephone. Further, an email introducing the researcher to the mining companies was sent on behalf of the researcher by officials from the Ghana Chamber of Mines to the environmental managers. Although the questionnaire was administered to all the 108 mining companies, 61 completed responses were received resulting in a response rate of 56.48%. The significantly high response rate was achieved due to the personal follow-ups the researcher made to the mining sites.

2.3.3 Research instrument

The items on the questionnaire used to measure the study variables were grouped into seven sections, A to G. Section A contained statements on measures of environmental performance (EP). The study adopted the EP metrics developed by the Committee on Industrial Environmental Performance Metrics (1999) in the USA. The EP metrics measures EP by MPI (management performance indicators), OPI (operational performance indicators) and ECI (environmental condition indicators) (See Appendix 2.1).

The MPIs relate to pollution prevention initiatives, environmental target setting and budgeting, environmental strategy and implementation, environmental complaints handling. The OPIs focus on energy usage and conservation, renewable energy sources, production pollution and operational risk issues, and production process waste recycling. The ECIs have to do with the condition of the environment surrounding a particular mining entity. The ECIs deal with community risk reduction measures, response to abnormal operating conditions, and environmental safety of surrounding communities.

Section B of the questionnaire assessed the level of firm performance. Based on existing literature on assessment of firm performance (Sidhoum & Serra, 2017), the section was designed to cover the following indicators: production outputs (PO), efficiency Level (EL), profitability level (PL), labour productivity (LP), customer satisfaction (CS), and regulatory compliance (RC). Sections C, D, and F focused on measuring the EAP of mining firms. These were measured based on three sub-constructs respectively: environmental management system (EMS); environmental accounting system (EAS); and stakeholder engagement practices (SEP). The final section of the questionnaire, Section G, dealt with personal demographics of the respondents and the profile of the mining firm.

In this present study, Likert-scale questions were used in measuring all the three key variables of this study. According to Yates (2004), Likert-scale is the most widely and reliable means to measure qualitative attributes or constructs with quantitative metric units. The scale was constructed by grouping similar statements, questions or items together to measure a variable and combining the respondents' score on the items into a composite score, using principal components analysis (PCA).

The research instrument was pre-tested to ensure reliability and validity. As defined by Bird and Dominey-Howes (2008), pre-testing is a valuable method that give researchers the assurance that they have captured the specified information among a smaller subset of target respondents. Pre-testing of the research instrument was undertaken to validate the instrument. It allowed the researcher to determine whether respondents understood the statements. The pre-test was also useful in assessing the adequacy, internal consistency, validity and reliability of the questionnaire.

2.3.4 Reliability and validity tests

The reliability and validity of quantitative study depends on instrument construction. One means to test reliability generally is the use of Cronbach alpha coefficient, which was used in this study. As noted by Sekaran and Bougie (2010), the Cronbach alpha coefficient is generally used to reliably indicate how well various items are positively correlated to one another. When the alpha of the scale for measuring a variable is 0.7 and above, then it is more reliable, however, a lesser alpha below 0.7 has reliability in doubt (Santana, Mengod, & Artigas, 2009). The test results for the Cronbach alpha for this study revealed a coefficient of above 0.7 for all the constructs.

2.3.5 Ethical consideration

Ethical consideration in research is very relevant and necessary for both the researcher and the subjects in the study. According to Neuman (2014), ethical research is done by balancing the value of advancing knowledge against the value of non-interference in the respected privacy of others. This is done by seeking consent, ensuring anonymity and confidentiality. Confidentiality and informed consent are key important ethical issues to consider when conducting a survey. In constructing the research instrument, the confidential right and anonymity of the study was highlighted. As a demonstration of the researcher's commitment to observing the required ethical standards, the researcher submitted the required clearance documents to the University of Ghana Ethics Committee for Humanities. Approval was granted for the data collection in a letter (ECH 003/17-18) dated 4th September 2017 (see Appendix G). Research participants were accordingly given consent forms (see Appendix F) to complete before the research instrument was administered. The study also regarded the ethical issues in reporting. Under no situation does the researcher formulate data to support conclusions reached.

2.4 Model Development and Hypotheses

This first empirical chapter employed OLS (ordinary least squares) estimation to investigate the hypothesised relationships between (1) EAP and FP; (2) EAP and EP; and (3) EP and FP. OLS regression with heteroscedasticity robust standard errors was used to test the relationships in the model (White, 1980). This was to avoid the problem of heteroscedasticity. Six models to test the associated hypotheses are presented as follows:

$$EP_i = \alpha_i + \beta_1 EAP_i + \beta_2 Age_i + \beta_3 Ownership_i + \beta_4 Size_i + \beta_5 Nature_i + \varepsilon_i \quad (1)$$

$$FP_i = \alpha_i + \beta_1 EAP_i + \beta_2 Age_i + \beta_3 Ownership_i + \beta_4 Size_i + \beta_5 Nature_i + \varepsilon_i \quad (2)$$

$$EP_i = \alpha_i + \beta_1 EMS_i + \beta_2 EAS_i + \beta_3 SEP_i + \beta_2 Age_i + \beta_3 Ownership_i + \beta_4 Size_i + \beta_5 Nature_i + \varepsilon_i \quad (3)$$

$$FP_i = \alpha_i + \beta_1 EMS_i + \beta_2 EAS_i + \beta_3 SEP_i + \beta_2 Age_i + \beta_3 Ownership_i + \beta_4 Size_i + \beta_5 Nature_i + \varepsilon_i \quad (4)$$

$$FP_i = \alpha_i + \beta_1 EP_i + \beta_2 Age_i + \beta_3 Ownership_i + \beta_4 Size_i + \beta_5 Nature_i + \varepsilon_i \quad (5)$$

$$FP_i = \alpha_i + \beta_1 MPI_i + \beta_2 OPI_i + \beta_3 ECI_i + \beta_2 Age_i + \beta_3 Ownership_i + \beta_4 Size_i + \beta_5 Nature_i + \varepsilon_i \quad (6)$$

Where,

EP = *environmental performance composite score;*
FP = *firm performance composite score;*
EAP = *environmental accountability practices composite score;*
EMS = *environmental management system composite score;*
EAS = *environmental accounting system composite score;*

SEP = *stakeholder engagement practices composite score;*
MPI = *management performance indicators composite score;*
OPI = *operational performance indicators composite score;*
ECI = *environmental condition indicators composite score;*
Age = *age of firm, measured in years of operation;*
Ownership = *ownership of firm measured as foreign or local*
Size = *size of firm, measured by scale of operation*
Nature = *nature of mine operation of the mining firm, measured as commercial production or otherwise.*
A = *constant; and*
E = *error term.*

2.4.1 Control variables

In the models stated above, additional independent variables were adopted as control variables. This was to prevent the results of this study from being affected by firms' heterogeneity. Various studies have used firm characteristics – size, age, industry, ownership – as control variables (Gallego-Alvarez et al., 2015), in examining the relationship between environmental accountability and firm performance. Larger firms are more likely to be interested in environmental responsibility and to reduce the negative impacts of the firm's activities so as to maintain a good reputation and corporate image for the firm. Firm size has also been found to be a strong determinant of corporate social and environmental disclosures (Lu & Abeysekera, 2014).

In the present study, size was measured by the scale of operation – large-scale or small-scale – as a dummy variable (1 for large-scale and 0 otherwise). Two more dummy variables were crafted: nature of operation and type of ownership. For nature of operation, commercial production served as the base group. If a mining company belonged to commercial production, it was assigned a value of 1, and 0 otherwise. Another dummy variable to describe ownership of a mining company to control for the type of controlling shareholders (that is, foreign or local ownership) was type of ownership (1 for a foreign-

owned firm and 0 otherwise). Age was measured by the number of years the mining firm had been in existence since its establishment.

2.4.2 Principal Component Analysis

Dimension reduction of measurement items was necessary to reduce the number of indicators in each variable. Principal component analysis (PCA) was employed in identifying the principal components of each factor, using IBM Statistics 20. The PCA was used to generate new factors to reduce the number of indicators for each variable. With Kaiser-Meyer-Olkin (KMO) index greater than 0.6 and sphericity test $p < 0.00$, there was evidence of a relationship among the indicators, which provided a basis for extraction of the principal components, using the Kaiser criterion for the selection of factors with eigenvalues whose explained variance was greater than 1.

2.5 Results and Discussion

With the aid of the Stata software, the regression outputs is depicted in the subsequent tables. The results of the study presented in Table 2.5 reveals a positive and significant relationship between EAP and FP, as well as between EAP and EP. However, between EP and all the EAP variables (EMS, EAS and SEP), only EMS showed a positive and significant relationship with EP. With respect to the relationship between EAP and FP, the study shows a positive and significant relationship. However, only EMS again showed a positive and significant relationship with FP. The relationship between SEP and FP was also positive but not significant. The results in Table 2.6 also shows a positive and significant relationship FP and EP. However, with respect to the relationship between FP and all the EP variables (MPI, OPI and ECI), only MPI showed a positive and significant relationship with FP. Table 2.3 present the descriptive statistics.

Table 2.3: Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
EMS	61	5.00	7.00	6.3279	.65119
EAS	61	4.00	7.00	6.0328	.70633
SEP	61	5.00	7.00	6.1639	.61047
MPI	61	4.00	7.00	5.9344	.70401
OPI	61	5.00	7.00	6.1639	.63719
ECI	61	4.00	7.00	5.9508	.69345
PO	61	3.00	7.00	6.0164	.80606
EL	61	4.00	7.00	6.0328	.70633
PL	61	5.00	7.00	6.1967	.60055
LP	61	5.00	7.00	6.2295	.55957
CS	61	5.00	7.00	5.6393	.57830
RP	61	5.00	7.00	6.0000	.60553
EAP	61	5.00	7.00	6.0820	.64018
EP	61	4.00	7.00	6.0000	.65828
FP	61	5.00	7.00	6.0000	.48305
Age	61	2	121	18.3278	20.1880
Ownership	61	0	1	.4098	.4958
Size	61	0	1	.8852	.32137
Nature	61	0	1	.4098	.4958

Source: Field Data (2017)

Table 2.4. depicts the correlation matrix. It reveals a positive correspondence between each pair of variable in the correlation matrix. The matrix shows significant correspondence between EP and all the variables of interest. The relationship between FP and the variables of interest were all significant.

Table 2.4: Correlation Matrix

	EMS	EAS	SEP	MPI	OPI	ECI	EAP	EP	FP
EMS	1								
EAS	0.746^{***}	1							
SEP	0.673^{***}	0.679^{***}	1						
MPI	0.742^{***}	0.418^{***}	0.380^{**}	1					
OPI	0.579^{***}	0.485^{***}	0.374^{**}	0.587^{***}	1				
ECI	0.260^{*}	0.193	0.248	0.284^{*}	0.311^{*}	1			
EAP	0.955^{***}	0.874^{***}	0.824^{***}	0.645^{***}	0.566^{***}	0.267^{*}	1		
EP	0.761^{***}	0.462^{***}	0.426^{***}	0.972^{***}	0.720^{***}	0.438^{***}	0.679^{***}	1	
FP	0.528^{***}	0.390^{**}	0.458^{***}	0.478^{***}	0.355^{**}	0.248	0.528^{***}	0.490^{***}	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2.5: Regression Results of EAP on EP and FP

	Model 1 EP	Model 2 FP	Model 3 EP	Model 4 FP
EAP	0.700***	0.511***		
	(0.119)	(0.109)		
Age	-0.0000465	0.00641	-0.00120	0.00578
	(0.00289)	(0.00464)	(0.00433)	(0.00419)
Ownership	0.215	0.202	0.0640	0.155
	(0.249)	(0.329)	(0.230)	(0.323)
Size	-0.408	-0.247	-0.363	-0.183
	(0.293)	(0.264)	(0.280)	(0.284)
Nature	0.431**	-0.177	0.383*	-0.215
	(0.184)	(0.305)	(0.219)	(0.332)
EMS			0.926***	0.410**
			(0.136)	(0.183)
EAS			-0.146	-0.0753
			(0.134)	(0.200)
SEP			-0.0796	0.236
			(0.123)	(0.189)
_cons	0.183	0.203	0.198	0.201
	(0.270)	(0.304)	(0.316)	(0.305)
N	61	61	61	61
R^2	0.542	0.311	0.652	0.330
adj. R^2	0.491	0.235	0.599	0.227
F	12.382	5.169	12.196	4.904
P	0.000	0.000	0.000	0.000

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The regression results from Table 2.5 shows that EAP has a positive relationship with EP in model 1. EAP also has a positive relationship with FP as shown in model 2. The results in model 3 and 4 shows that EMS has a positive relationship with both EP and FP respectively. The results in all the models depicted in Table 2.5 show no significant relationships between: *Age* and *EP; Foreign* and *EP; Local* and *EP; Size* and *EP; EAS* and *EP; SEP* and *EP; Age* and *FP; Foreign* and *FP; Local* and *FP; Size* and *FP; EAS* and *FP;* and, *SEP* and *FP.*

Table 2.6: Regression Results of EP on FP

	Model 5 FP	Model 6 FP
EP	0.472***	
	(0.123)	
Age	0.00777	0.00807
	(0.00603)	(0.00621)
Ownership	0.182	0.181
	(0.320)	(0.326)
Size	-0.167	-0.178
	(0.396)	(0.400)
Nature	-0.389	-0.391
	(0.311)	(0.318)
MPI		0.347**
		(0.153)
OPI		0.141
		(0.151)
ECI		0.0861
		(0.128)
_cons	0.127	0.125
	(0.445)	(0.455)
N	61	61
***R*²**	0.286	0.295
adj. *R*²	0.207	0.187
F	3.613	2.722
P	0.004	0.014

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The results from model 5 in Table 2.6 shows a positive relationship between EP and FP. MPI also has a positive relationship with FP. Meanwhile, OPI has no significant relationship with FP. ECI as shown in model 6 also shows no relationship with FP. Theoretically, EP has been shown to have a positive relationship with FP and this study confirms it. However, very few studies have examined the relationship beyond EP.

2.6 Conclusions and Recommendations

The purpose of this chapter of the study was to assess the effect of environmental accountability practices (EAP) on the performance of mining firms in Ghana. The aim was to determine whether EAP positively and significantly relate to EP and FP of mining firms

in Ghana. The rationale for focusing on the mining industry is because the industry is fraught with enormous challenges with respect to environmental issues (Gomes et al., 2013). Mining firms are increasingly called upon to engage in responsible and sustainable mining.

Using OLS estimation to test the relationships between: (1) EAP and FP; (2) EAP and EP; and (3) EP and FP, the results revealed that EAP has a positive and significant effect on the performance of mining firms in Ghana. The study recommends that mining firms should continue to improve their EMS since EMS is a significant driver of EAP. Giving emphasis to EAP eventually translates into improving firm performance thereby creating value for the firm's stakeholders.

This study suffers from the problem of multicollinearity with the measurement of EP. EP as a construct in this study can be part of EAP (as a process) and can also be part of FP (as an outcome) (Misani & Pogutz, 2015). To overcome this problem, the measurement items for EP was completely distinct from those of EAP and FP. Further, in the next chapter, EP is isolated from both EAP and FP by treating EP as a moderating as well as a mediating variable on the EAP–FP relationship.

Another limitation of this study is the relatively small sample size of 61 predominantly large-scale gold mining companies. Generalisability of the research findings may somewhat be inhibited but considering that the sampled firms account for 81% of the total gold outputs in Ghana (Statistics Department, Minerals Commission, 2017) makes the research outcomes of this study logically and scientifically viable.

Overall, operationalising the EAP construct bridges gaps in the literature while simultaneously building theory about the relationship between EAP, EP and FP at the micro level. In the end, the study has revealed that the key driver of EAP is EMS which in tend has a significant and positive effect on FP.

Further, this study has unveiled the need for firms to engage in social impact assessment (SIA) through stakeholder engagement, as part of their environmental management system. SIA is comparable to environmental impact assessment (EIA). SIA encompasses the engagement of all relevant stakeholders through consultations and public communications. The EIA guidelines provided by Environmental Protection Agency (EPA) has been argued to be inappropriate as the nature of the consultations are often one-way information-sharing sessions. As one community activitist put it, "*no one is given the opportunity to ask questions when the mining company's community relations officers meet the community members*" to disclose the impacts of their operations to communities. This assertion, when cross-examined with a mining company official, was highly refuted. An SIA, prepared and submitted by a mining company to EPA, when verified and successfully followed can help reduce tensions in mining environments.

Some studies on environmental governance in the mining sector have also questioned the efficacy of EIA as an environmental regulatory and management tool, and the capacity of the EPA in prioritising environmental concerns (Mason, 2014). Indeed, one way to improve environmental governance is also to intensify the role of SLO for mining firms. Firms in ESIs must give premium to practices that promote environmental accountability even when such practices have the potential of negatively affecting the bottom line significantly.

Appendix 2.1: Questionnaire items

A. ENVIRONMENTAL ACCOUNTABILITY PRACTICES [EAP]

I. ENVIRONMENTAL MANAGEMENT SYSTEMS [EMS]

1. EMS Standardisation & Utilisation [EMS1]

The mining site uses available voluntary EMS standard(s) to guide the development of its own environmental management system
Causes of environmental problems are focused on
Goals have been developed and implemented which report environmental performance
The mining site has a formal environmental management system (EMS)
There is a formal department responsible for environmental affairs
Top management shows support for environmental performance

2. Use of Green & Sustainable Initiatives [EMS2]

The firm has a positive predisposition to the use, purchase, or production of wastes, in favour of recycling materials
The firm uses consumables, goods and/or processed goods of low environmental impacts
The firm attaches high value to the introduction of alternative sources of energy
The firm's activities are planned to reduce the environmental impact that it generates
The firm participates in activities related to the protection and enhancement of its natural environment
The firm's mining site operations focus on the use of "green initiatives"
The firm takes energy savings into account in order to improve levels of energy consumption

3. EMS Orientation & Dissemination [EMS3]

Environmental issues, procedures, and policies are included in training
Training programmes are organized to educate workers on environmental procedures
The firm's environmental performance is formally tracked and reported on
Environmental achievements are given visibility in the firm's annual reports
Environmental performance results are widely distributed
Environmental position is given prominent visibility in the firm's annual report
EMS procedures are widely available and operating staff are knowledgeable of these

4. EMS Effectiveness [EMS4]

The firm's EMS helps the firm to manage, measure and improve the environmental aspects of its operations
The mining site takes initiatives to mitigate environmental impacts of its extractive and production process
The firm's EMS facilitates better cross-functional integration of resources and information to facilitate other environmental practices within the firm
The firm's EMS has led to a more efficient compliance with mandatory and voluntary environmental requirements
The firm's EMS is such that emission of harmful gases and wastes are minimized or eliminated
People within the firm consider the EMS highly effective
People outside the firm consider the EMS highly effective

5. Benefits of EAP [EMS5]

Cost reduction attributable to environmental accountability mechanisms
Productivity improvement attributable to environmental accountability mechanisms
Lead time improvement attributable to environmental accountability mechanisms
Waste reduction attributable to environmental accountability mechanisms
Quality improvement attributable to environmental accountability mechanisms

International product marketability attributable to environmental accountability mechanisms
Environmental accountability mechanisms benefits exceeds costs
Profitability improvement attributable to environmental accountability mechanisms
Enhanced reputation attributable to environmental accountability mechanisms
Funds accessibility attributable to environmental accountability mechanisms
Market position improvement attributable to environmental accountability mechanisms

II. ENVIRONMENTAL ACCOUNTING SYSTEMS [EAS]

1. EAS Policy & Implementation [EAS1]

The firm has a formal environmental policy that it follows
The firm uses consumables, goods and/or processed goods of low environmental impacts
The firm's EAS report identifies the person with overall responsibility for environmental issues
EAS makes room for information on actions taken in pursuit of stated objectives
The firm's EAS shows the extent of compliance with regulations and industry guidelines
The firm's accountant has a positive attitude towards innovation and development of new systems; especially, with regards to environmental accounting systems

2. EAS Reporting, Auditing & Dissemination [EAS2]

The firm's EAS follows current environmental reporting standards
Reports on EAS are frequently disseminated
The firm's environmental reports are verified by a third party (audited)
Key impacts of the business on the environment are reported
The firm's environmental reports are separated from its annual reports and accounts
The firm takes energy savings into account in order to improve levels of energy consumption

3. Motives for Environmental Accountability Mechanism [EAS3]

The firm's environmental accountability mechanism is driven by

- industry practice
- competitiveness
- financial performance
- industry sensitivity
- regulatory requirements
- stakeholder pressure
- core values

III. STAKEHOLDER ENGAGEMENT PRACTICES [SEP]

1. Stakeholder Representation & Decision Making [SEP1]

The decision-making process is accepted as legitimate by stakeholders
The firm's decision-making process allows full and active stakeholder representation
Key decisions are improved by public participation
Key decisions are accepted as legitimate by stakeholders

2. Consensus Building, Communication & Trust [SEP2]

Meetings with stakeholders are usually documented
The firm makes efforts to identify and interview key stakeholders, their needs and concerns
There is routine gathering of feedback from participants on effectiveness of approach used and satisfaction with identified solutions
Communication mechanisms are effective enough to monitor stakeholder behaviour and interests

Stakeholder meetings include all types of stakeholders, and allow for an all-inclusive participation
The firm and other stakeholders understand each other's concerns
The public has trust and confidence in the firm and its facility

3. Stakeholder Engagements Effectiveness [SEP3]

The firm's stakeholder engagement activities are continuous and embedded within the overall project management to track progress in meeting planned goals
The decision making process is accepted as legitimate by stakeholders
The firm has been more successful in accomplishing goals and avoiding costly mistakes, in time, money, and social capital as a result of effective stakeholder engagements
Management promotes effective stakeholder involvement such that it enhances the ability to design and implement sustainable solutions to environmental issues which are supported by community leaders
Projects have often been delayed due to public protest or controversy
Projects jointly decided upon, have often than not been successful

B. ENVIRONMENTAL PERFORMANCE [EP]

IV. MANAGEMENT PERFORMANCE INDICATORS [MPI]

1. Environmental Target Setting & Budgeting [MPI1]

The firm has systems in place to account for its environmental costs
Set environmental targets are realistic enough
Environmental costs at the site are budgeted for at the beginning of the reporting period
Management has set targets concerning environmental issues
Environmental targets are routinely and adequately revised to cater for needed changes

2. Environmental Strategy & Implementation [MPI2]

The firm invests in environmental research and development at the site level
The firm's environmental issues have been integrated with its long-term business strategy and corporate mission/vision
The firm has established environmental standards for its suppliers/contract mining firms
There is an officer or executive who is tasked with seeing to environmental issues at the mining site
The firm has corporate policies and procedures on environmental issues
At the site level, the firm evaluates compliance with environmental policies
Periodically, the firm conducts audit of its suppliers on environmental dimensions
The firm engages experts dealing with its environmental issues
The mining site has been able to achieve its environmental targets from the previous period(s)

3. Environmental Complaints & Damage Issues [MPI3]

The firm has had to bear costs of environmental damage often
The mining site has had a lot of complaints from the public and/or employees with regards to environmental issues

V. OPERATIONAL PERFORMANCE INDICATORS[OPI]

Renewable sources of energy are usually used in production
The mining site consumes a great amount of energy in its production
The mining site has instituted measures in place to reduce fuel consumption for logistics activities
The mining site is conscious about conserving energy during production
The mining site uses multiple sources of energy
Pollutants are usually emitted during production

The mining site's operations pose a considerable amount of risks to or endangers the environment

VI. ENVIRONMENTAL CONDITION INDICATORS[ECI]

The firm is able to respond promptly to abnormal operating conditions
The firm has made attempts to pose less risks to surrounding communities at the mining site
Communities around the firm's operation sites are environmentally safe despite the firm's operations

C. FIRM PERFORMANCE [FP]

1. Internal Firm Performance Measures [FP1]

Level of satisfaction with:

- quality of production outputs
- increase in sales
- profit margin
- increase in production outputs
- retention of best employees
- water usage
- level of profitability
- energy efficiency
- solid waste management
- labour productivity

2. External Firm Performance Measures [FP2]

Regular and prompt payment of property rate
Regular and prompt payment of corporate taxes
Regular and prompt payment of ground rent
Regular and prompt payment of environmental permitting fees
Regular and prompt payment of mineral royalties
Regular and prompt payment of annual mineral rights fees
Regular and prompt payment of other regulatory payments (e.g. processing fees, consideration fees)
Level of satisfaction with market share for the firm's production outputs
Level of customer satisfaction and loyalty
Regular and prompt payment of dividends
Level of satisfaction with market positioning, imaging, and reputation

CHAPTER THREE

THE MODERATING-MEDIATING EFFECT OF ENVIRONMENTAL PERFORMANCE ON THE RELATIONSHIP BETWEEN ENVIRONMENTAL ACCOUNTABILITY PRACTICES AND FIRM PERFORMANCE

CHAPTER THREE

THE MODERATING-MEDIATING EFFECT OF ENVIRONMENTAL PERFORMANCE ON THE RELATIONSHIP BETWEEN ENVIRONMENTAL ACCOUNTABILITY PRACTICES AND FIRM PERFORMANCE

Abstract

Based on the position that there is a positive and significant effect of environmental accountability practices (EAP) on the performance of mining firms, this chapter isolates environmental performance (EP) from the EAP–firm performance nexus. The intent is to examine the extent to which EAP can predict firm performance, in the presence or absence of EP. Using the same data set of 61 predominantly large-scale mining firms, the study employed structural equation methodology based on partial least squares path modelling technique to assess the moderating and mediating effects of EP on the EAP–FP relationship. The results reveal that EP is a more significant predictor of EAP of mining firms in Ghana. In the presence of EP, EAP is also able to drive FP. However, EP was not found to be a significant moderator of EAP–FP relationship. With the use of a different quantitative analysis technique, this chapter has deepened the reliability of the reflective and formative measurement items used in measuring EAP, EP and FP. To improve the environmental performance of mining firms, the study recommends that Government should adequately resource the regulatory bodies in order to strengthen their environmental performance monitoring and enforcement activities.

3.1 Introduction

The present study broadly investigates the environmental accountability practices (EAP) of mining firms in Ghana. Specifically, the study examines the effect of EAP on performance of mining firms in Ghana. Based on the position that there is a positive and significant effect of environmental accountability practices (EAP) on the performance of mining firms, this chapter isolates environmental performance (EP) from the EAP–firm performance nexus. The intent is to examine the extent to which EAP can predict firm performance, in the presence or absence of EP.

EAP is a multidimensional construct. It represents the extent to which initiatives, actions, activities, processes and projects of environmental sensitive companies, such as mining firms, impact their environment and how these companies are accountable for such practices while meeting the environmental expectations of their stakeholders and constituents (Alrazi, Villiers, & Staden, 2015). In their paper, Alrazi et al. (2015) provide the Environmental Legitimacy, Accountability, and Proactivity (ELAP) framework which demonstrates three important concepts of environmental performance and behavior. Their work considers environmental performance as the most important central theme in the framework. This present study extends the knowledge by considering the holistic environmental accountability and its relationship with environmental performance and firm performance.

Arguably, environmental accountability, according to Gray, Owen and Adams (1996), can be done through reporting (responsibility to report) and performance (responsibility for actions). In their perspective, environmental reporting and environmental performance constitute environmental accountability even though environmental performance is an

outcome (Jones, 2010) of environmental accountability rather than a component (Gray et al., 1996).

Prior studies (e.g. Mathews, 1993, 1997; Lamberton, 2005; Boiral, 2015; Edens, 2013; Gray, 2010, 2013; Biondi, 2014; Lamberton, 2015) have examined the need for firms in environmentally sensitive industries to account for the impact of their corporate policies and practices on their environmental and social habitats. Some studies have also examined the relationship between environmental reporting and environmental performance (Jones, 2010). Cho and Roberts (2010) found that poor environmental performers engage in more environmental reporting using optimistic narratives. In effect, their words speak louder than their actions (Cho, Guidry, Hageman, and Patten, 2012). This assertion suggests that environmental accountability demands the attention of researchers of environmental accounting and reporting (Jones, 2010). One medium of determining whether environmental reporting translates into environmental performance (EP) is by isolating EP from the EAP–FP link. This is the focus of this chapter.

Within the context of the mining industry, very limited studies have examined how accountability practices drive firm performance (FP) in the presence or absence of environmental performance (EP) (Iwata & Okada, 2011; Qi et al., 2014; Lu & Abeysekera, 2014; Gallego-Alvarez et al., 2015). Theoretically and in practice, a mining firm's EAP can indeed influence its performance and vice versa. Research examining the relationship between EAP and FP have produced inconclusive outcomes (Rokhmawati, Sathye, & Sathye, 2015; Muhammad, Scrimgeour, Reddy, & Abidin, 2015; Lee, Min, & Yook, 2015; Angelia & Suryaningsih, 2015; Gonenc & Scholtens, 2017). None of these studies

examined the moderating or mediating effect of environmental performance on the EAP–FP relationship.

Qi et al. (2014) used industrial munificence as a moderator on the EP –FP relationship. They however found no significant moderating effect of industrial munificence on the EP–FP link even though they found a significant effect of resource slack on the same link. Using industry pollution-related factors as moderating variables, Lucas & Noordewier (2016) found a positive marginal effect of environmental management practices (EMPs) on firm performance. Chen, Ong, and Hsu (2016) examined the relationship between EMP and financial performance, and found significant impacts on firm short and long-term financial performances of multinational construction firms.

The remaining sections of the paper is structured as follows. The next section defines the constructs and variables, and the conceptual models employed in this empirical analysis. The third section presents the research design (data sources and data collection, and measurement of constructs). Next, the results obtained in the empirical analysis are reported and discussed. Finally, the researcher provides the theoretical, managerial and policy implications of the present study in this chapter.

3.2 Literature Review

3.2.1 Environmental accountability practices

Environmental accountability practices (EAP) is a multidimensional construct. It represents the extent to which initiatives, actions, activities, processes and projects of environmental sensitive companies, such as mining firms, impact their environment and how these companies are accountable for such practices while meeting the environmental

expectations of their stakeholders and constituents (Alrazi et al., 2015). EAP is basically the responsibility for an entity's environmental actions and the responsibility to report on those actions (Gray et al., 1996). In this study, EAP is operationalised[3] in terms of environmental management systems (EMS) (Sroufe, 2003; ISO 14001), environmental accounting systems (EAS) and stakeholder engagement practices (SEP). Jones (2010) define environmental accounting system as "the development and operationalisation of an accounting system to measure the environment", and environmental reporting as "the reporting of environment accounting to external stakeholders".

3.2.2 Firm performance

Firm performance (FP) is a measure of the performance[4] of an entity from both quantitative and qualitative dimensions that reflect its effectiveness and efficiency in the achievement of firm objectives (Sidhoum & Serra, 2017). In the view of Claver, López, Molina, and Tarí (2007), firm performance comprise environmental performance, competitive advantage and economic performance.

Within the domain of SEA research, firm performance measures have been examined from various dimensions. Using a farming cooperative as a case study, Claver et al. (2007) found a positive net effect between environmental management and environmental performance leading to improvements in firm performance. However, it is not always the case that adopting the best environmental management practices would lead to best financial results. In any case, the relationship between environmental management and firm performance is

[3] For a full list of the operational definitions of terms used in this study, see Appendix J.

[4] In this study, performance and firm performance are used interchangeably. See operational definition of performance in Appendix J.

not always linear. Some studies suggest that at some point increased environmental performance corresponds to reduced firm performance (Iwata & Okada, 2011; Misani & Pogutz, 2015). In this study, FP is measured through the following reflective indicators: production outputs, efficiency level, profitability level, labour productivity, customer satisfaction, and regulatory compliance. Since EP and FP are both performance constructs and are usually treated as criterion (dependent) variables, this study completely and distinctly isolates the indicators measuring both constructs in order to reduce multicollearity.

3.2.3 Environmental performance

Environmental performance (EP) is the extent to which an entity meets the environmental expectations of their stakeholders. In many respects, EP can be viewed as an assessment of the environmental impact of a company's activities on the natural settings mostly determined by an external institution. In Ghana, EP is assessed by EPA as well as the MinCom Inspectorate Division through mine audit. It is imperative however to clearly distinguish EP from environmental management (EM). EP is an outcome from the EM process. EP is dependent on EM. EM is an embodiment of the environmental policies and measures applied to achieve EP (Claver et al., 2007).

While firm performance indicators are well defined and very structured, EP indicators are quite heterogeneous (Delmas & Blass, 2010). There are so many ratings, rankings, awards and certificates related to EP measures. In Ghana, for instance, the EP of mining firms is measured by the Ghana Chamber of Mines (GCM) through the Ghana Mining Industry Awards (Ghana Chamber of Mines, 2016). Categories in the award that relate to EP measures are best performer in environmental management, and best performer in

occupational health and safety. The Environmental Protection Agency (EPA) also assesses the EP of mining firms using a metric known as the AKOBEN environmental performance rating. As stated earlier, the MinCom Inspectorate Division also undertakes an annual assessment of the EP of mining firms through annual mine audits. The EP measures[5] from these institutions provide verifiable assessment of the EP of mining firms in Ghana.

Some studies (as highligted by Delmas & Blass, 2010) categorise EP indicators into environmental impact, regulatory compliance and organisational processes. The study adapted the EP metrics developed by the Committee on Industrial Environmental Performance Metrics (1999) in the USA, since this is widely used in the literature. The EP metrics[6] measures EP by MPI (management performance indicators), OPI (operational performance indicators), and ECI (environmental condition indicators). The MPIs relate to pollution prevention initiatives, environmental target setting and budgeting, environmental strategy and implementation, environmental complaints handling. The OPIs focus on energy usage and conservation, renewable energy sources, production pollution and operational risk issues, and production process waste recycling. The ECIs have to do with the condition of the environment surrounding a particular mining entity. ECIs deal with community risk reduction measures, response to abnormal operating conditions, and environmental safety of surrounding communities.

[5] These external third party performance measures could have perfectly been a valid and reliable source of secondary data for assessing the EP of mining firms in Ghana. However, beside the incomplete nature of the data obtained from these agencies, the researcher had difficulty modelling the primary data collected with the secondary data obtained.

[6] For a full list of the indicators measuring EP, see Appendix 2.1.

3.2.4 Environmental performance and firm performance

For some time now, the relationships between environmental performance (EP) and financial performance (FP) have become of interest to scholars and industry players (Lee, Min, & Yook, 2015; Angelia & Suryaningsih, 2015; Gonenc & Scholtens, 2017). Many hold the view that the more profitable a firm is, the more likely is it for the firm to be environmentally accountable (Rokhmawati, Sathye, & Sathye, 2015; Muhammad, Scrimgeour, Reddy, & Abidin, 2015). Firms that are profitable and financially viable are seemingly more credible in meeting societal expectations. Such firms are quick to resolve the social and environmental issues they encounter. The question is: does better environmental performance improve firm performance (Iwata & Okada, 2011) or does a firm's performance drive the firm's environmental performance (Misani & Pogutz, 2015)?

Similarly, some studies have established a significant link between EP and FP (Iwata & Okada, 2011; Qi et al., 2014; Gallego-Alvarez et al., 2015; Rokhmawati, Sathye, & Sathye, 2015; Muhammad, Scrimgeour, Reddy, & Abidin, 2015). On the global front, using data from 89 international companies, Gallego-Alvarez et al. (2015) found that reduction in carbon dioxide emissions (as a proxy for environmental accountability) generates a positive impact on firm financial performance. Using a dataset from Chinese industrial firms, the work of Qi et al. (2014) showed that EP significantly influences FP. Iwata and Okada (2011) and Gonenc and Scholtens (2017) found different effects of environmental performance on financial performance. Also, Lee et al. (2015) used an unbalanced panel data of 362 Japanese manufacturing firms to explore the relationship between EP and financial return of corporate environmental management. On the contrary, Pintea, Stanca, Achim, and Pop (2014) did not find a significant link between EP and FP, within the context of a developing region, using a panel of Romanian economic entities.

3.2 Study Framework and Development of Hypotheses

3.2.1 The moderating effect of environmental performance

As far back as 1986, Baron and Kenny (1986) highlighted the relevance of not applying the terms mediator and moderator interchangeably. Baron and Kenny (1986) wrote:

> "*The moderator function of third variables partitions a focal independent variable into subgroups that establish its domains of maximal effectiveness in regard to a given dependent variable. The mediator function of a third variable represents the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest*".

In the view of Baron and Kenny (1986), a moderator influences the direction or strength of the relationship between an independent and a dependent variable. A moderator variable is treated as a moderating variable because it works together with the independent variable to influence the dependent variable. It can determine the direction of the relationship, from positive to negative or from negative to positive.

To test for moderation, in the moderation analysis of this study, the interaction between EAP and EP must be significant while ensuring that EP is uncorrelated with neither the EAP nor FP. To achieve this, the study controls for the effects of EAP and EP on FP while testing for the significance of the interaction effect of EAP*EP on FP. Moderator effects are indicated by the significant effect of EAP*EP interaction while EAP and EP variables are controlled. Thus, the moderation hypotheses are formulated as follows:

H_1 = *EAP is significantly, positively and directly associated with FP.*

H_2 = *The relationship between EAP and FP is strengthened significantly in the presence of EP.*

These are exemplified in Figure 3.1.

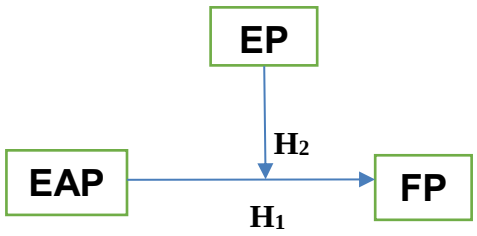

Figure 3.1: Research framework depicting the moderating effect of EP on EAP–FP

Source: Researcher's construct (2017)

The path model in Figure 3.1 depicts the moderating effect of EP on the EAP–FP relationship. EP is acting as a third party moderator variable that modifies the relationship between EAP (the independent variable) and FP (the dependent variable). The objective of EP is to measure the strength of the relationship between the EAP and FP. From a theoretical perspective, the relationship between EAP and FP of mining firms is enhanced if EP is introduced. Mining firms with better EP measures are expected to experience higher FP. However, firms can achieve some level of FP even in the absence of the moderator variable (EP) because EAP has a direct relationship with FP. This is the basis for investigating the moderating effect of EP on the EAP–FP relationship.

As a moderating variable, EP interacts with EAP (that is, EAP*EP) to influence the direction and strength of the effect of EAP on FP. So FP is regressed on EAP, on EP and on EAP*EP. To test for moderation, the study controls for the effects of EAP and EP on FP while testing for the significance of the interaction effect of EAP*EP on FP. Moderator effects are indicated by the significant effect of EAP*EP interaction while EAP and EP are controlled. The study employs structural equation methodology based on partial least squares path modelling technique to assess the moderating effect.

3.2.2 The mediating effect of environmental performance

The proposition of Baron and Kenny (1986) is that "a variable functions as a mediator when variations in the independent variable significantly account for variations in the mediator variable, and variations in the mediator significantly account for variations in the dependent variable". Given these conditions, mediation is indicated when the previously significant relationship between the independent and dependent variables is no longer significant. In actuality, mediation is fully demonstrated when there is zero effect of the independent variable on the dependent variable. A mediator actually creates the relationship between the independent variable and the dependent variable.

From the literature, to test for mediation; first, EP is regressed on EAP; second, FP is regressed on EAP; and third, FP is regressed on both EAP and on EP. The beauty of using PLS-SEM is being able to run these regressions consistently. To establish mediation, EAP must affect EP. Subsequently, EAP must be shown to affect FP, and EP must affect FP. If the effects of these circumstances are positive and significant, then the effect of EAP on FP must reduce once EP affects FP. If the effect of EAP is zero when EP is controlled then there is perfect mediation. The mediation hypotheses are therefore formulated as follows:

H_3 = *Variations in EAP significantly account for variations in EP.*

H_4 = *Variations in EP significantly account for variations in FP.*

These are exemplified in Figure 3.2.

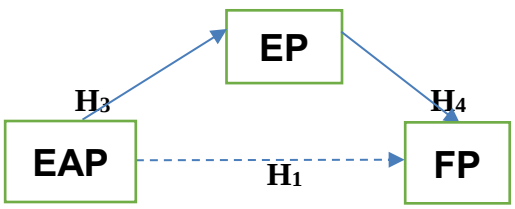

Figure 3.2: Research framework depicting the mediating effect of EP on EAP–FP

Source: Researcher's construct (2017)

The path model in Figure 3.2 depicts the mediating effect of EP on the EAP–FP relationship. Here, EP is acting as a mediator variable between EAP (the independent variable) and FP (the dependent variable). The objective of EP as a mediator variable is to explain the relationship between EAP and FP. Note that, in the mediation analysis, EAP is not directly influencing FP. EAP is indirectly influencing FP through a mediator variable, EP. In other words, EAP influences EP which in turn influences FP. EP actually creates the relationship between EAP and FP. In such a relationship, when the effect of EP is removed, the relationship between EAP and FP disappears. According to Carrión, Nitzl and Roldán (2017), a mediator variable is also known as an intervening or intermediary variable.

The initial set up of the study model seeks to examine the mediation effect of EP on the predictive power of EAP of mining firms on their FP. To test for mediation; first, EP is regressed on EAP; second, FP is regressed on EAP; and third, FP is regressed on both EAP and EP. The study employs structural equation methodology based on partial least squares path modelling technique to assess the mediating effect.

3.2.3 Further test on mediation analysis

Mediation is likely to lead to multicollinearity between EAP and EP. These two variables correlate because EAP is assumed to cause EP. It is important to note that it is possible for EAP to have a smaller coefficient when EAP predicts FP alone (i.e. direct effect) than when EAP and EP work together in the equation (i.e. indirect effect of EAP on FP through EP) but the larger coefficient is not significant and the smaller coefficient is significant. Further test may reveal that the indirect effect size may be larger than the direct effect size but the direct effect may be more significant than the indirect effect.

3.3 Research Method and Design

This chapter of the study uses quantitative research approach to determine the moderating and mediating effects of environmental performance on the relationship between EAP and FP. As stated earlier, a cross sectional survey research design was used to gather primary data from 61 predominantly large-scale mining firms in Ghana. This section describes the data sources and collection procedure, the dimension reduction and the justification for using partial least squares structural equation modelling (PLS-SEM) technique for data analysis.

3.3.1 Data sources and collection

The target population of the study comprised precious minerals producing mining firms in Ghana; specifically, mining firms with 'active' mining leases. As of 10th November 2017, according to statistical documents obtained from the MinCom, mining firms with mining leases and in active production were 108 in number. Based on the response rate of 56.48%, the resulting sample size was 61. The sample size of 61 met the 'ten times rule' (Goodhue, Lewis, & Thompson, 2012) for PLS-SEM. The rule states that the sample size should be greater than 10 times the maximum number of inner or outer model links pointing at any latent variable in the model. The maximum number of measurement items[7] in the outer model[8] is six, giving an expected minimum sample size of 60.

With the aid of questionnaires, primary data was collected from the 61 predominantly large-scale precious minerals producing mining firms. The research instrument

[7] See Appendix 3.1
[8] See Figure 3.5

administered to collect primary data was developed based on adopted and adapted validated scales of measuring the key constructs of EAP, EP and FP of mining firms in Ghana. Prior to the main data collection, a pre-test was conducted to test the validity and reliability of the research instrument. Although the questionnaire was administered to the environmental managers of the surveyed firms, the unit of analysis is the individual mining firms because one questionnaire was administered per firm.

3.3.2 Dimension reduction

To check for consistency in responses and control for response bias, the measurement items were not reduced before the final research instrument was administered even though the instrument has so many items measuring the various constructs. After the data collection, the IBM Statistic 20 was used to perform dimension reduction via factor analysis. The factor analysis reduced the measurement items based on the principal components and the eigenvalues.

On the instrument[9], for EAP, there were 38 items measuring EMS, 19 items measuring EAS, and 17 items measuring SEP. For EP, there were 16 items measuring MPI, 8 items measuring OPI and 3 items measuring ECI. FP had 21 items. PLS-SEM requires that the minimum sample size should be equal to 10 times the highest number of measurement items. The highest number of measurement items in this case is 38. Therefore, the minimum sample size should be 380. With the limited sample size of 61, this requirement could not have been met.

[9] See Appendix H

One option to overcome this limitation was to create composite scores using standardised factor loadings based on the principal components for each of the subscales (EMS, EAS, SEP, MPI, OPI, ECI), and FP as well. The IBM SPSS Statistics version 20 was used to perform a factor analysis to reduce the original measurement dimensions to principal components. Factor analysis expresses variables as a linear combination of factors or loadings. The principal component analysis (PCA) is the extraction method used to perform the factor analysis dimension reduction approach. Principal components expresses components or factors as a linear combination of variables or measurement items. For each subscale, a PCA was conducted on the measurement items with orthogonal (varimax) rotation. An initial analysis was run to obtain eigenvalues for component in the data. Components with eigenvalues over Kaiser's criterion of 1 were extracted.

With the exception of FP and EAS, none of the other constructs met the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy threshold of 0.7. This was not surprising considering the relatively low sample size of 61. The limited number of firms actually operating and producing in the mining and minerals sector accounts for the relatively small but representative sample size used for this study. The 61 firms however constituted 81% of production output in the industry (See Appendix B). The rotated component matrix reported 10 components for EMS, 4 for EAS, 6 for SEP, 5 for MPI, 4 for OPI, 1 for ECI, and 5 for FP. This occasioned in a dimension reduction from 122 measurement items to 36 principal components (See Appendix 3.1). Due to the limited sample size of 61, the highest number of components required in order to use the PLS-SEM should be six. Eventually, the 10 components extracted for EMS were reduced to six, the 5 components extracted for EAS reduced to 4 and the 6 components extracted for SEP reduced to 5. This resulted in a final 30 principal components or measurement indicators.

Factor loadings of 0.50 were suppressed since they were not considered significant. Any variable or measurement item whose factor loading was suppressed by the software was not considered in generating the composite scores. To generate the composite scores, the sumproduct function of Microsoft Excel 2013 version was used to determine the sumproduct of the standardised factor loadings and the original scores from the survey. This created composite scores for each of the 30 principal components for the 61 cases resulting in a data set of 1,952 data points. Using the SmartPLS 3 (Ringle et al., 2015), the 30 principal components were used as reflective measurement indicators for the first order latent constructs.

3.3.3 Structural equation modelling

The study employed structural equation modelling (SEM) based on partial least squares (PLS) path modelling technique for data analysis. In the structural equation model, the latent constructs for the second-order structural model (inner model) were made up of EAP, EP and FP. The first-order define the indicators forming the second-order constructs. The formative indicators for EAP were EMS, EAS and SEP. Formative indicators define the latent construct. On the other hand, latent constructs are explained by reflective indicators.

Since EAP is theorised as an exogenous construct, the complementary nature of the formative indicators reduced the overlap among the formative indicators. The indicators for EP were considered at one point to be formative and at another to be reflective. This is because EP is theorised as an exogenous variable for FP and an endogenous variable for EAP. When EP is considered as an exogenous construct the indicators are treated as formative. They are treated as reflective when considered as endogenous. Theoretically,

EP can predict FP and can also be predicted by EAP. To run the consistent PLS algorithm, the EP indicators are treated as reflective. FP was strictly theorised as an endogenous construct in the initial set-up, either relating to EAP or EP. Therefore, the indicators of FP were treated as reflective because they are interchangeable. In the measurement model (outer model), all the items reflecting the first-order constructs were treated as reflective. Eventually, those with loadings that do not meet the thresholds were dropped. Obviously, the path coefficients were expected to be significant in order to demonstrate that: (1) variations in EP is explained by the variations in EAP; (2) variations in FP is explained by the variations in EAP; and (3) variations in FP is explained by the variations in both EAP and EP.

3.3.3.1 Justification for using structural equation model

First, the justification for using structural equation modelling (SEM) is premised on the fact that SEM allows the use of multiple indicator approach and estimation of mediation paths by latent-variable structural modelling techniques. Second, SEM also allows for the analysis of experimental context. Third, with SEM, it is possible to directly test relevant paths with no omissions. Fourth, complicated and correlated measurement error, and feedback are incorporated directly into the model. The use of multiple regression to estimate a mediational model requires that there be no measurement error in the mediator, and that the dependent variable does not cause the mediator. Satisfying these two conditions in the mediation model is highly demanding, and the only way out was to use SEM which can incorporate these possibilities into the SEM technique.

3.3.4 Partial Least Squares-Structural Equation Model algorithm

The study employed latent variables and indicators by means of the partial least squares (PLS) path modelling approach. PLS path modelling is a statistical technique for modelling complex multivariable relationships among observed and latent variables (Vinzi, Chin, Henseler, & Wang, 2010). According to Hair, Ringle and Sarstedt (2011), a structural equation model with latent constructs has two components: the structural model (inner model) and the measurement models (outer models). The structural model shows the relationships (paths) between the latent constructs. PLS-SEM only permits recursive relationships in the structural model (i.e., no causal loops). In effect, the structural paths between the latent constructs can only head in a single direction. In the structural model, the exogenous (independent) constructs are distinguished from the endogenous (dependent) ones. Exogenous latent constructs do not have any structural path relationships pointing at them while endogenous are latent target constructs in the structural model that are explained by other constructs via structural model relationships. The second component of the structural equation model, the measurement models, represent the unidirectional predictive relationships between each latent construct and its associated observed indicators.

The indicators can be reflective or formative[10]. Reflective indicators are seen as functions of the latent construct while formative indicators are assumed to cause a latent construct. With reflective indicators, changes in the latent construct are reflected in changes in the indicator (manifest) variables but changes in formative indicators determine changes in the value of the latent construct. Reflective indicators are represented as single-headed

[10] See Figure 3.5

arrows pointing from the latent construct outward to the indicator variables whereas with formative the arrows point toward the latent construct inward from the indicator variables.

In PLS-SEM, the associated coefficients for reflective measurement models (i.e. reflective scales) and formative measurement models (i.e. formative indices) are called outer loadings and outer weights respectively. Consequently, it is important to note that exogenous (independent) constructs are measured with formative indicators while endogenous (dependent) constructs are measured with reflective indicators. The PLS-SEM algorithm estimates the latent constructs' scores, outer weights and loadings as well as the structural model's path coefficients. According to Rigdon, Sarstedt and Ringle (2017), the path modelling procedure is called *partial* because "the iterative PLS-SEM algorithm estimates the coefficients for the partial ordinary least squares regression models in the measurement models and the structural model". All partial regression models are estimated by the iterative procedures of the PLS-SEM algorithm.

According to Hair et al. (2011), PLS-SEM is comparable to using multiple regression analysis using PLS regression. The PLS regression is an approach that generalises and combines features from PCA and multiple regression but generally does not allow for the evaluation of complex cause–effect relationships between latent constructs.

3.3.4.1 Justification for using PLS-SEM

According to Rigdon et al. (2017), to estimate structural equation models, researchers can draw on two main approaches: Covariance-based structural equation modelling (CB-SEM) and partial least squares structural equation modelling (PLS-SEM). The study adopted PLS-SEM data analysis because, as Hair et al. (2011) posit, PLS-SEM is a causal

modelling approach aimed at maximizing the explained variance of the dependent latent constructs. Moreover, this study is focused on variance-based theory development aimed at exploration or prediction rather than confirmation of structural relationships.

Although some authors have critiscised PLS-SEM as not being a factor-based latent variable method, producing biased and inconsistent parameter estimates, Rigdon et al. (2017) further noted that the PLS-SEM is a prediction-orientation method capable of handling complex models, small sample sizes, and formatively specified constructs (Chin, 2010; Hair et al., 2011).

Compared to the CB-SEM technique, the PLS-SEM technique allow for small sample size. This study used data surveyed from 61 precious minerals producing mining firms. The sampled firms account for 81% of total minerals output in Ghana for the period 2005 to 2016, according to data obtained from the Minerals Commission (Minerals Commission, 2017). The data distribution appears to be non-normal, and therefore the possibility of the data set not meeting the distributional assumptions. The observations were highly interrelated resulting in high multicollinearity. With the creation of first, second and third level constructs in the study model, PLS-SEM was the preferred choice in handling such complex models involving many constructs and many indicators (Hair et al., 2011). Further, PLS-SEM optimises the explained variance of the endogenous variable. In this case, the endogenous variable is FP as well as indirectly EP.

The decision to use PLS-SEM was also premised on the basis that PLS-SEM is a powerful statistical technique that enabled the researcher to explore relationships among the key variables for this study. The statistical tool also enabled the researcher to identify the key

pathways that existed among the variables. The researcher was able to test for the multiple relationships among the variables consistently. In this regard, using the SmartPLS 3 software, FP was regressed on both EAP and EP. EP was also regressed on EAP.

The use of PLS-SEM however comes with its own limitations. First, PLS-SEM retains its basic functionality and does not estimate all model parameters simultaneously. Instead, as its name implies, it only estimates partial model structures, one equation at a time. Second, PLS-SEM is not a good goodness of fit model. It is also not a theory testing model. Rather, it is a prediction based model. Another limitation is that measurement error in the indicator variables is not explicitly accounted for even though PLS-SEM minimises the error. The small sample size also leads to substantially biased parameter estimates in the measurement models (Hair et al., 2017).

3.3.5 PLS-SEM and bootstrapping

The presumption with PLS-SEM is that it does not presume that the data are normally distributed. Consequently, PLS applies nonparametric bootstrapping where repeated random sampling with replacement from the original sample creates a bootstrap sample. This generates standard errors for hypothesis testing. The researcher applied the bootstrapping option in the PLS-SEM algorithm. The bootstrapping analysis allowed for the statistical testing of the hypotheses that a coefficient equals zero (null hypothesis) as opposed to the alternative hypothesis that the coefficient does not equal zero (two-tailed test). The bootstrap sample enabled the estimated coefficients in PLS-SEM to be tested for their significance. The PLS-SEM results of all the bootstrap samples provided the standard error for each path model coefficient.

3.4 Results and Discussion

This section involves examining the effects on the direct and indirect relationships between EAP and FP, when a third variable, EP, is introduced in the model. The discussion begins with the indirect effect of EP on EAP–FP relationship, with the assessment of the measurement model (outer model), followed by the structural model assessment.

3.4.1 The moderating effect of EP on the EAP–FP relationship

One of the objectives of this chapter was to assess the moderating effect of EP on the EAP–FP relationship. The aim was to measure the strength of the relationship between the EAP and FP. From a theoretical perspective, the relationship between EAP and FP of mining firms is enhanced if EP is introduced. Mining firms with better EP are expected to experience higher FP. However, firms can achieve some level of FP even in the absence of the moderator variable, EP, because EAP has a direct relationship with FP. This is the basis for investigating the moderating effect of EP on the EAP–FP relationship.

As a moderating variable, EP interacts with EAP to influence the direction and strength of the effect of EAP on FP. So FP was regressed on EAP, on EP and on the interaction between EAP and EP. To test for moderation, the effects of EAP and EP on FP was controlled for while testing for the significance of the interaction effect of EAP*EP on FP. Moderator effects were indicated by the significant effect of EAP*EP interaction while EAP and EP were controlled.

3.4.2 The mediating effect of EP on the EAP–FP relationship

Applying the PLS-SEM method of estimation, the initial results from the PLS algorithm suggested that the effect EAP has on FP is most likely mediated through EP. To validate

this assertion, the consistent PLS bootstrapping was performed to identify the indirect effect of EAP on FP through EP. Interestingly, the bootstrapping report showed significant specific indirect effects, using the P values. But the total indirect effects showed slightly indirect effects of EAP on FP through EP with a P value of 0.034. On the basis of these results, the conclusion is that there is mediation effect of EP on the relationship between EAP and FP, although it can be said to be a partial mediation effect with an effect size of 0.438 and a P value of 0.034. The direct effect revealed by the path coefficients also showed significant moderation effect. The model tested is depicted in Figure 3.3.

To test the mediating effect, using Baron and Kenny's (1986) approach for mediation, the study assessed the extent to which EP can predict FP, while controlling for EAP. First, FP was regressed on EAP to confirm that EAP is a significant predictor of FP. Then, EP was regressed on EAP to confirm that EAP is a significant predictor of EP. Finally, FP was regressed on both EAP and EP to confirm that EP is a significant predictor of FP. As was expected, EP was a significant predictor of FP because the previously significant EAP greatly reduced. That is, the coefficient of EAP in absolute terms was smaller than the original mediation effect size. If EAP did not reduce, then the conclusion would have been that EP is not a significant predictor in the EAP–FP relationship.

In order to establish full or partial mediation, the reduction in variance explained by EAP must be significant. The effect of EAP on FP can become nonsignificant when EP is introduced simply because an inconsequential amount of variance is explained. Thus, it is important to indicate a significant reduction in variance explained by EAP before asserting full or partial mediation. In the absence of a total effect, it is likely to have statistically

significant indirect effects. The presence of several mediating paths that cancel each other out become visible when one of the cancelling mediators is controlled for.

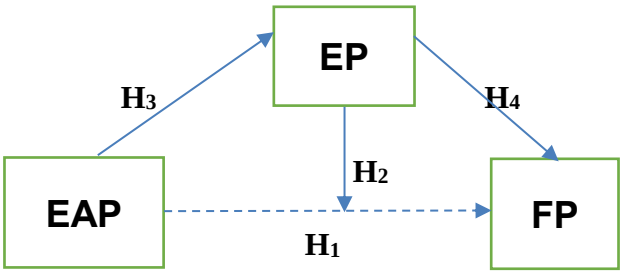

Figure 3.3: The moderating-mediating effect of EP on EAP – FP relationship

Source: Researcher's construct based on Field Data (2017)

Theoretically, EAP can directly influence FP without the presence of any mediator variable. Therefore, the path model in Figure 3.3 depicts a combined model with both moderation and mediation effects. EP has both moderator and mediator status in the model. The combined model shows the direct relationship between EAP and FP with EP acting as a moderator, as well as the indirect relationship between EAP and FP through EP, with EP acting as a mediator.

Based on the notion that EP can behave as a component of EAP (Gray et al., 1996) as well as an outcome of EAP (Jones, 2010), EP can function as an interacting (moderator) variable or intervening (mediating), respectively. In other words, when treated as a component of EAP, EP functions as a moderating third party variable whereas as an outcome of EAP, EP functions as a mediating third party variable. Again, the models and associated hypotheses of the present study suggest that EP is both an exogenous (independent) variable of FP, and an endogenous (dependent) variable of EAP. In effect, EP predicts FP but is also predicted by EAP. This situation confirms the moderating-

mediating influence of EP. Moderator variables always function as independent variables (Baron & Kenny, 1986), while mediator variables can shift from roles from effects to causes, depending on the focus of the analysis.

In assessing the moderating and mediating effects of EP, this investigation has revealed 'new findings' which suggest that EP and FP can actually predict EAP jointly and individually as shown in Figure 3.4. The 'new' recursive relationships are represented by the long dash lines in Figure 3.4.

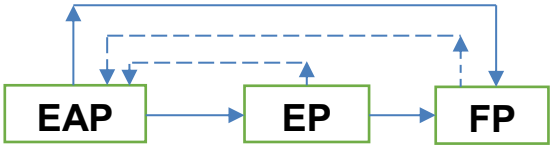

Figure 3.4: 'New findings' of the roles of EP and FP

Source: Researcher's construct based on field data (2017)

3.4.3 Path coefficients of moderation and mediation analyses

The original structural model and measurement model with a causal model involves three main latent constructs: EAP, EP and FP. Note that EAP is an exogenous variable while FP is an endogenous variable. However, EP is a mediating variable on the EAP–FP relationship in the causal model. The path coefficients is depicted in Figure 3.5.

The first step was to check the loadings which range from high (above 0.7), moderate (below 07 but above 0.3) to low (below 0.3). The path coefficients determine the extent to which the exogenous construct (s) is able to predict the endogenous construct. The first calculation produced very low loadings or coefficients. This predicated the deletion of

those manifest variables (in the measurement model) that may have contributed to the low loadings.

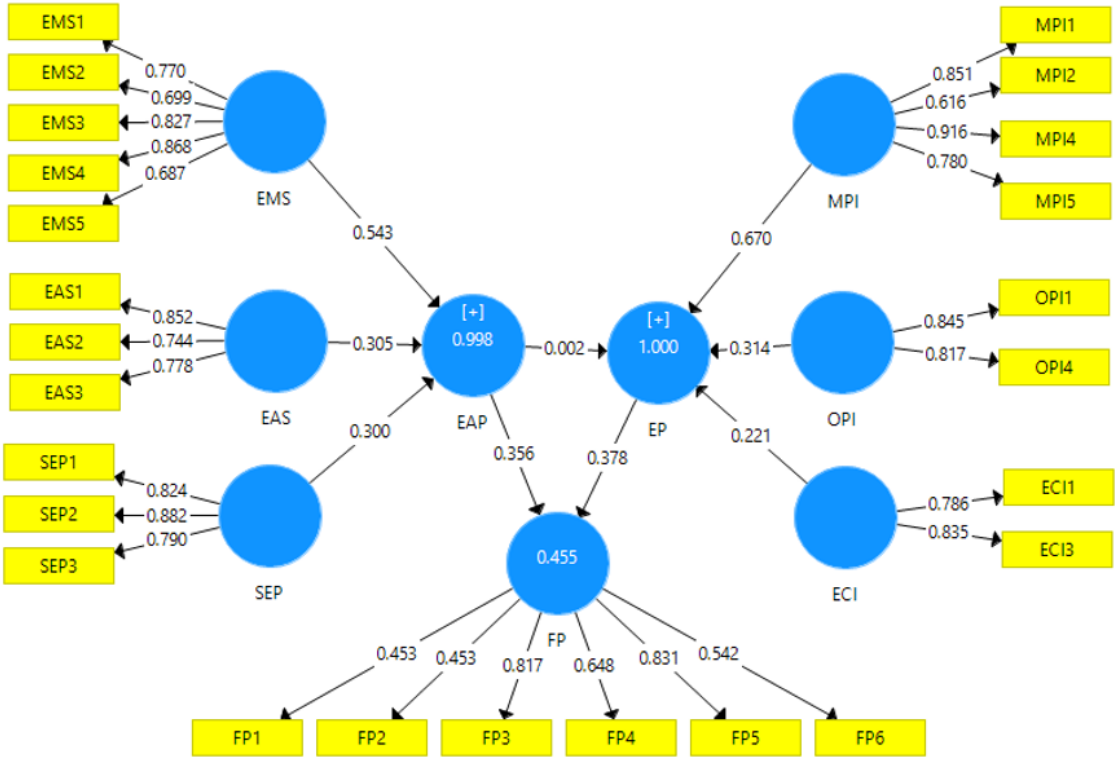

Figure 3.5: Path coefficients of PLS-SEM bootstrapping

Source: SmartPLS 3 software based on field data (2017)

3.4.4 Measurement model assessment

The first step in the measurement model assessment was to test the reliability and validity based on certain criteria associated with formative and reflective measurement model specifications. The aim was to test if the measurement model is good enough before examining the structural relationships (Hair et al., 2017).

As noted in the preceding paragraph, the evaluation of the measurement model was decomposed into reflective measurement model and formative measurement model. Reflective measurement model was assessed with regard to their composite reliability

(construct's internal consistency) and validity. With respect to validity, convergent validity and discriminant validity were used to examine reflective measurement models. Composite reliability values of 0.60 to 0.70 was considered acceptable for exploratory research (Hair et al., 2017). Convergent validity was assessed using the average variance extracted (AVE), with an AVE value of 0.50 and higher indicating a sufficient degree of convergent validity, meaning that the latent variable explains more than half of its indicators' variance. For the assessment of discriminant validity, two common measures are: the Fornell–Larcker criterion and cross loadings. The Fornell–Larcker criterion (Fornell and Larcker, 1981 as cited by Hair et al., 2011) advances that "a latent construct shares more variance with its assigned indicators than with another latent variable in the structural model". The criterion is that the AVE of each latent construct should be greater than the latent construct's highest squared correlation with any other latent construct. The cross loadings which is the second criterion of discriminant validity specifies that an indicator's loading with its associated latent construct should be higher than its loadings with all the remaining constructs.

The formative measurement model assessment began with a bootstrapping procedure which allowed for the testing of the significance of formative indicators' coefficients. Further, an indicator's loading which evaluates the indicator's absolute significance for its construct was evaluated. Formative indicators with low loadings were eliminated from the model even though elimination resulted in adverse consequences for the resultant measure's content validity. It was important to examine whether heterogeneity affected the coefficients in formative measurement models significantly before eliminating nonsignificant indicators. High levels of multicollinearity in the formative measurement model caused some indicator's information to become redundant. The redundancy made

some indicators to be nonsignificant. An examination of the degree of multicollinearity in the formative indicators was the test for determining redundancy. To examine the degree of multicollinearity in the formative indicators, the variance inflation factor (VIF) was calculated. A VIF value of 5 or higher implies a very high level of multicollinearity depicting that a greater percent of an indicator's variance is accounted for by the remaining formative indicators related to the same construct. To resolve this, it is recommended that an indicator is eliminated to reduce high level of multicollinearity. Therefore, indicators with low or even non-significant weights were also eliminated once the remaining indicators sufficiently represented the composition of the construct under consideration.

Based on the PLS algorithm report generated, the values for the measurement model assessment criteria was derived. Table 3.1 provides the values used for the measurement model assessment of the study. Based on Table 3.1, with the exception of FP, the values of Cronbach's alpha for all variables were more than the recommended threshold of 0.7 (Hair et al., 2017) while the composite reliability values were also above the threshold of 0.7. Unlike Cronbach's alpha, composite reliability does not assume that all indicators are equally reliable, making it more suitable for PLS-SEM. During model estimation, PLS-SEM prioritises indicators according to their reliability. The measurement model assessment subsequently revealed that all the items assigned to the EAP, EP, and FP constructs were found to have high internal consistency reliability, with a composite reliability being more than the recommended threshold of 0.7.

Table 3.1: Constructs Reliability and Validity

Constructs and Sub-constructs	Composite Reliability	Cronbach's Alpha	Average Variance Extracted (AVE)
EAP	0.897	0.872	0.435
EP	0.853	0.803	0.435
FP	0.799	0.691	0.413
EMS	0.881	0.829	0.599
EAS	0.835	0.704	0.628
SEP	0.871	0.780	0.693

EAP = Environmental accountability practices; EP = Environmental performance; FP = Firm performance; EMS = Environmental management systems; EAS = Environmental accounting systems; SEP = Stakeholder engagement practices

Source: Field Data (2017)

Next was the convergent validity test using an assessment of indicator reliability, and the AVE of all the constructs. Table 3.1 summarises the results of convergent validity tests based on AVE. All the values of AVE for the first-order constructs were more than the recommended value of 0.5. The values for the second-order constructs reduced slightly but were all above 0.4 which was expected. This implies that all the items have much in common with other items within the same construct. In summary, the convergent validity tests were fulfilled by the study model.

Subsequently, the discriminant validity was assessed by comparing the cross loadings of items associated with the EAP, EP, and FP against the associated values of loadings of the same items on other constructs. All the item loadings were found to be highest on each construct the items were supposed to measure. Thus, the model met the convergent validity requirement on cross loadings examination. From Table 3.1, the evaluation for the discriminant validity based on the Fornell-Larcker criterion indicated that the square root values of AVE for all constructs were higher than the associated cross-loading figures. In effect, the discriminant validity requirements were satisfied.

3.4.5 Structural model assessment

The present study's structural model assessment involved estimating the relationship among EAP, FP and EP. The principal evaluation criteria for the structural model are the coefficient of determination, R^2, values and the size and significance of the path coefficients. The R^2 reveal the predictive accuracy of the model. Hair et al. (2011) describe R^2 values of 0.75, 0.50 or 0.25 for endogenous latent variables in the structural model as substantial, moderate or weak, respectively. In the case of the moderated effect of EP on the EAP–FP relationship, the R^2 value was 0.507, which indicates that together, EAP and EP can explain 50.7% of the variation in FP. The explanatory power of the model is slightly increased from 46.9% to 50.7% with introduction of the moderator variable, EP.

The path coefficients are the standardised beta coefficients of PLS regressions. The bootstrapping procedure was used to assess each path coefficient's significance. Paths that were nonsignificant or showed signs contrary to the hypothesised direction did not support the hypothesed relationships, whereas significant paths showing the hypothesised direction empirically supported the proposed causal relationships.

Another assessment of the structural model involved the model's capability to predict. The predominant measure of predictive relevance is the Stone–Geisser's Q^2 (Geisser, 1974; Stone, 1974), which postulates that the model must be able to adequately predict each endogenous latent construct's indicators. If an endogenous construct's cross-validated redundancy measure value (i.e., Q^2) for a certain endogenous latent variable is larger than zero, its explanatory latent constructs exhibit predictive relevance (Hair

et al., 2011). In this case, the Stone–Geisser's Q^2 revealed 0.425, 0.193 and 0.150 for EAP, EP and FP respectively.

Table 3.2 presents the summary results for the assessment of structural model for the effect of the moderator, EP, on the EAP–FP relationship.

Table 3.2: Summary of Structural Model Assessment (EP*EAP on FP)

Hypothesis	Std ß	t-value	R^2	f^2	Q^2	Decision
H_1: Direct effect of EAP on FP	0.333	2.115**	0.469	0.006	0.193	Supported
H_2: Moderation effect of EP*EAP on FP	0.407	2.715**	0.507	0.010	0.150	Supported

Note: **p<0.05

The strength of the EAP–FP relationship is given as 0.333 which can be considered as strong as it is higher than the recommended value of 0.20. The empirical *t* statistics for this relationship is given as 2.115, which is higher than the critical *t* value at 5% level of confidence. Thus, H_1 which says that EAP is significantly, positively and directly related to FP, is supported.

The strength of the effect of EP*EAP on FP is given as 0.407 which implies that the interaction effect of EP on the EAP–FP relationship is also positive. A one standard deviation point increase in EP will lead to 0.407 increase in FP. The effect of EP*EAP on FP can be considered as small. The empirical *t* statistics for the EP*EAP on FP is given at 2.715. This value is higher than the critical *t* value at 5% level of confidence. Thus, the study finds that the moderated relationship between EAP and FP is significantly different from 0 at 5% level of confidence.

Additionally, the f^2 and Q^2 analyses were also used in evaluating the model's predictive ability. The effect size for the R^2 of EAP was 0.245, indicating that EAP has a moderate effect in producing the R^2 value for FP. The f^2 value for EP*EAP was 0.006 indicating that EP*EAP has a very small effect in producing the R^2 *of FP*, which indicates that the moderation effect of EP*EAP does have much effect in producing the R^2 for FP. The Q^2 which explains the predictive relevance of the model has a value of 0.150 (more than zero), which indicates that the overall model has a medium predictive relevance and validity for FP construct.

The work of Misani and Pogutz (2015) and that of Qi et al. (2014) confirms that findings of this study. However, the trivial effect of the moderating variable is opposed to the findings of Qi et al. (2014). From the legitimacy theoretical standpoint, a firm may achieve a certain level of performance even with minimal environmental effort.

3.5 Conclusion and Recommendations

This chapter provided an empirical justification for a study on the effect of EAP on performance of mining firms, in the presence and absence of EP, as a moderator or mediator. The study revealed that EP is a more significant predictor of EAP of mining firms in Ghana. In the presence of EP, EAP is also able to drive FP. However, EP was not found to be a significant moderator of EAP–FP relationship.

This chapter has revealed the urgent need for environmental sensitive firms (ESFs) to take actions and initiatives that will greatly transform their EP. These actions and initiatives that would demonstrate a consideration of the damage caused by their environmental impacts, and a restoration aimed at reducing these impacts while

improving their firm performance. There is the need for ESFs to embrace their environmental challenges. To improve the EP of mining firms, the study recommends that Government should adequately resource the regulatory bodies in order to strengthen their environmental performance monitoring and enforcement activities. Future studies may experiment with new environmental accounting systems with the aim of measuring, capturing and disclosing environmental impacts. Further research could also examine the possibilities of the existence of mediated moderation and moderated mediation relationships.

Appendix 3.1

Scale development to measure environmental accountability practices, environmental performance and firm performance

Latent Construct	Measurement Indicators	Manifest Variables/Subscales
Environmental Accountability Practices (EAP)	***Formative Indicators:***	
	Environmental Management Systems (EMS)	• EMS Standardisation & Utilisation • Use of Green & Sustainable Initiatives • EMS Orientation & Dissemination • EMS Effectiveness • Benefits of EAP
	Environmental Accounting Systems (EAS)	• EAS Policy & Implementation • EAS Reporting, Auditing & Dissemination • Motives for Environmental Accountability Mechanism
	Stakeholder Engagement Practices (SEP)	• Stakeholder Representation & Decision Making • Consensus Building, Communication & Trust • Stakeholder Engagements Effectiveness
Environmental Performance (EP)	***Formative Indicators:***	
	Management Performance Indicators (MPI)	• Environmental Target Setting & Budgeting • Environmental Strategy & Implementation • Environmental Complaints & Damage
	Operational Performance Indicators (OPI)	• Energy Usage & Conservation • Renewable Energy Sources • Production Pollution & Operational Risks • Production Process Waste Recycling
	Environmental Condition Indicators (ECI)	• Community Risk Reduction Measures • Response to Abnormal Operating Conditions • Environmental Safety of Surrounding Communities
Firm Performance (FP)	***Reflective Indicators:***	
	Production Outputs (PO)	• Production Outputs & Quality
	Efficiency Level (EL)	• Energy Efficiency, Water Usage & Waste Management
	Profitability Level (PL)	• Profitability & Sales
	Labour Productivity (LP)	• Labour Productivity & Retention
	Customer Satisfaction (CS)	• Customer Satisfaction, Market Share & Reputation
	Regulatory Compliance (RC)	• Payments of Taxes, Royalties, Fees & Dividends

Source: Researcher's construct based on adopted and adapted validated scales from the literature (2017)

CHAPTER FOUR

ENVIRONMENTAL REPORTING PRACTICES OF DOMINANT GOLD MINING FIRMS IN GHANA

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ENVIRONMENTAL REPORTING PRACTICES OF DOMINANT GOLD MINING FIRMS IN GHANA

Abstract

The focus of this chapter is to examine non-financial reporting practices with particular emphasis on the gold mining industry in Ghana. The research approach was to use documentary analysis research design to study the annual reports vis-à-vis the environmental reports of eight dominant large-scale gold mining firms over the period 2008 to 2017. The study draws extensively on publicly available official documents and interview data. Based on documentary analysis of the reports and interview data, it develops a multi-case report based on the key questions and other themes that emerged from the literature and the empirical material. The findings revealed that non-financial reporting and environmental accountability are now critical strategies that mining firms are seriously tackling proactively. The thematic issues covered in this chapter centred on the following: report content and quality; metrics and standards for environmental reporting; CSER reporting strategy; embedded or standalone reports; stakeholder engagements processes and reporting; and utilisation of environmental management systems in environmental reporting. In the end, there were mixed results with regards to mining firms' environmental reporting practices along these themes. The first half of the ten-year review period revealed that although the conventional accounting system was used in the recognition and measurement of environmental transactions, the nature, content, standard, presentation and disclosure of environmental reports varied across the firms. The recent review years however show evidence of commonality in the reporting practices of the dominant players in the industry. This chapter has reinforced the proposition for decoupling environmental reports within the broader sustainability reporting. The study recommends the development of a separate environmental reporting framework to ensure proactive environmental accountability by gold mining firms.

4.1 Introduction

While achieving their economic or financial targets, mining firms are now obligated to account for the impact of their activities on their social and environmental habitats. Mining firms must be accountable in terms of "doing the right thing" (performance), and "giving an account of it" (reporting) (Gray et al., 1996). They must account and report on their performance from all perspectives – financial, environmental and social (Mathews, 1993, 1997; Lamberton, 2005; Boiral, 2013; Edens, 2013; Gray, 2010, 2013; Biondi, 2014; Lamberton, 2015).

Cho and Roberts (2010) however found that, in an attempt to achieve environmental accountability, poor environmental performers engage in more environmental reporting using optimistic narratives. In effect, their words speak louder than their actions (Cho, Guidry, Hageman, & Patten, 2012). To complement the assessment of the environmental performance (what firms do) of mining firms, this chapter examines mining firms' environmental reporting (what firms say they do or they will do) practices, in the context of a developing economy. Environmental reporting falls within the spectrum of corporate social and environmental responsibility (CSER) reporting or the broader term sustainability reporting.

For some time now, there have been clarion calls for corporate responsible organisations to report on their financial, environmental and social performance (see, for examples, Mathews, 1993; Deegan & Newson, 1996; Elkington, 1999; Lamberton, 2005; Amponsah-Tawiah & Dartey-Baah, 2011; Boiral, 2013; Edens, 2013; Biondi, 2014). This sort of reporting usually entails measuring and revealing the impact of the corporate policies and practices on an organisation's performance at the economical (financial), ecological

(environment) and social (socio-cultural) levels. This form of reporting is commonly known as sustainability reporting, which is a form of reporting that focuses on the triple bottom line or Triple-Ps: People (Social), Planet (Ecological) and Profit (Economical). In other words, the focus is on measuring and reporting on the positive and negative impacts of an organisation's decisions and actions in respect of the economic, social and environmental dimensions.

Many studies have examined these three dimensions with limited studies focusing on only the environmental dimension (Meng, Zeng, Shi, Qi, & Zhang, 2014; Tackie, Agyenim-Boateng, & Arthur, 2017). It is the belief of the researcher that examining non-financial reporting from all three dimensions of sustainability can blur the peculiar issues that need to be examined with respect to environmental reporting. Within the gold mining industry in Ghana, to the best of the researcher's knowledge, very few studies have examined environmental reporting practices in Ghana's mining context. Tackie, Agyenim-Boateng, and Arthur (2017) examined environmental accounting and reporting practices of four large-scale gold mining companies in Ghana, over a six-year period from 2009 to 2015. This chapter extends and deepens the discussion in their paper, in terms of depth and breadth, by examining a ten-year review period from 2008 to 2017 for eight dominant gold mining firms. Coincidentally, the present researcher was the principal investigator in that investigation.

As indicated earlier, the chapter is fixated on environmental reporting which is an environmental accountability (EA) mechanism. Environmental reporting (ER) entails providing relevant, reliable and valid information about the environmental performance of an organisation to its stakeholders (Mathews, 1993; Deegan & Newson, 1996). Kemp,

Boele and Brereton (2006) believe the nature and content of ER have the tendency to increase or decrease the trust key stakeholders have in an organisation. Hamann and Kapelus (2004) perceived that some organisations have somewhat violated their social contract with their key stakeholders in the way they deliver and contradict what is reported.

Some studies posit a significant and positive association between environmental reporting and firm performance (Lu & Abeysekera, 2014). Based on a content analysis of 533 Chinese listed companies, Meng, Zeng, Shi, Qi, and Zhang (2014), revealed a nonlinear relationship between environmental performance and environmental reporting. According to Lu and Abeysekera (2014), environmental reporting is a management strategy for developing and maintaining satisfactory relationships with dominant stakeholders. It is therefore important to identify those dominant stakeholders who can influence, or may be influenced by, the firm's environmental reporting practices, and determine how the firm responds to their expectations. In many respects, powerful or dominant stakeholders influence environmental reporting and disclosures (Lu & Abeysekera, 2014).

This chapter tends to question whether there have there been any organisational policies and practices that are related to and have impacted on CSER reporting. The research approach was to study the environmental reports of eight dominant gold mining companies in Ghana. The study examines how these dominant gold mining companies account for and reports their EA activities along the following themes: (1) report content and quality; (2) metrics and standards for environmental reporting; (3) CSER reporting strategy; (4) embedded and standalone reports (5) stakeholder engagement processes and reporting; and (6) utilisation of environmental management systems in environmental reporting. The chapter interrogates management's motivation and rationale for adoption of stand-alone

or integrated voluntary, mandatory or standardised environmental reports. The chapter also assesses the major and minor stakeholders who grant the social licence to operate (SLO) and how these stakeholders influence the EA reporting practices of mining firms in Ghana.

The next section of the chapter is devoted to a review of the theoretical and empirical literature. Then, the (non-) financial reporting framework (including environmental reporting) is examined. In the third section, the research method employed for this study is presented including a brief account on Ghana's mining landscape, which is the study environment. The fourth section presents the findings and discussions on environmental reporting practices of the eight dominant gold mining companies based on themes that emerged from documentary analysis and interview data. The conclusions and policy and managerial implications for this study are provided in the final section.

4.2 Literature Review

4.2.1 CSER reporting and environmental accountability

In the view of Tackie et al. (2017), corporate social and environmental responsibility (CSER) reporting and environmental accountability (EA) are now critical strategies that environmentally sensitive firms (ESFs) are seriously tackling. Amponsah-Tawiah and Dartey-Baah (2011) posit that mining firm's corporate social responsibility (CSR) engagement is an accountability mechanism. CSR or CSER[11] is the voluntary actions undertaken by firms to act upon the social factors. Many believe that engaging in CSER have the potential of militating against the fulfillment of corporate goals even though research has shown that CSER engagements contributes greatly to the bottom line.

[11] In this study, the term CSER is preferred to CSR since CSER incorporates the environmental dimension in the discussion.

Certainly, CSER exhibits the voluntary action of an organisation which facilitates the achievement of corporate goals. The challenge is the contradictions with respect to CSER activities and what is reported.

CSER reporting in the Ghanaian mining industry have revealed that the operations of the extractive industries have direct impact on the environment and local communities (Amponsah-Tawiah and Dartey-Baah, 2011). CSER reporting in the mining industry is a demonstration of an entity's environmental accountability. There are a number of reports on voluntary actions undertaken by mining firms with the aim of either reducing their negative impacts or improving the living conditions of the local communities where they operate (Westphalen, 2012). Lamberton (2005) also asserts that most mining companies demonstrate their EA through investments in infrastructure, investments in building social capital, investments in building human capital, reforestation, and alternative energy supplies.

In many jurisdictions, socially responsible companies are more likely to gain acceptability and respectability by the corporate citizenry (Humphreys, 2000). From the perspective of mining companies engaged in CSER activities, EA is part of the corporate strategy of ensuring minimal community-level resistance in the face of increased concerns about the environmentally and socially disruptive nature of the extractive industry. Consequently, mining companies have realised that they "face significant risk if they operate without the consent of affected communities" and that they need to focus on "achieving and maintaining a social license, or freedom, to operate" (Kemp, Boele, & Brereton, 2006).

Many ESFs have deployed CSER reporting as a corporate strategy to deliver their social and environmental accountability to key stakeholders. These companies use such reporting outlets to demonstrate how they have impacted their mining communities through their CSER activities and projects. Community relations departments, which serve as an avenue for engaging and assisting the affected communities in CSER programmes, are used to disseminate information regarding CSER activities and projects. Some of the reports focus on how mining companies continue to invest in foundation trust funds to ensure adequate funding for their social investment activities (Dashwood & Puplampu, 2010). Some reports describe sustainable livelihood programmes, aimed at providing alternative sources of income while reducing dependency on the mining companies for inaccessible employment. There are also environmental rehabilitation trust funds to support CSER projects.

4.2.2 Sustainability reporting and environmental accountability

In simple terms, sustainability depicts managing the environment for future use. Sustainability has three dimensions: economic, environmental and social. Environmental sustainability (ES) can be achieved through environmental accountability, which is the focus on this entire study. ES is defined as the preservation of the features and practices that contribute to the quality of environment on a continuous basis (Vintró, Sanmiquel, & Freijo, 2014). By engaging in proactive EA, firms will be aiming at achieving ES. ES demands innovativeness, productiveness, efficiency, effectiveness, and economy in the use of resources. It calls for recycling, reuse and reduction of waste products – the 3Rs of environmental sustainability. ES is predominantly needed in the energy and transportation sectors; mostly driven by governments, institutions and firms.

The broader perspective of sustainability is often visualized in the context of sustainable development (Lodhia & Hess, 2014). "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission, 1987). It is in the light of this that the eight Millennium Development Goals (MDGs) which expired in 2015 metamorphosed into the charting of a new era of sustainability beyond 2015. To this end, the aim is now to achieve dignity by the year 2030 through the achievement of the 17 sustainable development goals (United Nations, 2014). Managers must determine how their organisations can become "more socially responsible, ecologically sustainable, and economically competitive" (Orlitzky et al., 2011). According to Vintró, Sanmiquel, and Freijo (2014), ecological or environmental sustainability may be viewed as the "maintenance of natural capital" that contributes to the quality of the environment on a continuous basis. Vintró et al. (2014) examined the adoption of environmental practices in SMEs in the surface mining industry in Catalonia (Spain). The work of Gomes, Kneipp, Kruglianskas, da Rosa, and Bichueti (2013) showed a positive relationship between sustainable management practices and business performance in the Brazilian mineral sector.

Sustainability reporting which is delivered through the triple bottom line (TBL) reporting aims to report on an organisation's economic, social and environmental impacts (Elkington, 1999). It is this TBL accounting that has evolved into the three dimensional definition of sustainability: economic sustainability, environmental (or ecological) sustainability and social sustainability (Hahn & Kühnen, 2013; Gray, Adams, & Owen, 2014). In other words, sustainability is attained in three main dimensions: economic, environmental and socio-cultural (society and social cohesion). The environmental dimension which is the emphasis of the present study is demonstrated by factors and actors

such as eco-friendly, capacity of the planet to absorb waste and support life, zero pollution and waste, waste recycling, renewable energy, water, greenhouse gases emission, conservation, restoration and safe environment.

4.2.3 Accounting for the environment

One important aspect for ensuring that mining firms are accountable for the environmental impacts of their operations is by ensuring that they engage in sustainable mining. Sustainable mining involves putting the biosphere at the end of the mining life back into the state it was at the beginning (Hart, 1997). Accounting for sustainable mining would therefore require determining the environmental costs of inputs that have no or reduced adverse environmental impacts; and costs required to remedy any environmental impacts that may arise.

Over the past fifty years, accounting for the envionment has received widespread attention in the academic literature (Gray, 1994; Lamberton, 2005; Lodhia & Hess, 2014). Lodhia and Hess (2014) found that, in developing countries, while there is slow progress in sustainability and environmental accounting, mining companies seem not to be fully accountable for their environmental impacts. Arthur, Wu, Yago and Jinhua (2017), however, insist that mining companies in Ghana have made considerable progress in developing sustainability measurement and reporting systems. Perhaps, this is only the case for the dominant players in the mining industry who are mainly international mining firms driven by global mining practices and policies.

Gray's (1994) work on sustainability accounting draws on the concept of capital maintenance recognising the need to maintain the stock of natural capital for future

generations. Within the context of financial reporting, the concept of capital maintenance, as stipulated by the IASB's conceptual framework applies to natural capital and not only to financial capital (Lamberton, 2005). This allows for the determination of sustainable cost which when deducted from accounting profit will lead to a hypothetical level of sustainable profit or unsustainable loss. Arriving at a reasonable estimate of sustainable cost poses grave difficulties.

In normal accounting usage, an accounting model comprises the financial reports and their underlying records; the objective of financial reporting; the generally accepted accounting principles that guide the preparation of these accounting records and their associated accounting reports; and the qualitative characteristics of financial information generated (Ijiri, 1983; Elliot and Jacobson, 1991; Solomons, 1995). This is the conventional accounting model that has been used for many decades. An environmental accounting model would incorporate the conventional accounting model and report on organisational environmental performance. More specifically, an environmental accounting model would give more attention to the issue of environmental impacts within the financial and non-financial reporting frameworks.

According to Edens (2013), the major aspects of environmental accounting are: (1) identifying environmentally related costs and revenues within the traditional accounting systems; (2) developing new accounting, information and control systems which provide information to encourage more environmentally friendly management decisions; (3) identifying areas where financial criteria and environmental criteria are in conflict and seeking to rectify this conflict; (4) finding ways in which sustainability may be assessed and incorporated; (5) developing new forms of performance measurement and reporting

purposes; and (6) assessing the business's operations to determine how they interact with the business's surroundings.

An environmental accounting model should provide the link between the financial bottom line and environmental performance. Economic or financial activities critically depend on the environment for inputs such as natural capital. However, the output from the economic activities in the form of emissions and waste also end up in the environment. This is what is termed as the input-output analysis of environmental accounting. Environmental accounting, which is a sub-measurement of sustainability accounting, measures the use of the environment in terms of natural resource inputs and outputs of waste and emissions (Edens, 2013). The argument is that the best way to directly account for the environment is through environmental accounting rather than indirectly sustainability accounting.

4.2.4 Environmental accounting and reporting quality

Environmental accounting and reporting delivers non-financial information into the public space. The content and quality of such non-financial information should be subjected to the same qualitative rigor of materiality, comparability, accuracy and completeness as is traditionally applied to financial reporting. The big question is: Can we recognise and measure the elements of financial statements (that is, assets, liabilities, capital, income and expenses) with respect to environmental dimensions? According to Boiral (2013), as cited by Speziale and Klovienė (2014), environmental reporting is intended to provide additional information to stakeholders who want to be better informed about the environmental impacts of their business activities. In this chapter, environmental reporting issues are exemplified around cross-cutting issues. These include: report content and quality; rationale and management motivations for reporting; stakeholder actions and

contradictions; voluntary, mandatory or compliance reporting; metrics and standards for environmental reporting; CSR reporting strategy; standalone and embedded or integrated reporting; stakeholder engagement processes and reporting; and utilisation of environmental management systems in environmental reporting.

Apart from demonstrating transparency, creating financial value and enhancing corporate reputation, environmental reporting improves regulatory compliance, enhances management systems, and attracts long term capital and favourable financing conditions. Environmental reporting covers a range of mechanisms whereby managers report to a range of stakeholders about how they have honoured the environmental responsibilities owed to these stakeholders. The challenge is how to ensure environmental accountability through the stewardship function, vis-à-vis reporting and assurance services. In the literature (Bonsón & Bednárová, 2015), some key bodies that have developed some environmental reporting standards and metrics. These include: AA1000 Framework (developed by the Institute of Social and Ethical AccountAbility (ISEA)); Caux Round Table Principles; DOMINI 400; EIRIS; EMAS; Ethical Trading Initiative; FTSE4 Good Index; the United Nations Global Compact; GRI G4 Standard; ISO 9000 and 14001; SA8000. In Ghana, the Ghana Extractive Industries Transparency Initiative (GEITI), has developed core principles of transparency and accountability in environmental reporting (Ministry of Finance, 2015). These standards and guidelines serve as avenues for promoting and reporting on environmental issues in the extractive industry.

4.2.5 Environmental reporting and (non-) financial reporting framework

In 1976, the Financial Accounting Standards Boards (FASB) of the United States of America (USA) defined a conceptual framework as “a constitution, a coherent system of

interrelated objectives and fundamentals that can lead to consistent standards and that prescribes the nature, function and limits of financial accounting and financial statements" (Page, 2005). The objectives identify the purposes of accounting. The fundamentals are the underlying concepts of accounting, the measurement of events and transactions, and the means of summarising and communication to interested parties. The conceptual framework, therefore, is intended to act as a basis for the standard setting process. Its purpose is "to guide in resolving disputes that arise during the standard setting process by narrowing the question as to whether or not specific standards conform to the conceptual framework" (Riahi-Belkaoui, 2004).

In 1989, the International Accounting Standards Board (IASB) also issued a conceptual framework for financial reporting ('the framework') which sets out the concepts that underlie the preparation and presentation of financial statements. Revised in 2010, the conceptual framework is a practical tool that assists the IASB in developing and revising the IFRS (Bradbury, 2014). Although not a standard or an interpretation, the framework significantly influences the development of new standards and the revision of existing ones. The objective of the IASB in developing the conceptual framework is to improve financial reporting by providing the Board with a complete and updated set of concepts to use when developing or revising its standards.

In a discussion paper published in 2014 for public comments, the IASB identified a number of limitations confronting the framework. Some of the important issues range from little guidance on measurement, presentation, disclosure and how to identify a reporting entity to clarity on definitions of assets and liabilities. Interestingly none of the revisions made to the framework categorically addresses environmental reporting. Obviously, the general

applicability of the conventional accounting principles to environmental reporting is not in doubt. However, the specific issues confronting the environment in which ESFs operate require special attention to environmental issues. For instance, Biondi (2014) pointed out that in respect of provision for environmental liability, in accordance with International Accounting Standard (IAS) 37 *Provisions, Contingent Liabilities and Contingent Assets*, the European Commission Regulation (having accepted and adopted the IFRS) recognises environmental liability only when there is a liability. This implies that a legal or constructive obligation resulting from past events must trigger the recognition of the liability. The provision for environmental liability will therefore be measured at the best estimate of future expenditure required to settle the present obligation, which reflects the present value of that future expenditure. In effect, IAS 37 stipulates that an entity must recognise a provision when all of the following three conditions are fulfilled: (1) a present obligation (legal or constructive) has arisen as a result of a past event (the obligating event); (2) payment for the obligation is probable ('more likely than not'); and (3) the amount can be estimated reliably. This, certainly, excludes recognition of a provision for environmental liability when the future expenditure cannot be measured reliably; particularly, where the future expenditure is considered to be remote. This also excludes capitalisation of future expenditure relating to voluntary commitment to environmental protection.

Mining companies are required by law to rehabilitate the lands that they mine (Statistics Department, Minerals Commission, 2017). Mining firms must estimate costs associated with rehabilitating land disturbed by the mining activities. In accordance with IAS 37, environmental rehabilitation liabilities are therefore accrued when (1) they become probable; and (2) their amounts can reasonably be estimated. An environmental reporting

framework which can be considered as a non-financial reporting framework should provide sufficient clarity and guidance on recognition, measurement, presentation and disclosure of environmental costs and liabilities.

4.2.6 Global Reporting Initiative (GRI) reporting guidelines

The Global Reporting Initiative (GRI) guidelines on sustainability reporting are fundamental principles of sustainability, practical strategic planning processes to implement sustainability into organizational cultures, and practical tools for measuring and monitoring progress along the so-called sustainability journey (Anielski, 2002). The GRI is a long-term, multi-stakeholder, international collaborative initiative to develop and disseminate globally acceptable sustainability reporting guidelines. These GRI guidelines (released in June 2000 as the Sustainability Reporting Guidelines) are to be used on a voluntary basis by organisations seeking to report and provide disclosures on the economic, environmental, and social performance of their activities, products and services. The GRI guidelines have been further refined and developed. The current version is the G4 Standard disclosures in which reporting organisations disclose their most critical impacts. The current version categorises the disclosures as universal standards and topic-specific standards (GRI, 2016).

4.2.7 Stakeholder engagements and environmental reporting

According to Freeman (1984), as cited by Parsons and Moffat (2014), stakeholders are entities who can influence or can be influenced by the activities of an organisation. Identifying key stakeholders is not quite a straightforward trait. An organisation may be saddled with the demands of numerous stakeholders. Parsons and Moffat (2014) recommend the need to reconceptualise the nature of company–stakeholder relationships

through “a more collaborative, dialogic and reflexive process”. Moreover, engagement with stakeholders is an indispensable way to reduce negative effects associated with the minerals and extractive industries (Tang-Lee, 2016). In line with the proposition of Tang-Lee (2016), this study recommends the need for mining companies to strengthen their engagement with indigenes, and not only local elites, and ensure alignment between CSER efforts and the immediate needs of the local communities. After all, ISO 26000 indicates that firms must build relationships with local authorities and local communities (Majer, 2013). Examining stakeholders’ perception of mining impacts, Viveros (2016) highlights the notion that CSR (or CSER) cannot be deployed as a tool to compensate for negative mining impacts. In line with this, the study asserts that reporting on CSER is not entirely an EA mechanism although it constitutes a significant EA initiative as a means of stakeholder management in practice (Ranängen & Zobel, 2014).

According to the stakeholder theory, a key responsibility of managers is to manage the relationships between the firm and its key stakeholders. At some point, managers may have to prioritise stakeholders depending on the accounting and reporting system, the managers’ philosophical beliefs and the organisation’s peculiar circumstances (Hall, Millo, & Barman, 2015). The legitimacy of a stakeholder’s relationship with the firm, the power to influence a firm, and the urgency with which the firm responds to the stakeholder’s demands are all driving forces in identifying stakeholders. This makes such a process rather subjective. In some instances, powerful stakeholders influence corporate social and environmental reporting and disclosures (Lu & Abeysekera, 2014). According to Lu & Abeysekera (2014), environmental reporting is a management strategy for developing and maintaining satisfactory relationships with dominant stakeholders. It is therefore important to identify those dominant stakeholders who may influence, or may be influenced by, the

firm's social and environmental reporting practices, and determine how the firm responds to their expectations. Reporting to key stakeholders and specifying the processes employed by management in communicating with these stakeholders is, to some extent, an accountability mechanism.

4.2.8 Social licence to operate and environmental accountability

It has long been established that mining companies must consistently satisfy not only the conditions required to obtain their mining licences, but also meet the concerns and expectations of their communities and the society at large (Prno & Scott Slocombe, 2012; Prno, 2013; Parsons & Moffat, 2014; Boutilier, 2014; Bice & Moffat, 2014; Wilson, 2015; Holley & Mitcham, 2016). This is what is commonly termed as social licence to operate (SLO) (Prno, 2013; Boutilier, 2014), particularly in the mining and minerals industry.

In addition to their legal and statutory obligations, mining companies require a "social licence" to operate. In a broader view, in addition to economic responsibilities, firms now have social and environmental responsibilities (Parsons & Moffat, 2014). SLO is apparently an 'ongoing acceptance of a company's activities by communities' (Boutilier, 2014). SLO can improve stakeholder engagement and environmental accountability (Bice & Moffat, 2014). Prno (2013) views it as a relationship building and engagement process where companies need to be part of the fabric of the community. The idea that mining firms need a licence from society can however create a contested space. Mining firms need to continue to earn and maintain a SLO for every new mining concession they procure while taking steps to minimize threats of losing existing social licenses.

Wilson (2015) proposes the active engagement of distinct groups within the community in the implementation of mining-driven community development. He asserts that exclusive powers should not be given to traditional leaders. Moreover, the belief is that mining-driven community development must be community-led rather than corporate-controlled. Community development has sometimes been undermined by the considerable amount of influence exerted by traditional authorities over community representatives and the community at large (Wilson, 2015).

4.2.9 Theoretical review

According to Mathews (1997), in providing accountability, the two main responsibilities or duties demanded are the responsibility to undertake certain actions and the responsibility to provide an account of those actions. Management's motivations to provide EA through ER are, to a large extent, influenced by theories such as stakeholder theory, legitimacy theory, and institutional theory (Hall, Millo, & Barman, 2015). With a belief in theoretical plurialism, in this study, the researcher draws extensively on these accountability theories.

Stakeholder theory thrives on the expectations of influential stakeholders if the managerial perspective of stakeholder theory is applied. The managerial perspective of the stakeholder theory permits the use of environmental reporting and disclosure to control the actions of dominant stakeholders. Dominant stakeholders are those who have resources which are central to the ongoing sustenance of the organisation.

Clarke and Gibson-Sweet (1998) contend that the legitimacy theory can also be used to explain the relationship between EA and ER. They further explain that environmental and

social disclosures result from predicaments that have ensued. In this regard, environmental reporting and disclosures are therefore used to manage a firm's reputation and to show that the firm is committed to fixing any social and environmental problems. The legitimacy theory suggests that a company that does not manage its reputation may witness a decline in firm performance. Legitimacy theory which is related to social contract provides evidence that an entity is complying with the expectations of society.

Institutional theory posits that organisations will adopt particular practices because of institutional pressures. Reporting on environmental issues is driven by normative, mimetic and coercive pressures. Mining companies follow certain standardised metrics in their environmental reporting. Some mimic other companies. But majority of them follow prescribed standards such the Global Reporting Initiative (GRI) guidelines on sustainability reporting.

4.3 Research Method

This chapter adopts a qualitative mode of enquiry based on documentary analysis and data obtained from semi-structured interviews. This section discusses the research paradigm adopted and provides an overview of the study environment as well as a description of the sources of data and data collection procedures. The data gathered were qualitatively analysed to identify and interpret common themes.

4.3.1 Research paradigm

Based on the researcher's philosophical and epistemic orientation, the researcher believes that "knowledge is established through the meanings attached to the phenomena studied" (Coll & Chapman, 2000; and Cousins, 2002, as cited by Krauss, 2005). And while the

researcher can interact with the object of study to obtain data, the researcher can still be independent of the object of study. The researcher adopted an interpretivist paradigm which led to the use of a qualitative research approach for this chapter using documentary analysis and narratives to address the questions posed in this study. This was intended to provide a complete and richer picture of the research process (De Silva, 2011).

4.3.2 Data sources and collection

Documentary analysis was employed to analysed the corporate annual reports of the dominant gold mining firms in Ghana. The annual reports which covered a period from 2008 to 2017 were predominantly gathered from the web pages of the dominant gold mining companies studied. After a preliminary review of the annual reports, a matrix was developed covering the key issues identified in the reports. Similar issues were grouped under common themes and divergent issues were noted for further analysis. The focus of the researcher was to identify themes relating to: report content and quality; rationale and management motivations for reporting; stakeholder actions and contradictions; voluntary, mandatory or compliance reporting; metrics and standards for environmental reporting; CSER reporting strategy; standalone and embedded or integrated reporting; stakeholder engagement processes and reporting; and utilisation of environmental management systems in environmental reporting. The analysis of the publicly available official documents took a period of four months to complete; from February to May, 2018.

Analysis of the emerging themes was concluded with the narratives in the reports supplemented by primary data sourced in the form of semi-structured interviews conducted with the environmental managers (See Appendix I for interview guide). In order to interrogate the environmental reporting regime in Ghana's mining sector landscape,

interviews were also conducted with officials from the Minerals Commission, Environmental Protection Agency (EPA), and the Ghana Chamber of Mines.

The sample selected for this chapter comprised eight dominant gold mining companies. The eight companies were sampled out of the 61 predominantly large-scale gold mining companies used for the entire study. Based on review of the gold production statistics for the period 2004 to 2017, the researcher considers the eight companies covered in this study as the dominant players in the mining industry in Ghana. They are the 'big 8' in the mining industry. Their gold production outputs represent a very significant economic contribution.

4.3.3 The study environment

In qualitative enquiry, context matters. It provides the setting within which a study in undertaken. In this section, a brief account is provided on the study environment which is the mining industry in Ghana.

Mining is one of the earliest industries to have ever emerged in Sub-Sahara Africa. Mining existed in Ghana even before the colonial period. It is a key industry for Ghana's growth and development since it is believed that countries which possess mineral deposits have an advantage in their developmental efforts. Historically, the mining sector has played a significant role in Ghana's socio-economic development through the payment of taxes, royalties, foreign exchange earnings, provision of employment, and development of banking, financial services, and transport sectors. Mining also contributes to community development through CSER activities and projects for host communities. The industry attracts huge investment from production, exploration and support service firms. The multiple effects of these investments in Ghana's economy is worth mentioning.

Mining companies provide significant revenue to government and employment for a large number of people enough to provide more visible economic benefits to the country and improved livelihood for the population (Akabzaa, 2007; Tackie et al., 2017; Arthur et al., 2017).

Apart from gold, Ghana's mining industry is rich in other precious minerals such as crude oil, diamond, copper, bauxite and manganese. Ghana also has substantial amount of iron, limestone, salt, and other industrial minerals. In terms of contribution to government revenues and employment, gold is the largest and most significant mineral resource in the country. Information sourced from the MinCom indicates that gold contributes up to 93% of all mining exports and attracts 60% of all foreign investment. As at 2014, Ghana's gold production was ranked as 11th in the world and second in Africa (Chamber of Mines, 2014). The main focus of Ghana's mining and minerals sector is gold. For these and other reasons, this chapter narrowed the focus of this study on the gold mining sector with an examination of the environmental reporting practices of dominant gold mining firms in Ghana.

It is important to note that, as of December 2017, there were fourteen (14) large-scale mining companies (Minerals Commission, 2018) producing gold, bauxite, manganese, and diamond. Over 600 registered artisanal and small scale mining groups are also engaged in the mining of gold, diamonds and industrial minerals, in addition to over ninety mine support service companies (Chamber of Mines, 2014). The major gold mining companies, according to gold production statistics for 2017 (see Appendix C) sourced from the MinCom, on the basis of ounces of gold produced, are: A. A. Minerals Ltd; Gold Fields Ghana Ltd (Tarkwa); Newmont Golden Ridge Ltd (Akyem); Newmont

Ghana Gold Ltd (Ahafo); Primestar Holdings (Gh) Ltd; Chirano Gold Mines Ltd; Guldrest Resources Company Ltd; AngloGold Ashanti (Iduapriem); Asanko Gold; Perseus Mining (Ghana) Ltd; Abosso Goldfields Limited; Golden Star Resources (Bogoso/Prestea); Golden Star Resource (Wassa); and Adamus Resources Limited. These companies had gold production in excess of 90,000 ounces. Thus, they form the top fourteen gold producing companies in Ghana, as of December 2017 (Minerals Commission, 2018). It is important to note that from group point of view, the leading gold producer in Ghana, as of December 2017, is Newmont Ghana Limited with a total gold production of 665,897.21 ounces of gold, followed by Gold Fields with 546,913.40 ounces. The gold production statistics for 2017 by the dominant large-scale gold producing mining companies in Ghana is depicted in Figure 4.1.

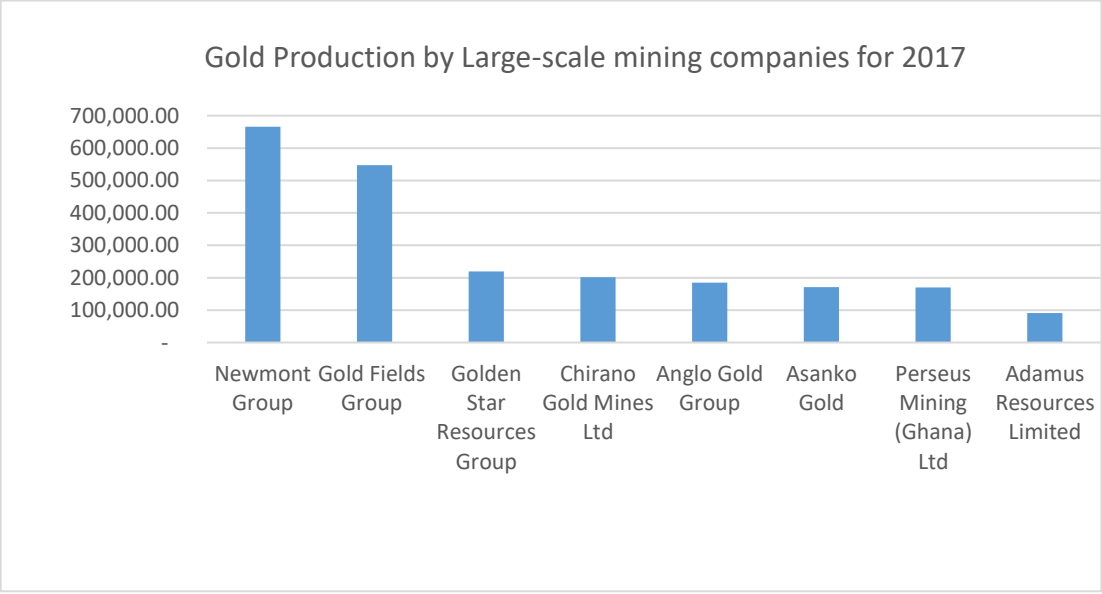

Figure 4.1: Gold production in 2017 by dominant gold mining companies

Source: Author compilation based on Minerals Commission's data (2017)

Within the mining landscape some mining companies especially the small scale miners have been accused of polluting the environment with cyanide, mercury and other

chemicals which they employ in processing gold ores. Addressing these challenges tend to increase the operating costs and reduce the profitability of operations alongside the increasing presence of illegal mining (‘galamsey’) operations on company concessions, substantial land compensation and environmental issues. Mining firms are expected to respond positively to these challenges by assuming responsibilities in local and national development (Vintró et al., 2014).

Some hold the view that, in recent years, there has been improved environmental accountability by the dominant gold mining companies (Arthur et al., 2017). This situation in the mining sector has emanated out of pressures from civil society and NGOs, as well as stringent demands from the compliance efforts of the regulatory bodies such as EPA and the MinCom Inspectorate Division. The assertion is that the foreign ownership of these dominant gold mining firms have contributed to their environmental accountability. All the eight dominant large-scale gold mining firms studied in this chapter are foreign owned firms. The local operation of these firms are largely driven by their corporate global policies and practices. These firms are usually required by their foreign investor companies to follow strict regulatory environmental compliance in order to avoid losing global investor confidence should any environmental lapses occur.

Indeed, Ghana’s mining sector has generally generated considerable social costs and negative impact, especially on the most vulnerable segments of the society like the rural poor, women and children. Some have suggested that a thorough cost-benefit analysis of the resurgent mining sector would probably return a negative figure. Mining firms enjoy high levels of fiscal incentives. They are also allowed to retain high levels of foreign exchange earnings in offshore accounts. There are however negative environmental

impacts of mining, including the growing incidence of conflicts between mining communities and their natural habitats.

4.4 Results and Discussion

The findings of this study begins with descriptions of the profiles of the dominant gold mining firms sampled for this study. The purpose is to unearth the nature and extent of operations of these firms as reported in their annual reports. Subsequently, the discussion centres on the emerging themes revealed by the documentary analysis of the annual report and interview material.

4.4.1 Profiles of the dominant gold mining companies studied

In this section, brief profiles of the gold mining companies used for this study is presented to further deepen the context upon which this study is dependent. The profiles were compiled from the annual reports and web pages of the eight dominant companies. To maintain anonymity, the study uses pseudonyms to conceal the identity of these companies. The section present the profiles from the group perspectives of the following companies: AGAL, NMGL, GFGL, GSRL, CGML, ADRL, ASGL and PSML.

AGAL

Established in 2004, AGAL is one of the largest gold producing companies in the world. It was formed as a result of a merger between AG and AGC. The Group headquarters is located in Johannesburg, South Africa. As an international company, AGAL is listed on the London, New York, Johannesburg, Australian and Ghana stock exchanges. It also trades on the Paris and Brussels bourses. AGAL engages in the exploration and production of gold. Other commodities it produces include silver, sulphuric acid and uranium which are generated in the process of mining gold at some of its operations.

AGAL engages in greenfield and brownfield and marine explorations in 12 countries in the world. Globally, According to its 2013 Annual reports, AGAL has 22 mine operations in 10 countries. Two of these mine operations are in OM and IM which are located in the Western and Ashanti regions of Ghana respectively. These two mines are wholly owned by the AGAL Group. The OM mine operation is one of the group's oldest mine (121 years) operations in the world. Although surface mining is still operational at the OM, the mine is currently closed for upgrade to increase its earning capacity.

It is believed that the state of mining activities undertaken at the OM over the years, and the environmentally unaccountable manner that the OM has witnessed for some time now may have contributed to the closure of the mine, for the first time in the mine's history. A news release from AGAL dated 27 June 2018 revealed that EPA has issued environmental permits for the OM paving the way for the redevelopment of the OM mine operation.

The IM gold mine which is an open-pit gold mine is situated 10 km south of Tarkwa, in the Western Region of Ghana. Following the closure of the OM, the IM gold mine is currently AGAL's main operation in Ghana.

GFGL

GFGL is a globally diversified South African gold mining company with seven operating mines in Australia, Peru, South Africa and Ghana. GFGL is also actively involved in greenfield and near marine exploration of gold. In Ghana, GFGL operates in two mine locations, GFGT and GFGD, both of which are located in the Western Region. The GFGT and GFGD mines are 90% owned by GFGT with the remaining 10% held by the

Government of Ghana. The GFGT gold mine is located 4km west of the town of TK. The GFGT mine operates under mining leases covering a total area of approximately 20,825ha. According information sourced from key informants, the GFGT concession mining leases expires in 2027. GFGL has mining leases in another mining concession which will expire in 2018. However, an extension for these mining leases has been applied for. It is estimated that the current mineral reserves will be depleted in 2031 (15 years). The GFGD concession lies to the north of and joins the TK concession, which is located near the town of TK. The GFGD concession covers a total area of 23,666ha. The GFGD plant processes mainly fresh ore with approximately 5% oxides, which is sourced from five open pit mining operations and existing surface stockpiles, located on the GFGD mine lease. The nature and setting of the GFGL mining operations suggest that the firm's mining activities largely affects the mining communities in TK and its environs. Communities bounded by the firm's operation have to endure the environmental impacts of the firm's operation.

NMGL

NMGL, a producer of gold, represents the Ghanaian operations of NC. Aside gold, NMGL also produces copper. Founded in 1921 and publicly traded since 1925, NMGL is headquartered in Greenwood Village, Colorado, in the USA. NMGL was named the mining industry leader in overall sustainability by the Dow Jones Sustainability World Index consecutively in 2015, 2016 and 2017. NMGL has ten mine operations in six countries; two of these operations are located in Ghana, its only operation in Africa. In Ghana, its operations are the NGAM and its recently added operation, the NGRL. NGAM, which operates the AM mine, is one of the five core operating districts of NMC. NGRL started operations in 2013. Many environmental activists in the mining sector acclaim that NMGL is the most environmentally responsible and accountable mining firm in Ghana.

This assertion was confirmed by key informants of regulatory institutions in the mining sector. Perhaps, the EAP engaged by Newmont Ghana has paid off and has translated into achieving milestones in terms of significant increases in gold production in recent years. Many consider NGML to be the gold producing leader in the sector, in all spheres.

GSRL

GSRL, a gold mining and exploration company, through its subsidiaries, engages in the acquisition, exploration, development and production of gold properties. It also explores for copper. The company which is a Canadian gold mining company holds interests in mines located in Australia, Peru, South Africa and Ghana. GSRL operates in other parts of West Africa and South America. It has exploration projects in Sierra Leone, Burkina Faso, Niger and Côte d'Ivoire. Listed on the New York, Toronto and Ghana stock exchanges, GSRL's headquarters is located in Toronto, Canada. In Ghana, it operates two mine operations, GSRWL and GSRBP, located in the Western Region of Ghana. It has been operating in Ghana from the BP mine since 1999. The BP gold mining concession and processing operation covers approximately 40 kilometers of strike along the southwest-trending Ashanti gold district in Western Ghana. Surface mining operation commenced at GSRWL in 2005. In January, GSRL commenced underground commercial production at GSRWL. Since early 2018, GSRWL has transitioned into an underground-focused operation. As with all mining firms in the Ghana, GSRWL has 90% interest in both the GSRBP mine and GSRWL mine while the Government of Ghana has 10% interest. According to its annual reports, GSRL's mission is to engage in responsible and profitable production of gold. It is obvious that GSRL is both concerned with environmental accountability and firm performance. While achieving profitability for its

investors, the firm is also focused on ensuring that the firm is environmentally accountable for its mining impacts.

CGML

CGML is a subsidiary of KG. KG, which was founded in 1993 and is headquartered in Toronto, Canada, has mining operations in the USA, Brazil, Chile, Ghana, Mauritania, and Russia. On September 17, 2010, KG acquired its ownership in the CGML mine when it completed its acquisition of RBMI. KG and the Government of Ghana have 90% and 10% interest in CMGL respectively. The CGML, located in the Western Region of Ghana, consists of several open pits and two underground operations. The mine is within the Bibiani gold belt. CGML's mining operation covers the exploitation of 11 gold deposits spread along a strike length of mineral reserve and resource.

ADRL

In 2011, ADRL was acquired by EMC based in West Perth, Australia. EMC disposed of its 90% interest in ADRL to BCMIL in December, 2017. The remaining 10% is owned by the Government of Ghana. The mine consists of a block of tenements and options covering approximately 665 square kilometers located in the Western Region of Ghana. ADRL engages in gold production, mineral exploration, mine development, and processing plant construction and commissioning activities. BCMIL, the current owners of ADRL, started operations in Western Australia and engaged primarily in the civil works and mining infrastructure construction business. It moved to Ghana in the year 1990 and has expanded to eight other countries with Ghana as its corporate headquarters.

ASGL

ASGL gold mine is a large scale, multi-pit asset. Built in 2015, first gold was poured in January, 2016, and commercial production commenced in April, 2016.The ASGL mine comprises two large deposits, a number of satellite deposits and a 3mt pa carbon-in-leach (CIL) processing plant facility. It is wholly-owned by ASL, with a 10% interest held by the Government of Ghana. The Company is strongly committed to the highest standards of environmental management, social responsibility, and health and safety for its employees and the neighbouring communities.

PSML

PSML is a multi-mine West African gold producer, developer and explorer, with two operating gold mines in Ghana and Côte d'Ivoire, and a third project in development. PSML is listed on the Australian Securities Exchange, Toronto and Frankfurt Stock Exchanges. PSML operates the EGM mine project. EGM is considered the flagship of PSML and it is the company's lead project. EGM comprises a group of large gold deposits located in the Ashanti gold belt. It is an open pit mine. Commercial gold production commenced on 1 January, 2012. It has been estimated to recover 220,000 ounces of gold over its remaining life. PSML also has a project located 35km east of the EGM mine. It is considered viable as a low-cost satellite producer to the larger EGM operation.

4.4.2 Environmental reporting practices of mining firms in Ghana

Based on the documentary analysis of the publicly available official documents, and responses from interviewees, this section discusses the environmental reporting practices of the gold mining companies studied. The discussion is organised according to the following themes: report content and quality; metrics and standards for environmental

reporting; CSER reporting strategy; embedded or standalone reports; stakeholder engagement processes and reporting; and utilisation of environmental management systems in environmental reporting.

4.4.2.1 Report content and quality

In the literature, assessment of report content and quality covers the following areas: strategic focus and future orientation; connectivity of information; stakeholder relationships; materiality; conciseness; reliability and completeness; consistency and comparability (Edens, 2013). With respect to environmental reporting, the report content of the dominant mining companies broadly covered areas such as: safety and health, resource custodianship, human rights, stakeholder engagement, and closure planning and provision.

Over the period reviewed, the report content suggests that mining companies continually improve on their environmental performance. Their intention is to demonstrate, through their environmental reports, that they are engaged in responsible gold mining practices. The narrative describe their commitment to the highest standards of corporate governance, ethics and honesty, commitment to the protection and promotion of human rights, assessment of ecosystem services, continuous improvement of operational systems, assessment of potential risks related to drought, extreme events, climate change, and operational issues. In its annual report for 2016, AGAL, for instance, stated that *"the company puts the highest priority on safe, healthy and environmentally sound work practices and systems"*.

In terms of report quality, the observation is that the highest reporting quality was maintained throughout the environmental reports analysed. Since all the mining companies

involved in this study are international or global companies, they follow reporting quality standards determined by their parent entities. The environmental reports[12] therefore do not necessary reflect what happens in the mining operations in Ghana even though it provides a general outlook of the companies in question.

4.4.2.2 Metrics and standards for environmental reporting

Some mining companies voluntarily use the GRI reporting guidelines in their reporting. Some also comply with the reporting requirements of the International Council on Mining and Metals (ICMM) Sustainable Development Framework (SDF). The SDF is supported by the following policies: occupational health and safety; human rights; ethics and corporate governance; risk management; environment; material stewardship and supply chain management; community and indigenous peoples and stakeholder engagements. Since mining companies use cyanide in their operations, the study revealed that over the period cyanide were certified or recertified as compliant with the International Cyanide Management Code (ICMC).

The use of ISO 14001 certification is a must for all the companies. In some instances, some operations' certifications are temporarily withdrawn to enable such companies address infrastructural challenges. During the visit to mining environment in Tarkwa, in the Western Region of Ghana, the researcher sighted two environmental certifications; one issued by the EPA and the other by Davis Langdon Certification Services in respect Australian/New Zealand Standard AS/NZS ISO 14001:2004 – Environmental Management Systems. The HSE manager of AGAL emphasised that, *"due to the global*

[12] Based on this assertion, the researcher went further to examine the environmental accountability practices within the Ghanaian mining environment from the perspectives of multiple stakeholders. The results is presented in the next chapter of this research report.

nature of AGAL's operations, each of the 22 mines are required to comply with the tenets of the standardised operations" – EMs.

The environmental accounting systems underneath the environmental reports include water accounting frameworks, energy and climate change, biodiversity waste management standard, biological resources management, tailings and waste management standard. For instance, NMGL reports indicate the use of *"biodiversity management standard to drive a more consistent approach to biodiversity conservation and resource stewardship*. *The water management system is used to isolate and recycle waters impacted by blasting".* Some companies also engage independent assurance firms to validate their environmental report. In 2016, NMGL achieved an A+ GRI rating. NMGL is also the first gold mining company selected to be part of the Dow Jones Sustainability World Index.

Apart from undertaking and reporting on Environmental Impact Assessment (EIA) for permitting new mine projects, the EPA requires mining companies to have an environmental management plan (EMP). The EMP is the blue print which is reviewed periodically and used as a benchmark to measure the environmental accountability practices of mining firms. The EMP can therefore be used as a metric for environmental reporting.

Almost all the mining companies endorse the principles and criteria of the Extractive Industries Transparency Initiative (EITI) which is also a reporting standard. Some have become part of the United Nations Global Compact. The UN Global Compact is the world's largest corporate responsibility initiative with over 6,500 business and non-business participants across 135 countries. Others also support the Voluntary Principles

on Security and Human Rights and the implementation of the Human Rights Adherence and Verification Program.

The documentary analysis of the annual reports of the mining companies studied also revealed that some companies use the following standards: World Bank Environment, Health, and Safety General and Mining Guidelines; and the World Health Organization Guidelines for Drinking-water Quality.

4.4.2.3 CSER reporting strategy

It is common knowledge that most mining firms use engagements in CSER activities and projects as an accountability mechanism. Some companies have community trust or development funds (some call it economic and social development fund) which fund community driven-projects. These projects include malaria control programmes, educational scholarship schemes, water treatment plants, free health screening, skills training, healthcare, sanitation projects, public infrastructure maintenance, institutional capacity building and livelihood programs.

With the respect to using CSER as an environmental accountability mechanism, all the mining companies studied have community affairs directorate with the responsibility of engaging the community in CSER projects and programmes. The mining companies' CSER activities are in the areas of health, education, environment, SMEs support, social infrastructure and charitable donations. In spite of the numerous community engagements and the CSER activities that the mining companies have undertaken within and for the communities in which they operate, there seem to be non-satiation on the part of the beneficiary communities. As one of the environmental managers puts it, "…*they always want more, they are never satisfied*". In economic science, such is human nature. It is

important to report that mining companies, as a matter of policy, do not entertain request for cash or kind contribution to any political campaign, party or candidate. They do not also contribute in cash or kind to support religious activities, which in turn will limit their support to a specific religious faith and its members, thereby excluding the broader community.

Most of these CSER activities and projects are delivered through foundations set up by some of the mining firms. The evidence from the annual reports of the mining companies surveyed showed that the dominant mining firms are delivering significant benefits to local stakeholders. This has strengthened their social licence to operate, as the interviews confirmed.

4.4.2.4 Embedded and standalone reports

In terms of decoupling of environmental reports, the evidence suggests that the corporate communication strategy of a particular mining firm drives how the report is delivered. Environmental reports could be deployed as embedded in the corporate annual report or produced as a standalone report. Some mining companies have both embedded and decoupled reports on environmental and sustainability issues. Usually, in such instances, the embedded is the abridged version of the standalone report. Some companies have also integrated sustainable considerations in the structure of their annual reports to produce a single integrated report; thus, following the International Integrated Reporting Council (IIRC) integrated reporting framework.

4.4.2.5 Stakeholder engagement processes and reporting

Mining companies use stakeholder engagements to communicate to key stakeholders, particular their host communities, about the environmental impacts and benefits of their activities. The mining companies holds community stakeholder meetings to understand how best they can help their host communities develop and also receive feedback on the effects of their activities on such communities. Through community stakeholder engagements, CSER projects in education, health and other social welfare projects are implemented. Proving employment to locals is also a key reporting feature in demonstrating stakeholder engagement.

The narrative in the annual reports reveal a spirit of transparency and good faith to support the social, economic, and institutional fabric of host communities. The intention is *"to actively reach out to understand the views and concerns of community stakeholders*" (EM1) while being transparent about their operations and their performance. The environmental reports captures the following media of engagement with community stakeholders: regular meetings with officials and neighbours, such as formal dialogue tables and stakeholder committees; community, business, government and school presentations; public mine tours; participation in local cultural and sports events; daily informal, impromptu conversations; and community grievance mechanisms.

Stakeholder engagements are mostly carried out by community affairs department. AGAL, for instance, has a sustainability department. In consultation with community leaders and other stakeholders, such departments mostly spearhead CSER reporting activities which is then included in the annual reports.

4.4.2.6 Utilisation of EMS in environmental reporting

A key instrument used by mining companies to manage environmental impacts is the ISO 14001 on environmental management systems (EMS). Aside using the EMS to generate data on environmental management, the EMS evaluates new mining projects taking into account closure and associated costs. It also plans and sets aside financial resources which caters for closure obligations when operations become defunct. In this regard, all the dominant mining companies have environmental rehabilitation trust fund (ERTF) which is invested in financial instruments. An assessment of closure liabilities is undertaken annually. Change in the extent of liability is effected when changes in certain variables require it. In effect, the fund is used to cater for expenses associated with mine closure which is also reviewed annually and adjusted accordingly. The EMS is also used to monitor usage, measure quality changes and to determine recycling opportunities.

4.5 Conclusion and Recommendations

Overall, the findings from the documentary analysis over the ten-year period for the eight dominant gold mining firms reveal that environmental reporting is now a critical strategic reporting practice for ESFs which almost all mining companies are seriously tackling proactively.

The earlier review period show mixed results with regards to the nature of environmental reporting practices. The first half of the ten-year review period revealed that although the conventional accounting system was used in the recognition and measurement of environmental transactions, the nature, content, standard, presentation and disclosure of environmental reports varied across the firms. The recent review years however show evidence of commonality in the reporting practices of the dominant players in the industry.

Some reports were stand-alone while others were integrated in the main annual reports. The rationale for this can be attributed to the stakeholders involved. In the case of AGAL, for instance, there are a wide array of global investors demanding mandatory, standardised and voluntary disclosures. This is the reason for the five different stand-alone reports that AGAL produces annually. Certainly, management motivations for providing these reports are influenced by the stakeholder complexities.

This chapter has revealed that financial reporting alongside environmental reporting adopts an entity assumption where the entity is treated as distinct from its owners and other stakeholders. From financial reporting perspective, transactions not directly impacting the entity are ignored which also implies that externalities caused by the reporting entity, some relating to social and environmental implications of the entity's operations, are ignored. In effect, environmental accountability and the 'entity assumption' are mutually exclusive leading to the non-recognition of items and transactions that impacts on resources not controlled by the entity. This is because externalities (social and environmental impacts) caused by the entity that cannot be reliably measured are disclosed using optimistic narratives in environmental reports. The financial reporting framework promulgated by the IASB should be redesigned to incorporate environmental accountability dimensions.

Environmental reporting by mining companies, to some extent, does not succinctly divorce from financial reporting because both reports serve different purposes. Environmental reporting is part of the Triple bottom line (TBL or 3BL) reporting which is an accounting framework with three parts: social (People), environmental (Planet) and financial (Profit). Holistic financial reporting must embrace these three aspects of TBL because TBL is a broad based stakeholder approach to providing a wide variety of information. Originally,

environmental reporting was not part of financial reporting and many have questioned whether it is real accounting. However, to the extent that the objective of general purpose financial reporting is intended to serve the needs of varied stakeholders, environmental reporting must be part of the financial reporting framework. Moreover, to the extent that environmental reporting aims at measuring and reporting environment profit then the reporting practices of ESFs must clearly demonstrate accountability for environmental impacts.

Other triple bottom line proponents have suggested a sustainability reporting framework rathan than an environmental reporting framework. Research linking accounting to the emerging concept of sustainability surfaced in the early 1990s and has received continuing attention in academic and professional accounting literature. Sustainability Reporting Guidelines (SRG) were released at the World Summit on Sustainable Development in August 2002, consolidating the various approaches into a sustainability accounting framework. The result is a comprehensive reporting model that presents an enormous challenge to business organisations, requiring a significant commitment of resources to achieve widespread implementation. Failure to meet this challenge enables business organisations to continue to avoid accountability for their continuing unsustainability (Lamberton, 2005).

This chapter has reinforced the proposition for decoupling environmental reports within the broader sustainability reporting regime. The study recommends the development of a separate environmental reporting framework to ensure proactive environmental accountability by gold mining companies.

Further studies can quantitatively examine the link between financial performance and environmental reporting of mining companies in Ghana using a disclosure index.

CHAPTER FIVE

THE STATE OF ENVIRONMENTAL ACCOUNTABILITY IN THE MINING INDUSTRY: STAKEHOLDERS' PERSPECTIVES

CHAPTER FIVE

THE STATE OF ENVIRONMENTAL ACCOUNTABILITY IN THE MINING INDUSTRY: STAKEHOLDERS' PERSPECTIVES

Abstract

The purpose of this fourth empirical paper is to analyse environmental accountability (EA) in Ghana's mining industry from the perspectives of multiple stakeholders. Some studies have focused on EA issues but were limited to industrial perspectives without considering the viewpoint of multi-stakeholders. This paper attempts to bridge this gap by analysing EA in Ghana's mining industry from the perspectives of regulatory bodies, mining companies, environmental managers, community partners, environmental consultants, and mining association. The study adopts a purely qualitative approach to research in terms of research method, data collection and data analysis. Based on responses from the interview respondents, themes from the literature and empirical material, the stakeholders' perspectives were analysed with respect to: (1) motivations for EA; (2) effectiveness of EA; (3) performance assessment; and (4) stakeholder engagements. One significant contribution of this paper is the determination of drivers (the 'why'), outputs (the 'how') and outcomes (benefits) of EA which was developed based on documentary analysis and interview data. The findings reveal commonality of acceptable and responsible EA practices that can lead to a 'win-win' situation for all stakeholders in the mining industry. Mining companies should increase their focus on practicing value-added EA in all facets of mining operations. They should also strengthen their engagement with indigenes, and not only local elites, and ensure alignment between CSER efforts and the immediate needs of the local communities.

5.1 Introduction

The mining industry, and for that matter, Ghana's mining industry have significantly gained a lot of public interest and attention both locally and globally, due to the nature of the environmental and social accountability issues. Although the industry accrues many advantages, inappropriate and irresponsible mining activities have led to drastic environment and resource depletion. To achieve a balance of such activities, environmental accountability (EA) have become a must for industry players. Some contemporary businesses engage in sustainable strategies like green initiatives and CSER to demonstrate their accountability practices (Chaabane et al., 2011; Maxwell et al., 2006; Bendell & Kearins, 2005). According to Peloza (2006) and Salam (2009), EA increases sales revenue and capital share and improves customers' perceptions of a business. In this way, EA acts as a strategic issue in modern competitive business (Salam, 2009).

The main reason a corporation adopts EA is to contribute to a better society and cleaner environment for safe human living (European Commission, 2001; Hamann and Kapelus, 2004; Velásquez, 2012). Over the years, the mining industry have been criticized for various gaps in implementing EA even though the industry plays a vital role in both the local and global economy through the provision of basic raw materials and energy for many industries, including ceramics, electronics, metal, paper, plastics, and others (Vintró Sánchez et al., 2012). Unfortunately, unplanned expansion, environmental accidents, and direct disposal of wastewater have led to irreversible results like chemical leakage, acid mine drainage, soil contamination, threats to fisheries and activity, and land and water contamination, alongside its heinous health implications (Kemp et al., 2010; Hilson, 2002).

For some time now, African countries with mining sectors have shifted their policy emphasis towards a primary objective of maximising tax revenue from mining over the long term, rather than pursuing other economic or political objectives. The mining industry in Ghana cannot be considered an isolated phenomenon. Ghana was among the first sub-Saharan country to embark on major economic reforms. From 1984 to date, there have been significant institutional development and policy changes to reflect the new paradigm, from the establishment of the Minerals Commission in 1984 and the promulgation of the Minerals and Mining Code in 1986 to the promulgation of the Small-Scale Mining Law in 1989 and the establishment of the Environmental Protection Agency in 1994.

Over the past years, mining concession holders (MCH) have applied portions of their profits to support national or local projects through CSER strategies. Improved CSER trends within the sector have arisen out of pressures from civil society and NGOs, rather than from the compliance efforts that the EPA has been able to exert. Violence in the sector is not unknown; for example, reports persist of security agents shooting people who trespass in mining areas. A number of civil society organisations are advocating improved environmental governance, social protection, compensation for affected communities, and human rights in mining regions in Ghana.

Many have questioned the real benefits accruing to the ordinary Ghanaian in the mining communities and to the country as a whole, in the light of the extremely generous fiscal and other incentives given to MCH in spite of the harmful nature of their activities. Indeed, Ghana's mining sector has generally generated considerable social costs and negative impacts especially on the most vulnerable segments of the society like the rural poor, women and children. It has been suggested that a thorough cost/benefit analysis of the

resurgent mining sector would probably return a negative figure. This is because of such factors as the high level of fiscal incentives enjoyed by MCH and the high level of foreign exchange earnings they are allowed to retain in offshore accounts. Other relevant factors include the negative environmental impact of mining, and the growing incidence of conflict between mining communities and their chiefs on one hand and mining companies on the other hand.

It is important to conduct a holistic view of stakeholders (Weng, Chen, & Chen, 2015) in establishing appropriate EA practices. MCHs should be interested in knowing what the key drivers are in establishing appropriate EA practices. Are regulatory institutions such as the Minerals Commission and the EPA the most influential and important stakeholders? How should MCH address the concerns of various stakeholders? In the present study, the stakeholder theory is employed as the lens to frame the approach to the study. The use of stakeholder theory is to obtain a complete view of the perspectives of key stakeholders in Ghana's mining industry. Based on responses from the interview respondents, themes from the literature and empirical material, one significant contribution of this study, is the attempt to classify various stakeholders as regulatory stakeholders, operational stakeholders, community stakeholders, internal stakeholders, and interactional stakeholders.

Regulatory stakeholders comprise regulatory bodies (such as Minerals Commission and EPA) as well as other government agencies. Operational stakeholders refer to mining concession holders (MCH), predominantly made up of mining firms. Operational stakeholders include contract miners. Community stakeholders are generally community partners – host communities and their leaders. Internal stakeholders consist of investors,

management, mine workers and suppliers. Interactional stakeholders are those who MCHs interact regularly with and who do not belong to any of the earlier classification. They include mining association, media and the public, affiliate and associate institutions, and external or global bodies.

It is important that mining companies initiate strategic stakeholder engagement practices that takes into account the demands of multiple complex stakeholder groups. Studies on the stakeholder-firm relationship have focused on stakeholder influences. Very few studies have looked at the engagement approaches adopted by MCHs in addressing the concerns of powerful stakeholders who can influence corporate social and environmental accountability disclosures (Lu & Abeysekera, 2014). Some studies have focused on EA issues but were limited to industrial perspectives without considering the viewpoint of multi-stakeholders. This paper attempts to bridge this gap by analysing EA of Ghana's mining industry from the perspectives of multiple stakeholders. The paper assesses the stakeholder engagement practices of mining firms that are intended to address the socio-economic and environmental impact of the mining operations on communities in mining areas. The paper also examines the expectations of stakeholders and how mining companies seek to prioritise these expectations.

5.2 Literature Review

5.2.1 Economic importance of the mining industry

Mining is considered as one of the important economic activities in the developing world due to its significant contribution to export earnings, government revenues, and employment. The mining industry's revenues contribute significantly in insulating the Ghana's economy against the adverse impacts of economic downturn. According to the

Bank of Ghana, total merchandise export earnings by the traditional minerals (Gold, Bauxite, Manganese and Diamond) represented about 49% of gross merchandise exports. The mining sub-sector grew remarkably by 11.2% in 2008 compared to the 6.8% it recorded in 2009. By this growth performance, the industry came second behind the Electricity sub-sector which grew by 16.7% in 2010. The total mineral revenue from mining firms increased significantly from US$2,925,831,036 in 2009 to US$3,724,847,388 in 2010 representing an increase of 27%. The industry committed about 68% of its revenue into the Ghanaian economy with an average of 25% going through the Bank of Ghana to satisfy its statutory obligations and a further 43% through the commercial banks.

Table 5.1: Mining Sector Contributions to Ghana's Economy (2004–2013)

Year	Mineral Royalty	Property Rate	Corporate Tax	Dividend	Total
2004	20,724,725	210,809	500,643	3,145,873	**24,582,049**
2005	23,293,296	253,103	10,222,868	6,862,456	**40,631,723**
2006	32,191,084	699,265	20,830,991	7,194,552	**60,915,892**
2007	41,107,525	914,811	15,573,250	3,853,422	**61,449,008**
2008	61,260,431	796,978	32,237,579	1,417,128	**95,712,116**
2009	96,618,198	913,773	17,501,129	504,466	**115,537,566**
2010	150,453,905	830,051	116,692,387	28,021,188	**295,997,531**
2011	218,151,362	482,092	339,732,910	200,713,222	**759,079,586**
2012	357,367,781	2,121,800	712,448,942	15,836,553	**1,087,775,076**
2013	361,409,336	1,898,917	459,049,324	1,329,862	**823,687,439**
Total	**1,362,577,643**	**9,121,599**	**1,724,790,023**	**268,878,721**	**3,365,367,986**

Source: Statistics Department, Minerals Commission (2017)

The mining industry also contributes so much to revenue generation through corporate taxes, royalties and income taxes on both salaries and wages of employees, and dividends declared. For instance, the total company tax, representing corporate tax, withholding tax and levies paid by the sub-sector, over the period 2004 to 2013 amounted to almost GH¢1,700 million, as depicted in the Table 5.1. The mining sector maintained its position as the highest payer of company tax during 2012 by contributing about GH¢894 million representing 37% of total company tax (GRA, 2010). The sector has also contributed immensely in the area of employment. The sector as at the end of the year 2010 provided

15,861 jobs. Employee remuneration, which covered salaries and other benefits accounted for 7% of mineral revenue. Out of this, ninety-eight percent (98%) were Ghanaians and 2% expatriate. Small-scale mines also generated about 500,000 jobs across the nation and certain indirect jobs were also created, because of the existence of mining companies.

Another factor which makes mining important in the country is its contribution to social multipliers, which arise from the role of mining companies in the development of human resources and infrastructure such as schools, colleges, clinics, roads, and housing. These are done in relation to their CSER projects where all commercial production members of the Ghana Chamber of Mines (GCM) have set up social development funds to make available such facilities to their communities (Ghana Chamber of Mines, 2016). All the gold producing members of GCM have decided to contribute a dollar per ounce as well as a percentage of gross profit into the funds for the socio-economic development of host communities in which the mine is cited. Table 5.2 shows the contributions made by the MCGs to host communities and the general public in 2017.

Table 5.2: Voluntary Contributions to Socio-economic Development (2017)

Socio-economic contributions	**2017 (US$)**
Education	1,010,246
Health	565,596
Electricity	458,797
Roads	609,146
Water	220,876
Housing	618,531
Agro-Industry	386,668
Agriculture	743,937
Sanitation	262,863
Resettlement Action Plan	4,503,381
Alternative Livelihood Projects(others)	2,897,767
Others	830,747
Total	**13,108,554**

Source: The Ghana Chamber of Mines (2018)

5.2.2 Environmental accountability in the mining industry

In times past, mining was just an activity of exploiting a concession until natural resources were worn out. Then the mining concession holder would move to the next place where this process would be continued (Vintró Sánchez et al., 2012). Due to high pressure from the host communities, the mining industry integrated sustainable practices in their operations in the early 1980s (Esteves, 2008; Jenkins and Yakovleva, 2006), but there is limited literature on mining firms that integrate EA strategy. Hamann (2003) discussed sustainable development in mining companies and challenges encountered in the implementation of EA in South African mining industries. He also explored the combined role of companies, government and civil society to promote effective and efficient EA strategy.

From the literature, there are some papers on South African mining firms that have incorporated EA strategy into their operation. Kemp et al. (2012) examined EA in mining sectors and their audit cultures. He also explained the importance of audits to mining sectors for long term success and expressed internal accountability in the mining industry to promote social performance. Many studies (Fonseca et al., 2014; Murguia & Bohling, 2012; Pellegrino & Lodhia, 2012; Lodhia, 2012; Northey et al., 2012) emerged with the sustainable reporting and environmental disclosures in mining sectors.

Land conflict is one of the vital issues in mining sectors. In this regard, Hilson (2002) wrote a paper which explores land conflict in mining communities and the negative effects of illegal mining such as erosion, sedimentation, and vegetation removal. He provides the conclusion with societal strategies like improved community consultation, governmental coordination of research activities, provision of appropriate compensation, and working

partnerships between large and small-scale mines. Prno and Slocombe (2012) explored concepts of 'social license to operate' in the mining sector and the benefits associated with them. He also provides governance and sustainable theories with their perspectives with a case study of the Canadian mining sector. Esteves (2008) focused on the concept of community investment in the mining sector. Both papers have a multi-criteria decision analysis but he differentiates the paper by integrating social impact assessment (SIA) in business planning. Jenkins and Yakovleva (2006) explored trends in reporting impacts and issues in the global mining industry and provide a broad view of social and environmental disclosure in mining sectors. Kemp et al. (2010) correlates water and human rights issues in mining and highlights points of disconnection between technical, scientific and engineering approaches.

Some researchers have investigated different case studies of the mining sector. Solomon et al. (2008) explored research policies and challenges in the Australian mining sector through a case study and identified current themes in the social dimension of mining based on values, drivers and interpretations. Similarly, Campbell (2003) discussed governance factors, codes and conduct, policy reforms in African mining sectors with the EA perspective. Hamann and Kapelus (2004) investigated African mining environment, and Vintró Sánchez et al., (2012) and Velásquez (2012) discussed the status of EA in Catalan and Southern Ecuadorian Andes mining industries, respectively. Freitas and Magrini (2013) developed a multi-criteria decision making support system for sustainable water management in the Brazilian mining sector. Gomes et al. (2014) analysed the factors related to the management of sustainability in Brazilian mining companies.

Some studies have also focused on the cleaner production and environment in the mining industry. Muduli et al. (2013) investigated barriers and behavioral factors of green supply chain management in Indian mining sectors. Ghose (2003) examined the techno-economic and socio-cultural characteristics of Indian small-scale mines and also the legislative measures for cleaner production in the mining sector. Ghose (2003) examined environmental management plans (EMP) in Indian small-scale mines.

From the literature, it was evident that analysis of EA in Ghana's mining sector is yet to be given some prominence, and especially, from the perspective of multiple stakeholders.

5.2.3 Drivers of environmental accountability

Haigh and Jones (2006) reviewed drivers of EA, and they distinguished drivers as internal drivers, competitive drivers, external drivers, regulatory drivers, and considered other pressures and popular mobilizations. Hietbrink et al. (2010) explored EA from a business purchasing context, as they mentioned factors such as environmental impact of products and production processes, avoiding child labor, stimulating employee volunteerism, codes of conduct and pressures from consumers as drivers of EA strategies.

In the literature, the focus has been on societal and business drivers whereas, in contrast, Moon (2004) argues on the importance of government as a driver of EA. Smith (2007) argues that customers are the real drivers of EA by explaining ethical influences on customer behavior. Powell et al. (2009a) analysed motivations of EA in supply chains, and they listed reputation, brand image, market sales, risk management, corporate identity, pressures from customers, investors and regulatory pressures. Carter and Jennings (2000) explored four drivers of EA, namely: people oriented organisational culture; organisational

policies; employee initiatives; and pressures from external customers. Ogawa (2009) argued that codes of conduct are a main driver of CSR. He also explained this with Japanese transnational corporations.

According to Li and Chiang (2010), the reasons for EA adoption are reputation, community relations, regulation, stakeholder willingness, public pressure, consumer pressure, business ethics, risk protection, competition strategy, market positioning, recruitment, political and social relationship, society roles, strategic advantage, supply chain efficiency, non-governmental organisations, industry, codes of conduct, environment for resources and social legitimacy. Majumdar and Nishant (2008) made a conceptual framework on EA in large-scale organisations and debated about drivers like avoidance of child labor, risk minimisation, market opportunity, sustainability issue, reputation, job losses, customers, business partners, local communities, employees and the public.

Cruz and Wakolbinger (2008) discussed EA in supply chain networks, where they discussed common drivers of EA like external pressure, internal pressure, reputation, long term success, health and safety regulations, labour rights abuses, public awareness, managing risk, brand recognition, cost reduction and customer loyalty. Many researchers (Hsueh, 2012; Ostrau et al., 2012; Ciliberti et al., 2011 McWilliams and Siegel, 2001) have also investigated drivers of EA such as globalization, reputation, legal sanctions, customer loyalty, reduced cost, reduced risk, and brand recognition.

5.2.4 Accountability to whom?

As Sinclair (1995) points out, accountability is a somewhat multi-faceted term that does not lend itself to precise definition. Not only does it have discipline specific meanings, but even within the accounting domain, there is a distinct lack of consensus as to what accountability actually entails. The question remains, however, to whom is the account made? Benston (1982, p. 88) identifies "shareholders, stakeholders[13] and society in general" as three possible recipient groups.

5.2.5 The stakeholder construct

The stakeholder construct serves as the lens through which this chapter is deployed. According to Freeman (1984), as cited by Parsons and Moffat (2014), stakeholders are groups or individuals who can affect or can be affected by the organisation's activities. Identifying key stakeholders of a particular firm is not quite a straightforward trait. An organisation may be saddled with the demands of numerous stakeholders.

According to the stakeholder theory, a key task of managers is to manage the relations between the firm and its various stakeholders. At some point, managers may have to prioritise stakeholders depending on the accounting and reporting system, the managers' epistemic beliefs and the organisation's peculiar conditions (Hall, Millo, & Barman, 2015). The power to influence a firm, the legitimacy of a stakeholder's relationship with the firm and the urgency with which the firm responds to the stakeholder's demands are all driving forces in identifying stakeholders. It is therefore important to identify those powerful stakeholder groups who may affect, or may be affected by, the firm's social and environmental accountability practices, and determine how the firm responds to their

[13] In this study, the researcher refers to all affected parties as stakeholders.

expectations. Indeed identifying, prioritising and meeting the needs and expectations of stakeholders is an accountability mechanism.

5.2.6 Stakeholders' perspectives

The EA literature offers several constructs for interpreting and applying EA. To date, an understanding of EA through stakeholders' perspectives of EA remains fertile. Perhaps, the lack of common definition or the different understandings of what EA really encompasses (Karnani, 2011) leads to diverse outcomes. Moreover, not only are there diverse definitions or understandings, but stakeholder groups themselves vary as much as the expectations about EA and the likely impacts by companies.

Wood and Jones (1995) identify three roles of stakeholders. First, stakeholders are the source of expectations for a company's performance. Secondly, they experience the effects of companies' activities and, thirdly, they evaluate companies' outcomes in terms of stakeholder expectations; and the effects on them. Of course, from a stakeholder perspective, EA will be evaluated on the basis of how a company meets the stakeholder demands and expectations. Thus, stakeholders will perceive EA according to the stakeholders' own demands and interests (Fiedler & Kirchgeorg, 2007; Hillenbrand & Money, 2007). In many cases, the diversity of stakeholders translates into a diversity of interests and objectives. These interests sometimes converge or diverge into confronting scenarios involving social, environmental and economic domains (Steurer et al., 2005). In such circumstances, stakeholder perspectives about EA are not only diverse across groups, but sometimes even within the same group.

5.2.7 Stakeholder engagement

Wilson (2015) proposes the active engagement of disparate groups within the community in decision making at all stages of mining-driven community development rather than giving exclusive powers to traditional leaders. In areas where the presence of minerals has led to conflict with inhabitants over rights of ownership over mineral resources, the minerals have been referred to as conflict minerals (Rustad, Østby, & Nordås, 2016).

Parsons and Moffat (2014) recommend the need to reconceptualise the nature of company–stakeholder relationships through a more collaborative, dialogic and reflexive process. Moreover, engagement with stakeholders is an indispensable way to reduce negative effects associated with the minerals and extractive industries (Tang-Lee, 2016). Tang-Lee (2016) recommended the need for mining companies to strengthen their engagement with indigenes, and not only local elites, and ensure alignment between CSER efforts and the immediate needs of the local communities. After all, ISO 26000 indicates that firms must build relationships with local authorities and local communities (Majer, 2013).

Examining stakeholders' perspectives of mining impacts, Viveros (2016) highlighted the notion that CSER cannot be used exclusively as a tool to compensate negative mining impacts. The assertion is that CSER is not entirely an environmental accountability practice, although it constitutes a significant EA initiative as a means of stakeholder management in practice (Ranängen & Zobel, 2014).

According to Ranängen and Zobel (2014), the stakeholder engagement process involves five main iterative stages. These are: (1) strategic thinking about engagement; (2) engagement analysis and planning; (3) maintenance and strengthening of the capacities

needed to engage effectively; (4) engagement; and (5) definition of actions based on the output of the engagement process and reviewing of the engagement process. They further added that, in most instances, the issues to consider in stakeholder engagement include identification of engagement approaches, and level of engagement based on specific stakeholder profile, the specific issue to be examined, the relationship context, and the organisation's as well as stakeholders' objectives and needs. Level of engagement may vary from simple information sharing to empowerment.

Some common engagement methods found in the literature are appreciative inquiries, consensus building, scenario planning, and inviting written responses from stakeholders, e.g., via telephone hotlines, meetings, online engagement mechanisms, focus groups, surveys, stakeholder advisory or assurance panels, multi-stakeholder forums, multi-stakeholder alliances, partnerships, voluntary initiatives, and joint-projects.

5.2.8 The stakeholder theory and the social capital theory

Whereas many new theories have evolved regarding EA, the two most popular theories are the stakeholder theory and the social capital theory. The main theme of the stakeholder perspective focuses on managerial decision making in business environments, while the social capital theory deals with the gap between multiple disciplines from economics, sociology, and political science perspectives (Sen, 2011). The evolution of EA started in 1960 but EA concepts became more aggressive from 1990 onwards (Sen, 2011; Larsen, 2010).

In this study, the researcher draws extensively on the stakeholder theory in analyzing the perspectives of stakeholders on the state of EA in the mining industry.

5.3 Research Method

Based on the interpretivist research paradigm, this study adopts a purely qualitative approach to research in terms of research method, data collection and analysis. Semi-structured interviews were used to undertake the study (e.g. Jones & Solomon, 2010; Edgley et al., 2010; O'Dwyer et al., 2011) because it is considered as the most appropriate means of researching ethical and social responsibility dimensions of accounting (Parker & Roffey, 1997). It also allows for varying the order of inquiries between the interviews (Saunders et al., 2007). The main advantage of the semi-structured interview method is that it enables the researcher to explore a deeper level than the questionnaire-based survey method.

5.3.1 Data sources and collection

Primary data was sourced in the form of semi-structured interviews and a focus group discussion. For the four-month fieldwork (October, 2017 to January 2018), 25 interviews were conducted. Twenty-one environmental managers of the mining firms surveyed were interviewed. The remaining four interviews were conducted with officials from the Minerals Commission, EPA, and the Ghana Chamber of Mines.

From the onset, the researcher purposed to interview all the environmental managers of the mining companies surveyed. However, once sufficiency and saturation of information (Seidman, 2006 as cited by Tang-Lee, 2016) were achieved, the researcher ended with 21 interviews from 21 companies. Eight out of the 21 companies were dominant large-scale gold mining companies. The companies covered, however, represent a significant proportion of the mining industry, in terms of mining concession.

Gaining access to each environmental manager was a very difficult hurdle. Even with introductory letters obtained from the Minerals Commission (See Appendix E) and from the Ghana Chamber of Mines (GCM), gaining access to the intended interviewees was very challenging. The researcher had to resort to personal references from one interviewee to the next interviewee since the environmental managers in the mining industry are very much connected to one another.

With a purely qualitative approach to enquiry for this chapter, the researcher resorted to the use of a self-constructed interview guide as the research instrument to solicit the views of key officers of the dominant gold mining companies. The interview guide had six sections (A to F). Section A dealt with the interview profile. Section B focused on the measurement and indicators of environmental performance. Section C solicited responses relating to the nature and drivers of environmental accountability practices. The nature, contents, approach and focus of environmental reporting were contained in Section D. Section E looked at stakeholder engagements and environmental accountability. The final section, Section F, demanded background information of respondents. In addition to the interview guide, the researcher crafted and emailed a concept note to all the prospective interviewees. The concept note was designed to explain the rationale and objectives of the research, and also to assure prospective interviewees of the strict confidentiality attached to this purely academic exercise.

The entire fieldwork for the data collection took a duration of almost three months. However, the researcher used eight non-consecutive days to conduct the interviews spanning a total duration of 1,141 minutes (approximately 19 hours). The average time for each interview was 60 minutes. The interviews with the environmental managers of the

mining firms surveyed were spread across six regions out of the ten regions in Ghana. The regional distribution of mining firms' interviews conducted is depicted in Table 5.2.

Table 5.2: Regional Distribution of Interviews Conducted with Mining Firms

	Frequency	Percent
Western Region	8	38.1
Ashanti Region	2	14.3
Greater Accra Region	2	19.0
Brong Ahafo Region	2	14.3
Eastern Region	2	9.5
Central Region	1	4.8
Total	**17**	**100.0**

Source: Field Data (2017)

Apart from the interviews conducted with the mining firms, the researcher also conducted interviews with officers of the following institutions: Minerals Commission, EPA, the Ghana Chamber of Mines and the Earth Science Department of the University of Ghana. The purpose of these interviews was to fully appreciate the nature, extent and constituents of mining operations in Ghana. And also, to validate some publicly available official documents gathered from the various web pages of the respective institutions.

As depicted in Table 5.2, the field work for the present study was undertaken in the various mining communities across Ghana; specifically, Eastern, Ashanti, Central and Western regions. Participants were identified from a list of registered mining firms obtained from the MinCom, and purposively sampled to identify relevant players. The mining firms comprised in this research work, are recognised in the Ghanaian mining sector, ranging from exploration companies to those with mining leases, both small-scale and large-scale firms. Also included are locally owned and foreign owned mining firms. The interviewees were similarly selected from these mining regions after a stakeholder mapping that

identified and selected the following key stakeholder groups: regulatory bodies (i.e. Minerals Commission, EPA), mining concession holders, environmental managers, community partners, environmental consultants, and mining association (i.e. Ghana Chamber of Mines). The categories of persons interviewed and their respective codes have been presented in Table 5.3.

Table 5.3: Category of Interviewees and Key Informants

Category interviewed	Number interviewed	Code
Minerals Commission	4	MinCom
Environmental Protection Agency	1	EPA
Mining concession holders	4	MCH
Environmental managers	17	EMs
Community partners	2	CP
Environmental consultants	3	EC
Mining association	1	MA
Total	**32**	

Source: Field Data (2017)

First, meetings were arranged by telephone and face-to-face to discuss and inform potential participants about the scope of the project and the interview. All participants were assured of anonymity. This was done to ensure honest and direct answers based on experiences and perceptions. Interviewees provided their written consent prior to a tape-recording of interviews.

During the interview, participants were asked questions such as: What are the motivations for EA in the mining industry? How do the mining firms demonstrate their EA? What kinds of impact result from the mining industry? What relevant aspects of EA are being addressed in the mining industry or what are those not being addressed? How often does the firm dialogue with the communities? How do mining companies act in a manner that is socially responsible? These questions guided the main objective of this study and

provided further discussion in a flexible and natural conversation that allowed the researcher to introduce more questions when unforeseen and interesting areas emerged.

The researcher conducted almost all the interviews via face-to-face, with the exception of two interviews which were conducted via telephone. In addition, the researcher had seven interactions with duty bearers of regulatory bodies and mining association. The potential for misinterpretation of the interviewees' responses was minimised by association with the interviewees in terms of cultural practices and by recording the interviews and transcribing them with the help of professional transcribers to eliminate bias. To ensure reliability, the researcher underwent a thorough process of reflexivity where some of the possible threats including reactivity, respondent biases, and researcher biases were dealt with.

The chapter adopted an inductively-based analytical approach to analyse the qualitative data (Saunders et al., 2007). The data was analysed through a purely manual and qualitative manner, where concepts or themes within the gathered data were identified. This technique allowed working with coded information to identify common themes and insights (Miles & Huberman, 1984; Yin, 1994) as well as relationships between concepts amongst different stakeholder groups. Later, in order to assure analytic closure (Miles and Huberman, 1994), coded material was reviewed and complemented with notes taken during the interview process. The processes required in-depth analysis of interview data and involved a process of interpretation and creativity by the researcher to make the data more meaningful.

5.4 Results and Discussion

This section presents and discusses the findings of this study in four aspects. The first relates to the nature and classification of identifiable stakeholders in the mining industry. The second focuses on analysis of EA in Ghana's mining industry. The third deals with stakeholder engagement practices in Ghana mining industry. The fourth aspect provides a summary on the stakeholder perspectives on EA with respect to motivation for EA, effectiveness of EA, firm performance assessment and stakeholder engagements. The paper concludes by providing the drivers (the "why" of EA), outputs (the "how" of EA) and outcomes (the "benefits") of EA in the mining industry.

5.4.1 Stakeholders in the mining industry

In the mining industry, a number of stakeholder groups have been identified. Table 5.4 presents the various stakeholders in Ghana's mining industry and their classification. The classification was based on responses from the interview respondents, themes from the literature and empirical material. Regulatory stakeholders comprise regulatory bodies (such as Minerals Commission and EPA) as well as other government agencies. Operational stakeholders refer to mining concession holders (MCH), predominantly made up of mining firms, and contract miners. Community stakeholders are generally community partners – host communities and their leaders. Internal stakeholders consist of investors, management, mine workers and suppliers. Interactional stakeholders are those who MCHs interact regularly with and who do not belong to any of the earlier classification. They include mining association, media and the public, affiliate and associate institutions, and external or global bodies.

Table 5.4: Classification of Stakeholders in Ghana's Mining Industry

Stakeholder Category	Stakeholder Group	Stakeholders Involved
Regulatory Stakeholders	*Primary Regulators*	• Minerals Commission • Environmental Protection Agency (EPA) • Forestry Commission
	Secondary Regulators	• Water Resources Commission • Lands Commission • Ghana Revenue Authority
	Government agencies	• Ministry of Lands and Natural Resources • Ministry of Environment, Science, Technology and Innovation • Ministry of Finance • Metropolitan, Municipal and District Assemblies • Arms of Government • Office of the Administrator of Stool Lands
Operational Stakeholders	*Mining Firms*	• Commercial production firms • Non-commercial production firms • Pre-production firms • Exploration/prospecting firms • Contract mining firms
Community Stakeholders	*Community partners*	• Host communities • Chiefs • Community Interest Groups • Opinion leaders
Internal Stakeholders	*Investors*	• Shareholders • Foreign Direct Investors • Private Investors
	Management	• Directors and Top management
	Mine workers	• Permanent and Contract employees of mining firms
	Suppliers	• Service providers
Interactional Stakeholders	*Mining association*	• Ghana Chamber of Mines; Ghana Chamber of Commerce • Association of Ghana Industries
	Media and the public	• Ghana Extractive Industries Transparency Initiative • Media organisations and public interest groups • Non-Governmental Organisations (NGOs) • Civil society organisations (i.e. ISODEC)
	Affiliate and associate institutions	• Ghana Atomic Energy Commission • Geological Survey • University of Mines & Technology, Tarkwa • Other mining and minerals related service providers
	External or Global Bodies	• United Nations • Extractive Industries Transparency Initiative (EITI) • Global Environmental Management Initiative

Source: Researcher's construct based on documentary analysis and interview data (2018)

5.4.2 Environmental accountability in the mining industry

Environmental accountability (EA) of mining firms as defined in this work refers to a set of strategies, policies and actions adopted by mining firms, and properly reporting these to the key stakeholders. It has become very difficult for most firms to operate smoothly in the absence of EA (Idowu, 2009; Roome and Nigel, 2005; Larsen, 2010). As a result, this chapter sought views from stakeholders, as to the activities that mining firms engage in to show their commitment to EA. Before addressing the issue of EA, respondents were asked about their general opinion on the importance of mining activities in the mining areas. Many believe that the existence of the mines in their communities has given them a lot of benefits. Some asserted that:

> *"It is good because it has offered a lot of employment to the youth in the area. Without such employment, life could have been very unbearable" - CP1.*

> *"In one way they are being helpful, they are putting lots of projects, examples schools, clinics, community centres, etc. On the other hand, they are acquiring all our land which are meant for farming. But overall, the benefits will be positive" - CP2.*

> *"I will say in general when mining companies are located in an area it gives employment to the inhabitants of the community. The only problem I will say is that it comes with environmental problems which will be difficult to deal with. For example, when the land and water bodies are destroyed it will be very difficult if not impossible to reclaim it" - CP1.*

> *"In my view the mining companies do help us very much. In our community, we can boast of the community centre which is yet to be completed. They have also provided drinking water to us as well as granting of some scholarships to our kids. I will say that the mining companies help the community to some extent but not as we want" - CP2.*

> *"Mining sustains a lot of us. If I'm not lying about 70% have been employed through mining. Even if you are not directly employed by the mother company one can be employed by the sub-contractors. Families are able to pay their children school fees and cater for them" - CP1.*

In terms of mining companies engaging in responsible and sustainable mining activities to demonstrate their environmental accountability, some respondents observed that:

> *"Mining in this area were supposed to be done underground. Later, there were many discussions of the introduction of surface mining. Surface mining will bring a lot of damage to the land but the government finally agreed. What we have been hearing is the blasting and the rest, and this is very bad and most of us have a great deal of worries" - CP1.*

> *"Yes. I will say it's important to this area because the gold is here and we thank God. The only problem is that it should be done in a responsible way so that we can benefit" - CP2.*

In spite of the benefits of mining activities to host communities, some respondents also believe that mining have come with a heavy price to pay in terms of the degradation of the river bodies and farmland. One of the topmost environmental problems that the respondents were very much concerned about is the impact of spill overs and disposal of large volume wastes. Most respondents referred to tailings material as the greatest stream of waste from mining operations.

The EPA have impressed upon mining companies to maintain good environmental practices. This was visibly clear to see from the mining sites of most companies visited due to the protocols in place to ensure that waste is dealt with effectively and responsibly. For example, the management of AGAL admitted that in September 2007, the EPA temporarily closed AGAOM's two metallurgical plants, the tailings storage facilities

(TSFs) and all ancillary facilities (for 12 days) due to a discharge of untreated process water into the environment. Some of the mining companies have been signatories to the International Cyanide Management Code to emphasise their commitment towards the management of mining waste.

Another environmental concern which was of great importance to the respondents is the issue of noise and vibration caused by mining operations. Many respondents of mining communities are very much concerned about noise pollution. They however pointed out that before "blasting" is done, adequate notice is given to community members. Regarding complaints from community members about cracks in their building because of "blasting" activities, it was noted that not all cracks in buildings were caused by mining activities. Other concerns expressed regarding the environment include "habitat destruction and reduction of biodiversity". Respondents were however less concerned about acid mine drainage, environmental impact of products during and after use, and reinstatement of sites after mine closure.

In the literature, it is asserted that poor economic performance breeds poor EA (Rokhmawati, Sathye, & Sathye, 2015; Muhammad, Scrimgeour, Reddy, & Abidin, 2015). Engaging in EA is considered a cost inflator rather than achieving immense benefits. Some believe that a relief from EA will improve economic performance. One mining consultant agreed with this position with a remark that:

> *"Mining firms are not motivated to be environmentally friendly because of their economic performance. These firms are very much concerned about minimising cost and would usually view environmental responsibilities as cost inflators. Their thinking is that they will improve their economic position better when relieved of these environmental responsibilities" - EC2.*

Some stakeholders are also of the view that demands from host communities are sometimes unrealistic in nature. This is as a result of communities' misunderstanding of how the mining sector, and for that matter, mining firms operate. This is evident in the response from a mining concession holder (MCH) who is even yet to begin commercial production.

> *"Per the government laws, you can do social responsibility after you have made profits. But it is the company that decides to do the short-term projects for the community, to ensure that the coexistence between the two parties is cordial… most of the communities we have provided for we have not even started mining there… But with such a step, the community may demand more than necessary, an attitude that can bring agitation between the two parties and collapse the company"- MCH3.*

5.4.3 Stakeholder engagement practices

Findings from this study has revealed that, as a way of improving their relationships with mining communities, mining companies have established Community Consultative Community Meetings (CCCM). The CCCM meet formally and regularly, usually monthly, and informally, whenever necessary. This consultative committee is made up of the chief, a youth leader, a religious leader, a women's representative, a CBO representative and a leader from the farmers in the village.

Apart from the CCCM, some mining companies have their own unique working committees for various purposes. At AGAIM, for instance, there is the Community Liaison Group (CLG), which comprises two selected executives from the CCCM, a representative for the NGOs and a representative from the mine's Health, Safety and Environment (HSE) Department. They meet on a quarterly basis. According to the HSE manager of AGAIM,

"*in addition, there is the Monitoring Advisory Group (MAG), which has an independent chairperson, composed of representatives from two NGOs, a representative of the Tarkwa Nsueam Municipal Assembly (TNMA), two representatives from the host communities, the Managing Director of AGAIM and a representative of the EPA. The MAG meets twice a year and can be convened in the event of an emergency" - EM12.*

The views of regulatory stakeholders on stakeholder engagement in the mining industry are that:

"Mining companies should be made to implement effective and transparent engagement with their stakeholders at all times. There should be a system in place to independently verify reporting arrangements with mining stakeholders" – MinCom 1.

"I think the mining companies should put in place community consultation prior to each stage of operations, be prepared to modify project plans and practices according to the consultations. They should also develop and maintain appropriate community consultation through all stages of exploration, extraction, waste disposal and mine closure" - EPA.

"Mining companies should make sure that appropriate systems are in place for the promotion of interaction with affected stakeholders. They have to make sure that all the minorities as well as the marginalised groups have equitable and culturally appropriate means of engagement" – MinCom 2.

"As required by law, in their EIA, mining companies provide technical information about potential effects of their activities from time to time. Management of waste, rehabilitation procedures, and socio-economic and environmental impacts of mining activities should all be clearly communicated to their host communities. They can't take them for granted" - EPA.

5.4.4 Stakeholders' perspectives on environmental accountability

The findings of this study has revealed that a major motivating factor for EA in the mining industry is the fact that EA forms part of the regulatory requirement for acquiring an operating permit as well as a social license. Interviewees were confident that the motivation for mining firms to engage in EA is not based on a single factor but a multiplicity of factors. From the interviews, a number of factors surfaced. On one hand, most mining firms attributed their commitment towards EA to being a core value, drawn from *responsible mining*. Most of the mining firms claimed that care for the environment in which they operate forms a focal point in their core values and therefore, drive their actions towards EA.

Other stakeholders on the other hand, again, commending mining firms for their efforts towards EA, did not believe that if left on their own, these same mining firms would care so much about the environment. They argued that the presence of regulatory requirements and their associated penalties, have been the main drive behind mining firms' commitment towards EA. Some further pointed out that, *"the mining firms are in business simply to maximise profit, and they would do whatever it takes to achieve that", EC1.* Therefore, *"even when it seems they are caring so much for the environment, they simply do so not out of empathy, but, in the long run, they seek to advance their profit position" - EC2.*

Pressure from mining communities also surfaced as one of the major factors that spur mining firms on towards EA. Majority of the stakeholders, other than the mining firms themselves, attributed the mining firms' efforts toward EA to regulation. So, in effect, the key drivers of EA are regulatory requirements, core values, and pressure from communities.

Table 5.5 provides a summary of the stakeholders' perspectives on EA with respect to motivation for EA, effectiveness of EA, firm performance assessment and stakeholder engagements. The interview data from which these perspectives were crafted have been attached in Appendix K.

Table 5.5: Summary of Stakeholders' Perspectives

Stakeholder Group	Stakeholders' Perspectives			
	Motivation for Environmental Accountability	**Effectiveness of Environmental Accountability**	**Firm Performance Assessment**	**Stakeholder Engagements**
Regulatory bodies (i.e. Minerals Commission, EPA)	• Pollution control • Regulatory enforcement • Emission reduction • Tailings management • Operating license • Benefits that outweigh costs	• Achievement of environmental targets • Reduction of incidents • Environmental safety of mining communities • Regulatory compliance • Submission of EA reports • Application of current environmental reporting standards	• Prompt regulatory payments • Regular permit and license renewal • Submission of returns • Contribution to safe human living	• Representative nature of stakeholder meetings • Stakeholder consultations • Stakeholder access to EA reports
Mining Firms (i.e. Mining concession holders, mining firms' environmental managers)	• Core values • Financial performance • Regulatory requirement • Environmental safety • Corporate environmental strategy and policy • Firm reputation • Benefits that outweigh costs	• Achievement of environmental targets • Reduced environmental damage costs • Environmental audit of suppliers • Improved tailings management • Eased accessibility to funds and investors • Improved staff orientation on EMS procedures • Dissemination of EA reports • Application of current environmental reporting standards	• Energy conservation • Cost reduction • Improved productivity • Benefits that outweigh costs • Improved profitability	• Stakeholder-firm consensus building • Continuous stakeholder engagements • Stakeholder consultations • Effective communication mechanisms • Documentation of stakeholder meetings • Success of jointly decided projects

Community Partners	• Environmental complaints • Environmental damage • Environmental safety • Social license • Firm reputation	• Compensation for farmers or land owners • Reduction in environmental damages • Provision of social amenities • Employment opportunities	• Less environmental risks posed • Improved livelihood of indigenes • Fair compensation packages	• Stakeholder consultations • Stakeholder access to EA reports
Environmental consultants (i.e. Mining experts)	• Community risk reduction • Regulatory requirement • Social requirement • Benefits that outweigh costs	• Regulatory compliance • Application of current environmental reporting standards	• Prompt response to abnormal operating conditions • Reduction in operating costs • Meeting regulatory requirements • Meeting community needs	• Stakeholder consultations • Success of jointly decided projects • Stakeholder access to EA reports
Mining Associations	• Industry practice • Industry sensitivity	• Regulatory compliance • Application of current environmental reporting standards • Focus on green initiatives	• Compliance to industry conditions • Improved contribution to industry development • Improved access to funding • Adaptability to changing environmental conditions	• Stakeholder consultations • Stakeholder access to EA reports

Source: Researcher's construct based on documentary analysis and interview responses (2018)

Table 5.5 confirms that in the mining communities, some efforts have been made towards engaging in EA. The researcher however probed further to find out how effectively mining firms are carrying out their EA. It was evident that some gaps or lapses exist between mining firms' EA and the expectations of mining communities. From the perspectives of the regulatory bodies, it appeared there were no lapses, and that all regulatory requirements are being fulfilled by the large-scale commercial production mining firms but not by the artisanal and small-scale miners. This feedback did not come as a surprise. It goes a long way to confirm how the presence of regulations motivate mining firms to be environmentally accountable. It brought to bear how potentially chaotic the mining sector would be if the element of regulation is taken out. As one officer with the MinCom Inspectorate Division puts it, *"the mining industry is the most regulated industry"*.

5.4.5 Drivers, outputs and outcomes of environmental accountability

Based on the interview responses and analysis of environmental accountability (EA) in the mining industry from the perspectives of multiple stakeholder, Table 5.6 describes the drivers (the "why" of EA), the outputs (the "how" of EA) and the outcomes (the "benefits") of EA in the mining industry. The drivers are the motivations for mining firms to engage in EA. They are the reasons 'why' mining firms would want to be environmentally accountable. The outputs refer to what mining firms do to demonstrate that they are environmentally accountable. They are the 'how' of EA. The outcomes are the 'benefits' that accrue once mining firms engage in EA. The outcomes are beneficial to all stakeholders in the mining industry. In the end, it is obvious that engaging in EA creates a 'win-win' situation for all.

Table 5.6: Drivers, Outputs and Outcomes of Environmental Accountability (EA)

Drivers of EA (The "Why" of EA)	Outputs of EA (The "How" of EA)	Outcomes of EA (The Benefits of EA)
• Pollution control • Regulatory enforcement • Emission reduction • Tailings management • Operating license • Benefits that outweigh costs • Core values • Financial performance • Regulatory requirement • Environmental safety • Corporate environmental strategy and policy • Firm reputation • Environmental complaints • Environmental damage • Social license to operate • Community risk reduction • Industry practice • Industry sensitivity	• Achievement of environmental targets • Reduction of incidents • Environmental safety of mining communities • Regulatory compliance • Submission of EA reports • Application of current environmental reporting standards • Environmental audit of suppliers • Staff orientation on EMS procedures • Dissemination of EA reports • Compensation for farmers or land owners • Reduction in environmental damages • Provision of social amenities • Employment opportunities • Focus on green initiatives • Documentation of stakeholder meetings • Stakeholder consultations • Meeting regulatory requirements • Meeting community needs • Adaptability to changing environmental conditions • Stakeholder access to EA reports • Continuous stakeholder engagements	• Prompt regulatory payments • Regular permit and license renewal • Submission of returns • Contribution to safe human living • Energy conservation • Cost reduction • Reduced environmental damage costs • Improved productivity • Improved staff orientation on EMS procedures • Eased accessibility to funds and investors • Improved tailings management • Benefits that outweigh costs • Improved profitability • Less environmental risks posed • Improved livelihood of indigenes • Fair compensation packages • Prompt response to abnormal operating conditions • Reduction in operating costs • Compliance to industry conditions • Improved contribution to industry development • Improved access to funding • Stakeholder-firm consensus building • Effective communication mechanisms • Representative nature of stakeholder meetings • Success of jointly decided projects

Source: Researcher's construct based on documentary analysis and interview responses (2018)

5.5 Conclusion and Recommendations

Responses from the various stakeholder interviewees conducted has confirmed that in order to gain 'operating and social licenses', mining firms do take stakeholder engagement quite seriously.

As part of regulatory requirements, mining firms are supposed to meet with the mining communities alongside their elders at least once before actual work begins. At that same meeting, the concerns of these communities are tabled, and the mining firms let the communities know what they can also do to improve the wellness of these communities. A concern that some stakeholders expressed however, was that some mining firms tend to neglect these very communities after they have gained a hold within. Members of the community accused most mining firms of neglect, and in effect, cause a lot of problems for these firms. Countering this allegation, virtually all the mining firms have also accused community members of being too demanding and not being realistic with their expectations.

Another issue that came up had to do with the fairness in compensating farmers or land owners. In an attempt to create some fairness in compensation, mining firms use LI 2175.

On a whole, there was a convergence in the views of stakeholders that large-scale commercial production mining firms operating in Ghana are making efforts in the quest to achieve environmental sanity as well as improve the livelihood of community members. There however existed a diversity in stakeholder views on the degree to which EA has been properly handled by mining firms. The mining firms believed that they were doing their best for these communities, while, community members expressed a bit of

discontentment. These issues aside, community activities that mining firms undertake as part of their EA include but not limited to building water and waste dams in order to avoid contaminating water bodies, building boreholes, reclaiming the land, planting of trees, building schools, hospitals, providing employment, instituting other internal control measures, community collaborations, among others.

Mining communities should be enlightened on how the mining sector operates. Mining is a capital-intensive sector, and mining firms spend a great deal of resources before they even start actual production. Community partners must be reasonable in their demands since most large-scale mining firms are already doing a lot to demonstrate their EA even though they can do more.

In line with the proposition of Tang-Lee (2016), the study recommends the need for mining companies to strengthen their engagement with indigenes, and not only local elites, and ensure alignment between CSER efforts and the immediate needs of the local communities.

It is recommended that government should adequately resource the regulatory bodies in order to strengthen their monitoring and enforcement activities. Regulatory compliance is a major driver of EA in the mining industry. Punitive measures should be instituted for non-compliance with regulatory requirements to serve as a deterrent. Government's efforts at combating illegal mining activities should be seriously encouraged and supported by all stakeholders, particularly community partners. The study has revealed that the most environmentally unaccountable players in the mining industry are the illegal miners.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary, conclusions and recommendations for the entire study. The chapter begins with the summary of the entire work, followed by the conclusions and then recommendations. The limitations of the study and contributions of the study have also been highlighted. Some suggestions for further research has also been outlined.

6.2 Summary

Environmental accountability (EA) in the mining sector, similar to other sectors, entails a firm's voluntary actions to either reduce its negative impacts or to improve the living conditions of the local communities where it operates. The essence, for firms to report on their social and environmental activities, practices and impacts is a demonstration of their environmental accountability to their stakeholders. Within this arena, the questions we are bothered with are: Is there a commercial imperative for mining firms to engage in environmental accountability (EA)? How can we validate the alignment of their responsibility to report on their environmental actions with their responsibility for their environmental actions? Does the environmental accountability practices (EAP) of mining firms translate into their performance? Or rather, is their EAP driven by the level of their firm performance (FP)? What is the role of environmental performance (EP) in these considerations? Is EP part of the EAP composition or it is an outcome that mining firms seek to achieve or it is both a component and an outcome?

To answer these questions, this study investigated the environmental accountability practices of mining firms in Ghana. Specifically, the study: (1) investigated the effect of EAP on performance of mining firms; (2) assessed the moderating-mediating effect of EP on the EAP–FP relationship; (3) examined the environmental reporting practices of dominant mining firms in Ghana; and (4) analysed the state of environmental accountability in the mining industry from the perspectives of stakeholders.

The first and second objectives were approached quantitatively while the third and fourth were dealt with qualitatively. Results from each of these research objectives were presented as empirical chapters.

The first chapter of this research report offered a general introduction to the study dealing with the background to the study, statement of the problem, research objectives, summary of hypotheses, significance of the study, and scope of the study.

The second chapter which is the first quantitatively researched empirical chapter investigated the effect of EAP on performance of mining firms in Ghana. The purpose was to determine the extent to which the EAP of mining companies significantly and positively affect their environmental performance (EP) and firm performance (FP). A cross-sectional survey was used to gather primary data from 61 predominantly large-scale mining companies operating in Ghana. Principal component analysis (PCA) was used to generate composite scores in measuring the three key variables – EAP, EP and FP. The study employed OLS estimation to test the hypothesised relationships between (1) EAP and FP; (2) EAP and EP; and (3) EP and FP. The results of the study revealed a positive and significant relationship between EAP and FP, as well as between EAP and EP. However,

only environmental management systems (EMS) showed a positive and significant relationship with EP.

Chapter 'three' presented the second empirical paper that assessed the moderating-mediating effect of environmental performance on the relationship between EAP and FP. Based on the results from the first empirical paper that there is a positive and significant effect of EAP on the performance of mining firms, this chapter isolated environmental performance (EP) from the EAP–FP nexus. The intent was to examine the extent to which EAP can predict firm performance, in the presence or absence of EP. Using the same data set of 61 predominantly large-scale mining firms, the study employed structural equation methodology based on partial least squares path modelling technique to assess the moderating and mediating effects of EP on the EAP–FP relationship.

The results revealed that EP is a more significant predictor of EAP of mining firms in Ghana. In the presence of EP, EAP is also able to drive FP. However, EP was not found to be a significant moderator of the EAP–FP relationship. With the use of a different quantitative analysis technique, chapter 'three' of this study deepened the reliability of the reflective and formative measurement items used in measuring EAP, EP and FP.

The third empirical paper was presented in chapter 'four'. The chapter examined the environmental reporting practices of dominant gold mining firms using publicly available official documents gleaned from the annual reports and secondary data obtained from the Minerals Commission. Based on documentary analysis of the reports and interview data, it developed a multi-case report based on the key questions and other themes that emerged from the literature and the empirical material. The findings revealed that non-financial

reporting and environmental accountability are now critical strategies that mining firms are seriously tackling proactively. The thematic issues covered in this chapter centred on: report content and quality; metrics and standards for environmental reporting; CSER reporting strategy; embedded or standalone reports; stakeholder engagements processes and reporting; and utilisation of environmental management systems in environmental reporting.

Chapter five covered the last empirical paper which also employed a qualitative mode of enquiry to analyse the perspectives of stakeholders in relation to environmental accountability in the mining industry. The purpose was to analyse the perspectives of regulatory bodies, mining companies, environmental managers, community partners, environmental consultants, and mining association. The chapter adopted a purely qualitative approach to research in terms of research method, data collection and data analysis. Based on responses from the interview respondents, themes from the literature and empirical material, the stakeholders' perspectives were analysed with respect to: (1) motivations for EA; (2) effectiveness of EA; (3) performance assessment; and (4) stakeholder engagements.

In this chapter (chapter 'six'), the researcher presents the summary, conclusion and recommendations for the entire study.

6.3 Conclusion

The researcher set out with the aim of achieving four objectives with respect to environmental accountability practices of mining firms in Ghana. The following are the conclusions from the study, as organised according to the specific objectives of this study.

6.3.1 Effect of EAP on performance of mining firms

The results of this study revealed that EAP drives both FP and EP, based on a significantly positive relationship between EAP and FP, as well as between EAP and EP. The relationship between stakeholder engagement practices and FP was also positive but not significant. Companies that give prominence to stakeholder engagements are rewarded with better firm performance. The relationship between FP and EP between was positive and significant. EMS is a significant driver of EAP which positively impacts on EP which eventually translates into improving FP creating value for the mining firm's stakeholders. The unique contribution of this study is the development of a scale for measuring EAP, EP and FP. The scale was developed based on adopted and adapted validated scales from literature.

6.3.2 Moderating-Mediating Effect of EP on the EAP–FP relationship

This study concludes that EP is a significant predictor of EAP of mining firms in Ghana. In the presence of EP, EAP is also able to drive FP although EP was not found to be a significant moderator of the EAP–FP relationship. To improve the environmental performance of mining firms, EP assessment measures must be strengthened.

6.3.3 Environmental reporting practices of dominant gold mining firms

The metrics used by large-scale mining companies are predominantly driven by Global Reporting Initiative G4 standard disclosure, Sustainable Development Framework, EPA reporting requirement, Dow Jones Sustainability Index and ISO 14001. In terms of whether the environmental reports are embedded or decoupled (standalone), the result is inconclusive. Some companies have both embedded and decoupled reports on

environmental and sustainability issues. Others have embedded their environmental reporting in their annual financial reports while others have published standalone reports.

In addition to the EPA reporting requirements and the global or standardised metrics (such as ISO 14001) for environmental reporting, some mining firms have developed in-house environmental management system (EMS) to capture environmental data for reporting purposes. These include Integrated Management System (IMS) and Corporate Responsibility Management System.

The findings from this objective revealed that non-financial reporting and environmental accountability are now critical strategies that mining firms are seriously tackling proactively. Environmental reporting issues that drive EA are: report content and quality; metrics and standards for environmental reporting; CSER reporting strategy; embedded or standalone reports; stakeholder engagements processes and reporting; and utilisation of environmental management systems in environmental reporting.

Some reporting practices revealed the use of the conventional accounting system in the recognition and measurement of environmental transactions, the nature, content, standard, presentation and disclosure of environmental reports varied across the firms. The recent review years however show evidence of commonality in the reporting practices of the dominant players in the industry. This objective has reinforced the proposition for decoupling environmental reports within the broader sustainability reporting.

6.3.4 State of environmental accountability in the mining industry

First, based on documentary analysis and interview data, the stakeholders identified in this study are classified as regulatory stakeholders, operational stakeholders, community stakeholders, internal stakeholders, and interactional stakeholders.

Regulatory stakeholders comprise regulatory bodies (such as Minerals Commission and EPA) as well as other government agencies. Operational stakeholders refer to mining concession holders (MCH), predominantly made up of mining firms. Operational stakeholders include contract miners. Community stakeholders are generally community partners – host communities and their leaders. Internal stakeholders consist of investors, management, mine workers and suppliers. Interactional stakeholders are those who MCHs interact regularly with and who do not belong to any of the earlier classification. They include mining association, media and the public, affiliate and associate institutions, and external or global bodies.

Stakeholders' perspectives on motivation (or drivers) for engaging in environmental accountability (EA) include: pollution control, regulatory enforcement, tailings management, core values, corporate environmental strategy and policy, firm reputation, social license to operate, industry practice and industry sensitivity. Multi-stakeholders' perspectives on effectiveness (outputs) of EA include: achievement of environmental targets, submission of EA reports, application of current environmental reporting standards, environmental audit of suppliers, staff orientation on EMS procedures, dissemination of EA reports, focus on green initiatives, stakeholder consultations and continuous stakeholder engagements. Stakeholders' perspectives on benefits (outcomes) of engaging in EA include prompt regulatory payments, regular permit and license

renewal, energy conservation, cost reduction, improved productivity, eased accessibility to funds and investors, improved tailings management, improved profitability, stakeholder-firm consensus building, and success of jointly decided projects.

This study has unearthed the drivers (the 'why'), outputs (the 'how') and outcomes (benefits) of EA which was developed based on documentary analysis and interview data. The findings reveal commonality of acceptable and responsible EA practices that can lead to a 'win-win' situation for all stakeholders in the mining industry.

6.4 Theoretical, Empirical and Practical Implications of the Study

Overall, the implications of the study to theory, literature, policy and practice cannot be overemphasised. Theoretically, this study has reinforced legitimisation of environmental behaviour of mining firms as a way of deriving their social licence to operate. To achieve this, mining firms use their environmental management system to drive their environmental accountability. In other words, environmental management system has proven to be more important than environmental accounting system. Mining firms that focus on improving their environmental management system tend to achieve better performance.

Stakeholder engagement in the mining environment is an environmental accountability strategy. Again, companies that give prominence to stakeholder engagements are rewarded with better firm performance. The stakeholders in the mining industry categorised as regulatory, operational, community, internal and interactional stakeholders have differing needs and priority demands.

Further, environmental reporting practices is predominantly driven by international best practices, investor control and legislation. Regulated environmental performance assessment measures improves the performance of mining firms.

Considering the state of environmental accountability (EA) in Ghana's mining landscape, artisanal and small-scale mining firms are the most environmentally unaccountable firms. There is however commonality of acceptable and responsible EA practices among the dominant gold mining firms that can lead to a 'win-win' situation for all stakeholders in the mining industry.

6.5 Recommendations

Based on the above findings and conclusions, the following recommendations have been advanced:

1. Mining firms should improve on their EMS since EMS is a significant driver of EAP which positively impacts on EP which eventually translates into improving firm performance thereby creating value for the firm's stakeholders.
2. The ICAG should consider proposing to the IASB to revise financial reporting framework to incorporate environmental accountability dimensions.
3. Firms in environmentally sensitive industries must give premium to practices that promote environmental accountability even when such practices have the potential of negatively affecting the bottom line significantly. The cost of not being environmentally accountable far outweighs the benefits of engaging in it.
4. Government should adequately resource the regulatory bodies in order to strengthen their monitoring and enforcement activities. Regulatory compliance is a major driver of EA in the mining industry.

5. The effects of activities of small-scale mining firms should be of concern to all stakeholders in the mining industry. It is plausible that since large-scale mining firms are generally environmentally accountable players in the mining industry, the concentration must and should continue to be on dealing with the environmental damage caused by artisanal and small-scale mining firms.
6. The study recommends the need for mining companies to strengthen their engagement with indigenes, and not only local elites, and ensure alignment between CSER efforts and the immediate needs of the local communities.
7. Mining companies should increase their focus on practicing value-added EA in all facets of mining operations. They should also strengthen their engagement with indigenes, and not only local elites, and ensure alignment between CSER efforts and the immediate needs of the local communities.

6.6 Limitations of the Study

One main limitation of the study is the relatively small sample size of 61 predominantly large-scale mining firms purposively and conveniently surveyed for the study. Although the number of licensed mining firms in Ghana exceeds 600, those in active production are little over 100. Many of the mining firms are into exploration. The 61 firms surveyed constitute 81% of total gold output in Ghana, based on 2017 production statistics obtained from the Minerals Commission of Ghana. Another limitation of the study is non-testing of the recursive relationships between EAP, EP and FP. But the researcher's limitation in rigorous quantitative techniques, the recursive relationships could have been tested using dynamic models. The primary data used for this study also limited the use of such dynamic models. At some point the researcher intended to combine primary data gathered with secondary data sourced from the regulatory bodies. This was however not feasible. More

methodological search on this approach may be required. The empirical chapters of the study suffer from common method bias. This was to some extent reduced through data validation from the regulatory bodies.

6.7 Contributions of the Study

1. To the best of the researcher's knowledge, this is the first study that comprehensively investigates environmental accountability practices in Ghana's mining sector using a mixed research approach.
2. The study contributes to literature by considering the holistic environmental accountability and its relationship with firm performance. The study places environmental accountability (EA) as the central theme rather than solely environmental performance.
3. The study provides a scale for measuring EAP, EP and FP of mining firms. The composition and detailed nature of the scale which is an adaption of existing validated scales provides a strong footing for research in other environmentally sensitive industries.
4. Based on analysis of identifiable stakeholders in the mining sector and their respective interests, the study provides a stakeholder classification grid that serves to delineate stakeholder interest prioritisation.
5. The study offers directions to environmental managers of mining firms about the key drivers (the 'why'), outputs (the 'how') and outcomes (benefits) of EA. This was developed based on documentary analysis and interview data.

6.8 Suggestions for Future Study

Critics of this study may argue that it is rather environmental performance (EP) that causes environmental accountability practices (EAP) and not the other way round. Similar argument may be advanced for firm performance and EAP. Again, EP and FP may rather cause EAP. In this regard, further studies may use dynamic models to examine the reverse causality issues. A comparative study of environmental accountability practices in Ghana and South Africa can also be undertaken.

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APPENDIX A: Scale development to measure EAP, EP and FP

Scale development to measure EAP, EP and FP

Latent Construct	Measurement Indicators	Manifest Variables/Subscales
Environmental Accountability Practices (EAP)	***Formative Indicators:***	
	Environmental Management Systems (EMS)	• EMS Standardisation & Utilisation • Use of Green & Sustainable Initiatives • EMS Orientation & Dissemination • EMS Effectiveness • Benefits of EAP
	Environmental Accounting Systems (EAS)	• EAS Policy & Implementation • EAS Reporting, Auditing & Dissemination • Motives for Environmental Accountability Mechanism
	Stakeholder Engagement Practices (SEP)	• Stakeholder Representation & Decision Making • Consensus Building, Communication & Trust • Stakeholder Engagements Effectiveness
Environmental Performance (EP)	***Formative Indicators:***	
	Management Performance Indicators (MPI)	• Environmental Target Setting & Budgeting • Environmental Strategy & Implementation • Environmental Complaints & Damage
	Operational Performance Indicators (OPI)	• Energy Usage & Conservation • Renewable Energy Sources • Production Pollution & Operational Risks • Production Process Waste Recycling
	Environmental Condition Indicators (ECI)	• Community Risk Reduction Measures • Response to Abnormal Operating Conditions • Environmental Safety of Surrounding Communities
Firm Performance (FP)	***Reflective Indicators:***	
	Production Outputs (PO)	Production Outputs & Quality
	Efficiency Level (EL)	Energy Efficiency, Water Usage & Waste Management
	Profitability Level (PL)	Profitability & Sales
	Labour Productivity (LP)	Labour Productivity & Retention
	Customer Satisfaction (CS)	Customer Satisfaction, Market Share & Reputation
	Regulatory Compliance (RC)	Payments of Taxes, Royalties, Fees & Dividends

Source: Researcher's construct based on adoption and adaptation of existing validated scales available in literature.

APPENDIX B: Total gold and other minerals production (2005 – 2017)

S/N	Mining Company	Total	%
1	Goldfields Ghana Ltd (Tarkwa)	8,332,659.31	19.15%
2	Newmont Ghana Gold Ltd	4,951,900.16	11.38%
3	AngloGold Ashanti(Obuasi) Ltd	3,367,360.16	7.74%
4	Other Exports through PMMC	3,253,441.40	7.48%
5	Abosso Goldfields Ltd	2,405,828.00	5.53%
6	Chirano Gold Mines Ltd.	2,359,598.04	5.42%
7	AngloGold Ashanti (Iduapriem) Ltd	2,318,043.35	5.33%
8	A. A. Minerals Limited	2,178,609.15	5.01%
9	Newmont Golden Ridge Ltd	1,922,772.31	4.42%
10	Guldrest Resources Company Ltd	1,767,653.79	4.06%
11	Golden Star Res. Bogoso/ Prestea	1,723,542.80	3.96%
12	Golden Star Res. Wassa	1,665,317.00	3.83%
13	Perseus Mining Company	1,102,951.00	2.53%
14	Adamus Resources Limited	689,710.76	1.58%
15	Xtra Gold Mining Co. Ltd	667,494.89	1.53%
16	AsanSka Jewellery Limited	526,754.03	1.21%
17	RD Ackahs and Partners	451,986.54	1.04%
18	BGC International DMCC Gh Ltd	392,429.58	0.90%
19	PMMC	371,154.14	0.85%
20	Asanko Gold	334,302.11	0.77%
21	Small-Scale (MIRAMEX+PMMC)	323,680.84	0.74%
22	Smagow Resources Limited	320,621.31	0.74%
23	Primestar Holdings(Gh) Ltd	279,031.38	0.64%
24	ASAP VASA Co. Ltd.	233,419.22	0.54%
25	Miramex	227,139.84	0.52%
26	Solid Express Ghana Ltd.	212,875.25	0.49%
27	K. K Enterprise Limited	211,142.03	0.49%
28	Teberebie Goldfields Ltd.	201,701.00	0.46%
29	Bhagya Laxmi Impex	187,012.22	0.43%
30	Italtec Ghana Limited	172,646.76	0.40%
31	Bogoso Gold Ltd.	136,668.48	0.31%
32	Ashanti (Bibiani) Ltd	114,979.44	0.26%
33	Sika Coco Ltd	105,922.50	0.24%
34	Finegold Impex Ltd	97,726.79	0.22%
35	Wexford Goldfields Ltd	85,623.43	0.20%
36	Chyuan Chya Gh. Investment Ltd	82,548.94	0.19%
37	Med Mining Company	80,391.60	0.18%
38	Prestea Sankofa Gold	52,907.79	0.12%

39	Central African Gold (Bibiani) Ltd / Noble Gold	45,037.74	0.10%
40	Sahara Royal Gold Refinery Ltd	17,630.19	0.04%
41	Gold Recovery Ghana Ltd.	14,899.35	0.03%
42	Owere Mines Limited	13,186.02	0.03%
43	Atasay Gold Comp.	8,250.87	0.02%
44	Deepsin Impex Limited	4,896.14	0.01%
45	Precious Metal Refinery	4,818.48	0.01%
46	Ringmead Company Ltd	2,950.55	0.01%
47	Menzbanc Ghana Company Ltd	2,900.77	0.01%
48	Shaanxi Mining Ghana Limited	2,320.11	0.01%
49	Adfat Company Limited	578.71	0.00%
50	Bar Purity Ghana Limited	412.74	0.00%
51	888 Investment Ghana Ltd	-	0.00%
52	Napari Company Limited	-	0.00%
53	Indo Ghana Natural Resources	-	0.00%
	Total Gold (Ounce)	**43,522,124.60**	**100%**
53	**Ghana Bauxite Company (Mt)**	**10,469,982.10**	**100%**
54	Ghana Consolidated Diamonds Ltd	4,501.65	0.08%
55	Licensed Diamond Winners	5,458,880.74	99.87%
56	Great Consolidated Diamonds Gh Ltd	2,358.63	0.04%
	Total Diamond (Ct)	**5,465,741.02**	**100%**
57	**Ghana Manganese Company Limited (Mt)**	**20,820,789.00**	**100%**

Source: Minerals Commission (2018)

APPENDIX C: Three-year minerals production statistics (2015 – 2017)

MINERALS PRODUCTION STATISTICS OF MINING COMPANIES (2015 - 2017)				
S/N	**Company**	**Annual Total**	**Annual Total**	**Annual Total**
		2015	**2016**	**2017**
	Major LSM Companies (A)			
	Newmont Group			
1	Newmont Ghana Gold Ltd	331,506.73	348,860.47	286,934.21
2	Newmont Golden Ridge Ltd	472,632.00	470,312.00	378,963.00
	Total (Newmont Group)	**804,138.73**	**819,172.47**	**665,897.21**
	Gold Fields Group			
3	Gold Fields Gh Ltd (Tarkwa)	586,050.10	568,037.05	426,612.40
4	Gold Fields Gh Ltd (Damang)	167,579.00	147,722.00	120,301.00
	Total (Gold Fields Group)	**753,629.10**	**715,759.05**	**546,913.40**
	AngloGold Ashanti (AGA) Group			
5	Anglogold Ashanti (Obuasi)	51,460.00	2,137.07	1,595.96
6	Anglogold Ashanti (Iduapriem)	190,808.77	204,997.23	183,290.37
	Total (AGA Group)	**242,268.77**	**207,134.30**	**184,886.33**
	Golden Star Group			
7	Golden Star Res. (Bogoso/Prestea)	119,065.85	90,885.78	111,656.23
8	Golden Star Res. (Wassa)	108,266.00	104,382.00	107,867.00
	Total (Golden Star Group)	**227,331.85**	**195,267.78**	**219,523.23**
	Total of Major LSM Companies (A) (Oz)	**2,027,368.45**	**1,937,333.60**	**1,617,220.16**
	Other LSM Companies (B)			
9	Chirano Gold Mines Ltd	262,796.00	211,440.00	201,430.00
10	Adamus Resources Limited	110,302.00	87,378.00	90,773.00
11	Perseus Mining (Ghana) Ltd	191,531.00	151,045.00	169,489.00
12	Asanko Gold	0	163,485.00	170,817.11
	Total Other LSM Companies (B) (Oz)	**564,629.00**	**613,348.00**	**632,509.11**
	Total All LSM Companies (A + B) (Oz)	**2,591,997.45**	**2,550,681.60**	**2,249,729.27**
13	**Small-Scale Mining Companies (C) (Oz)**	**1,031,178.55**	**1,283,791.73**	**1,015,113.70**
	Total Gold Production (A + B + C) (Oz)	**3,623,176.00**	**3,834,473.33**	**3,264,842.98**
	Diamond (Ct)			
14	Great Consolidated Diamonds Gh Ltd	251.4	111.2	140.5
15	Licensed Diamond Winners	174,188.39	173,751.89	79,223.73
	Total Diamond (Ct)	**174,439.79**	**173,863.09**	**79,364.23**
	Bauxite (Mt)			
16	Ghana Bauxite Company Ltd	**1,014,605.00**	**1,278,561.00**	**1,196,256.00**
	Manganese (Mt)			
17	Ghana Manganese Company Ltd	**1,562,769.00**	**2,034,560.00**	**2,203,720.00**

Source: Author's computation based on statistics from Minerals Commission (2018)

APPENDIX D: Letter of introduction from Department of Accounting

UNIVERSITY OF GHANA
BUSINESS SCHOOL
DEPARTMENT OF ACCOUNTING

UGBS
University of Ghana Business School

Ref. No.: DoA.58/Vol.III

30th May, 2017

Dear Sir/Madam,

LETTER OF INTRODUCTION

This is to introduce to you, **Mr. George Tackie,** a student at the University of Ghana Business School, Legon who is pursuing a PhD in Accounting programme.

Mr. Tackie is required to submit a Thesis as part of the requirements for the award of the PhD and the topic of his research is: **"An Investigation into Environmental Accountability Practices of Mining Firms in Ghana".**

I would appreciate any assistance that can be given to him to enable him collect data/information for the study.

This is purely an academic exercise and any information given would be treated as confidential.

Yours faithfully,

Dr Samuel Nana Yaw Simpson
[Principal Supervisor]

COLLEGE OF HUMANITIES
P. O. Box LG 78, Legon, Accra, Ghana
• Telephone: +233 (0) 342 197 101 • Email: doougbs@ug.edu.gh • Website: www.ug.edu.gh

APPENDIX E: Letter of introduction from The Minerals Commission

MINERALS COMMISSION

12 Switchback Road Residential Area, Cantonments
P. O. Box M 248, Accra-Ghana
Tel: (233-302) 772783/772786/773053/771318 Fax:(233-302)773324
E-mail: mincom@mc.ghanamining.org
Website: www.ghana-mining.org

Our Ref: MC.18/SF.1

22nd January, 2018

Dear Sir/Madam,

TO WHOM IT MAY CONCERN

This is to introduction to you, Mr. George Tackie, a student at the University of Ghana Business School, Legon, who is pursuing a PhD in Accounting programme.

Mr. Tackie is required to submit a Thesis as part the requirements for the award of the PhD and topic of his research is: "An investigation into Environmental Accountability Practices of Mining Firms in Ghana".

We would appreciate any assistance that can be given him to enable him collect data/ information for the study.

This is purely an academic exercise and any information given would be treated as confidential.

Counting on your co-operation in this regard.

Yours faithfully,

(ADDAE ANTWI-BOASIAKO)
CHIEF EXECUTIVE OFFICER

APPENDIX F: Research ethics informed consent form

UNIVERSITY OF GHANA BUSINESS SCHOOL
DEPARTMENT OF ACCOUNTING

Research Ethics Form: Informed Consent Form for Research Participants

A. Introduction
My name is **George Tackie,** a PhD Accounting candidate of the University of Ghana Business School. I humbly seek your knowledge on the environmental accountability practices of mining firms in Ghana by focusing on the initiatives, actions, activities, processes and projects of environmental sensitive entities that impact their environment and how these companies are accountable for such practices whiles meeting the environmental expectations of their stakeholders and constituents. As part of collecting primary data for this study, you have been selected for interview due to your immense knowledge and expertise in this regard.

B. Research Title
An investigation into Environmental Accountability Practices of Mining Firms in Ghana

C. Researcher's obligation to protect the identity of research respondents
The information collected will be used only for academic purposes. If I wilfully use the information for any other purpose without your approval or consent I am solely liable for any legal redress.

D. Research Participants Consent (Tick N/A where it is Not Applicable)
Subject to confidentiality agreements (specified below), please indicate below how you wish to participate in the research (*please circle or tick as appropriate*):

i.	Consent to fill questionnaire	(a) Yes	(b) No	(c) N/A
ii.	Consent to grant an interview	(a) Yes	(b) No	(c) N/A
iii.	Consent to record the interview	(a) Yes	(b) No	(c) N/A
iv.	Consent to give documents	(a) Yes	(b) No	(c) N/A

E. Confidentiality Agreements
1. In the course of the interview if you would like to make a comment that should be off the record or be treated as confidential please say so.

2. *Except for comments made under confidentiality agreement,* I shall quote relevant portions of the interview to support my research findings. (a) Yes (b) No

3. *Except for documented information given under confidentiality agreement*, I shall quote relevant portions of documents that you have given me to support my research findings. (a) Yes (b) No

4. You have the right to withdraw from the interview at any time.

F. Custody of Informed Consent Form
For future reference, a research participant shall have custody of the signed informed consent form and the researcher shall also keep a photocopy where possible.

G. Particulars of Research Participant
Name of research participant: **(Optional)**.....

Signature:……Date/Time:……

Name of organisation:……Position:……

H. Researcher's Contact Information and Signature
Name: George Tackie **Signature**:……
Email: gtackie@ucc.edu.gh **Telephone:** 0244378894 / 0208753999

APPENDIX G: Ethical clearance approval letter

UNIVERSITY OF GHANA
ETHICS COMMITTEE FOR THE HUMANITIES (ECH)
P. O. Box LG 74, Legon, Accra, Ghana

My Ref. No.....

4th September, 2017

Mr. George Tackie
Department of Accounting
University of Ghana Business School
University of Ghana
Legon

Dear Mr. Tackie

ECH 003/17-18: AN INVESTIGATION INTO ENVIRONMENTAL ACCOUNTABILITY PRACTICES OF MINING FIRMS IN GHANA

This is to advise you that the above reference study has been presented to the Ethics Committee for the Humanities for a full board review and the following actions taken subject to the conditions and explanation provided below:

Expiry Date:	29/08/18
On Agenda for:	Initial Submission
Date of Submission:	12/06/17
ECH Action:	Approved
Reporting:	Bi-Annually

UG/ISSER/ECH VALID UNTIL 29 AUG 2018 APPROVED DOCUMENT

Please accept my congratulations.

Yours Sincerely,

Rev. Prof. J. O. Y. Mante
ECH Chair

CC: Dr. Mohammed Amidu, Department Accounting, University of Ghana Business School

Tel: +233-303933866
Email: ech@ug.edu.gh | ech@isser.edu.gh

APPENDIX H: Questionnaire

DEPARTMENT OF ACCOUNTING

PHD RESEARCH (FIELD WORK)

QUESTIONNAIRE

AN INVESTIGATION INTO ENVIRONMENTAL ACCOUNTABILITY PRACTICES OF MINING FIRMS IN GHANA

PREPARED BY:

GEORGE TACKIE
PHD ACCOUNTING CANDIDATE [10540057]

SUPERVISORS:

DR. SAMUEL N. Y. SIMPSON
PROF. MOHAMMED AMIDU
DR. CLETUS AGYENIM-BOATENG

AUGUST 2017

Dear Respondent,

Thank you for accepting to participate in this study. Kindly respond appropriately to the questions to the best of your knowledge, ability and expertise.

The main objective of the study is to investigate the environmental accountability practices of mining firms in Ghana. Environmental accountability practices is a multidimensional construct. It represents the extent to which initiatives, actions, activities, processes and projects of environmental sensitive companies, such as mining firms, impact their environment and how these companies are accountable for such practices while meeting the environmental expectations of their stakeholders and constituents.

To this end, the study is aimed at examining the nature and drivers of environmental accountability practices that impact on environmental performance and firm performance of mining firms in Ghana. This study will benefit mining firms, service providers, regulators, community partners, mining associations, mine workers, affiliate and associate institutions in assessing the effect of these practices.

The intended respondents are environmental managers, finance directors, sustainability managers, senior executives and community relations officers of mining firms in Ghana; basically, persons who are responsible for accounting and reporting on environmental and sustainability issues, which includes accounting and finance personnel.

The study is purely an academic exercise to gather field data for a thesis as part of the requirements for the award of a PhD in accounting programme. It does not in any way attempt to invade the privacy of individuals and assess them. The results of the study will be reported only as aggregate statistics, general analysis and interpretation. Please be assured that any information given would be treated as strictly confidential.

This questionnaire will take approximately forty (40) minutes to complete. Please respond by ticking [√] the appropriate box or providing appropriate answers and your comments where necessary. Your prompt response would be very much appreciated. Besides strengthening the contribution to the growing literature on the subject matter, your responses will ensure that the environmental accountability practices in Ghana's mining industry is accurately represented in the final research report. If your outfit is interested in further information about the research and its outcome, please contact the undersigned student researcher. The student researcher will be delighted to provide you with a copy of the final research report. Thank you for your time, effort and expertise in this exercise.

Sincerely,

SGD.

George Tackie
PhD Accounting Candidate, UGBS, 10540057

SECTION A
Measurement of environmental performance (EP) of mining firms

Please indicate the extent to which you disagree or agree with the measurement of the environmental performance of your firm on the following scale by ticking [√] the appropriate box:

1	Strongly disagree	**5**	Somewhat agree
2	Disagree	**6**	Agree
3	Somewhat disagree	**7**	Strongly agree
4	Neither agree nor disagree		

S/N	ENVIRONMENTAL PERFORMANCE STATEMENT	1	2	3	4	5	6	7
	Management Performance Indicators (MPI)							
A1	There is an officer or executive who is tasked with seeing to environmental issues at the mining site							
A2	Management has set targets concerning environmental issues							
A3	Set environmental targets are realistic enough							
A4	Environmental targets are routinely and adequately revised to cater for needed changes							
A5	Environmental costs at the site are budgeted for at the beginning of the reporting period							
A6	The mining site has been able to achieve its environmental targets from the previous period(s)							
A7	The mining site has had a lot of complaints from the public and/or employees with regards to environmental issues							
A8	The firm has had to bear costs of environmental damage often							
A9	The firm engages experts dealing with its environmental issues							
A10	The firm has systems in place to account for its environmental costs							
A11	The firm has established environmental standards for its suppliers/contract mining firms							
A12	The firm invests in environmental research and development at the site level							
A13	The firm's environmental issues have been integrated with its long-term business strategy and corporate mission/vision							
A14	Periodically, the firm conducts audit of its suppliers on environmental dimensions							
A15	The firm has corporate policies and procedures on environmental issues							
A16	At the site level, the firm evaluates compliance with environmental policies							

	Operational Performance Indicators (OPI)							
A17	The mining site consumes a great amount of energy in its production							
A18	The mining site uses multiple sources of energy							
A19	The mining site is conscious about conserving energy during production							
A20	Renewable sources of energy are usually used in production							
A21	Pollutants are usually emitted during production							
A22	The mining site's operations pose a considerable amount of risks to or endangers the environment							
A23	The mining site recycles it production process waste							
A24	The mining site has instituted measures in place to reduce fuel consumption for logistics activities							
	Environmental Condition Indicators (ECI)							
A25	The firm has made attempts to pose less risks to surrounding communities at the mining site							
A26	The firm is able to respond promptly to abnormal operating conditions							
A27	Communities around the firm's operation sites are environmentally safe despite the firm's operations							

SECTION B
Assessment of firm performance

Please indicate your assessment of the level of satisfaction of your mining firm's performance based on the following scale by ticking [√] the appropriate box:

1 Strongly Dissatisfied
2 Dissatisfied
3 Somewhat Dissatisfied
4 Neither satisfied nor dissatisfied
5 Somewhat Satisfied
6 Satisfied
7 Strongly Satisfied

S/N	**FIRM PERFORMANCE INDICATORS**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
B1	Increase in production outputs							
B2	Quality of production outputs							
B3	Energy efficiency							
B4	Water usage							
B5	Solid waste management							
B6	Level of profitability							
B7	Increase in sales							
B8	Profit margin							
B9	Labour productivity							
B10	Market share for the firm's production outputs							
B11	Level of customer satisfaction and loyalty							
B12	Satisfaction and retention of best employees							
B13	Market positioning, imaging, and reputation							

	Regular and prompt payments of:							
B14	Corporate taxes							
B15	Dividends							
B16	Mineral royalties							
B17	Ground rent							
B18	Property rate							
B19	Environmental permitting fees							
B20	Annual mineral rights fees							
B21	Other regulatory payments (e.g. processing fees, consideration fees)							

SECTION C
Assessment of environmental management systems (EMS) of mining firms

Please indicate the extent to which you disagree or agree with the assessment of the environmental management systems (EMS) in your firm based on the following scale by ticking [√] the appropriate box:

1	Strongly disagree	**5**	Somewhat agree
2	Disagree	**6**	Agree
3	Somewhat disagree	**7**	Strongly agree
4	Neither agree nor disagree		

S/N	**ENVIRONMENTAL MANAGEMENT SYSTEM ASSESSMENT**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
C1	The mining site has a formal environmental management system (EMS)							
C2	The mining site uses available voluntary EMS standard(s) to guide the development of its own environmental management system							
C3	The firm's EMS helps the firm to manage, measure and improve the environmental aspects of its operations							
C4	The mining site takes initiatives to mitigate environmental impacts of its extractive and production process							
C5	The firm's EMS has led to a more efficient compliance with mandatory and voluntary environmental requirements							
C6	The firm's EMS facilitates better cross-functional integration of resources and information to facilitate other environmental practices within the firm							
C7	The firm's mining site operations focus on the use of "green initiatives"							
C8	The firm's EMS is such that emission of harmful gases and wastes are minimized or eliminated							
C9	The firm uses consumables, goods and/or processed goods of low environmental impacts							
C10	The firm takes energy savings into account in order to improve levels of energy consumption							

C11	EMS procedures are widely available and operating staff are knowledgeable of these							
C12	There is a formal department responsible for environmental affairs							
C13	The firm's environmental performance is formally tracked and reported on							
C14	Top management shows support for environmental performance							
C15	Training programmes are organized to educate workers on environmental procedures							
C16	Environmental issues, policies, and procedures are included in training							
C17	Goals have been developed and implemented which report environmental performance							
C18	Environmental position is given prominent visibility in the firm's annual report							
C19	People within the firm consider EMS highly effective							
C20	People outside the firm consider the EMS highly effective							
C21	The firm attaches high value to the introduction of alternative sources of energy							
C22	Environmental performance results are widely distributed							
C23	Causes of environmental problems are focused on							
C24	Environmental achievements are given visibility in the firm's annual reports							
C25	The firm has a positive predisposition to the use, purchase, or production of wastes, in favour of recycling materials							
C26	The firm participates in activities related to the protection and enhancement of its natural environment							
C27	The firm's activities are planned to reduce the environmental impact that it generates							
	The firm's environmental accountability mechanisms have:							
C28	Significantly improved quality							
C29	Significantly improved lead time							
C30	Improved position in market place							
C31	Significantly reduced cost							
C32	Reduced waste within production processes							
C33	Improved chances of selling products in international markets							
C34	Enhanced the firm's reputation							
C35	Benefits that outweigh costs							
C36	Improved on productivity significantly							
C37	Improved on the firm's profitability significantly							
C38	Eased access to funds or made accessing funds less difficult							

SECTION D

Assessment of environmental accounting systems (EAS) of mining firms

Please indicate the extent to which you disagree or agree with the assessment of the environmental accounting systems (EAS) in your firm based on the following scale by ticking [√] the appropriate box:

1	Strongly disagree	**5**	Somewhat agree
2	Disagree	**6**	Agree
3	Somewhat disagree	**7**	Strongly agree
4	Neither agree nor disagree		

S/N	ENVIRONMENTAL ACCOUNTING SYSTEM (EAS) ASSESSMENT	1	2	3	4	5	6	7
D1	The firm has a formal environmental policy that it follows							
D2	The firm's EAS report identifies the person with overall responsibility for environmental issues							
D3	Environmental objectives or targets are clearly stated in financial terms							
D4	EAS makes room for information on actions taken in pursuit of stated objectives							
D5	Key impacts of the business on the environment are reported							
D6	The firm's EAS shows the extent of compliance with regulations and industry guidelines							
D7	The firm's environmental reports are separated from its annual reports and accounts							
D8	The firm's environmental reports are verified by a third party (audited)							
D9	The firm's accountant has a positive attitude towards innovation and development of new systems; especially, with regards to environmental accounting systems							
D10	Reports on EAS are frequently disseminated							
D11	All stakeholders have access to EAS reports							
D12	The firm's EAS follows current environmental reporting standards							
	Management is motivated to account and report on the firm's environmental issues because of:							
D13	Core values							
D14	Financial performance							
D15	Stakeholder pressure							
D16	Industry practice							
D17	Industry sensitivity							
D18	Competitiveness							
D19	Regulatory requirements							
D20	Other (please specify)							

SECTION E
Environmental Indicators and Firm Performance

Please indicate your assessment of the importance of the following environmental factors in evaluating your firm's performance on the bases of *not important, important and very important*.

S/N	ENVIRONMENTAL FACTOR	Not Important	Important	Very important
E1	Reduction in incidents and accidents			
E2	Continuous improvement			
E3	Customer perception			
E4	Compliance costs			
E5	Litigation costs			
E6	Cleanup liabilities			
E7	Waste disposal costs			
E8	Environmental improvement investments			
E9	Pollution prevention savings			
E10	Energy efficiency savings			
E11	Spills, violations, accidents			
E12	Environmental policy			
E13	Resource consumption			
E14	Environmental auditing program/independent audits			
E15	Third-party environmental certification			
E16	Recyclability of outputs			
E17	Resource recovery/recycling program			
E18	Pollution prevention program			
E19	Waste reduction			
E20	Short-term environmental spending (1–2 years)			
E21	Long-term environmental spending (5–10 years)			
E22	Effect of environmental factors on future revenues and risks			
E23	Reactive environmental compliance			
E24	Proactive environmental improvement investing			

SECTION F
Stakeholder engagement practices (SEP) of mining firms

Please indicate the extent to which you disagree or agree with the stakeholder engagements practices in your firm based on the following scale by ticking [√] the appropriate box:

1	Strongly disagree	**5**	Somewhat agree
2	Disagree	**6**	Agree
3	Somewhat disagree	**7**	Strongly agree
4	Neither agree nor disagree		

S/N	STAKEHOLDER ENGAGEMENT PRACTICES	1	2	3	4	5	6	7
F1	The firm's decision making process allows full and active stakeholder representation							
F2	The decision making process is accepted as legitimate by stakeholders							
F3	The firm and other stakeholders understand each other's concerns							
F4	The public has trust and confidence in the firm and its facility							
F5	Key decisions are improved by public participation							
F6	Key decisions are accepted as legitimate by stakeholders							
F7	The firm has been more successful in accomplishing goals and avoiding costly mistakes, in time, money, and social capital as a result of effective stakeholder engagements							
F8	The firm's stakeholder engagement activities are continuous and embedded within the overall project management to track progress in meeting planned goals							
F9	Communication mechanisms are effective enough to monitor stakeholder behaviour and interests							
F10	Management promotes effective stakeholder involvement such that it enhances the ability to design and implement sustainable solutions to environmental issues which are supported by community leaders							
F11	The firm makes efforts to identify and interview key stakeholders, their needs and concerns							
F12	The firm's stakeholder plan adopts methods for continually assessing stakeholder interests and flexibility for changes as needed							
F13	Stakeholder meetings include all types of stakeholders, and allow for an all-inclusive participation							
F14	There is routine gathering of feedback from participants on effectiveness of approach used and satisfaction with identified solutions							
F15	Projects have often been delayed due to public protest or controversy							

F16	Meetings with stakeholders are usually documented							
F17	Projects jointly decided upon, have often than not been successful							

The following are ***twelve (12) identifiable stakeholders*** in the mining industry. Please rank your firm's preference in relation to stakeholder interest. Rank the highest preference as 1 and the least preference as 12. Please, use one number for each stakeholder by determining the position of each stakeholder on a scale of 1 to 12. Do not repeat a number or a position.

F18	Mine workers	
F19	Mining association (i.e. Ghana Chamber of Mines)	
F20	Community partners	
F21	Minerals Commission	
F22	Environmental Protection Agency (EPA)	
F23	Directors and Top management	
F24	Government (Ghana Revenue Authority, Ministry of Lands and Natural Resources, District Assemblies, Arms of Government)	
F25	Investors	
F26	Media and the public	
F27	Suppliers and contract mining firms	
F28	Affiliate and associate institutions	
F29	Other regulatory bodies (i.e. Forestry Commission, Water Resources Commission, Lands Commission)	

SECTION G
Background information of respondents

G1	Gender: 1. Male [ ] 2. Female [ ]
G2	Highest educational/professional qualification (tick as many as applicable): 1. Doctorate's degree [ ] 2. Master's degree [ ] 3. Bachelor's degree [ ] 4. Professional qualification/certification (ICAG, ACCA, CIMA, CPA, etc.) [ ]
G3	Position/Level in the firm: 1. Strategic (Top) [ ] 2. Tactical (Middle) [ ] 3. Operational (Lower) [ ]
G4	Name of firm:
G5	Nature of firm: 1. Large-scale mining [ ] 2. Small-scale mining [ ]
G6	Nature of ownership: 1. Foreign-owned [ ] 2. Ghanaian-owned [ ] 3. Both [ ]
G7	Nature of mine operation:

	1. Commercial production [ ] 2. Pre-production [ ] 3. Exploration/prospecting [ ] 4. Contract mining [ ] 5. Affiliate [ ] 6. Associate [ ] 7. Others [ ]
G8	Date/Year in which firm was established:
G9	Number of mine operations/locations/sites in Ghana:
G10	How long have you been working in this firm?
G11	For the purpose of conducting this study, we will be very grateful if your financial statements (for the past 3 or 4 years) will accompany this questionnaire. 1. Yes, we will supply you with our financial statements [ ] 2. No, we will not supply you with our financial statements [ ]

Thank you once again for your time and effort in this exercise.

APPENDIX I: Interview Guide

DEPARTMENT OF ACCOUNTING

PHD RESEARCH (FIELD WORK)

INTERVIEW GUIDE

AN INVESTIGATION INTO ENVIRONMENTAL ACCOUNTABILITY PRACTICES OF GOLD MINING FIRMS IN GHANA

PREPARED BY:

GEORGE TACKIE
PHD ACCOUNTING CANDIDATE [10540057]

SUPERVISORS:

DR. SAMUEL N. Y. SIMPSON
PROF. MOHAMMED AMIDU
DR. CLETUS AGYENIM-BOATENG

AUGUST 2017

Dear Respondent,

Thank you for accepting to participate in this study. Kindly respond appropriately to the questions to the best of your knowledge, ability and expertise.

The main objective of the study is to investigate the environmental accountability practices of mining firms in Ghana. Environmental accountability practices is a multidimensional construct. It represents the extent to which initiatives, actions, activities, processes and projects of environmental sensitive companies, such as mining firms, impact their environment and how these companies are accountable for such practices while meeting the environmental expectations of their stakeholders and constituents.

To this end, the study is aimed at examining the nature and drivers of environmental accountability practices that impact on environmental performance and firm performance of mining firms in Ghana. This study will benefit mining firms, service providers, regulators, community partners, mining associations, mine workers, affiliate and associate institutions in assessing the effect of these practices.

The intended respondents are environmental managers, finance directors, sustainability managers, senior executives and community relations officers of mining firms in Ghana; basically, persons who are responsible for accounting and reporting on environmental and sustainability issues, which includes accounting and finance personnel.

The study is purely an academic exercise to gather field data for a thesis as part of the requirements for the award of a PhD in accounting programme. It does not in any way attempt to invade the privacy of individuals and assess them. The results of the study will be reported only as aggregate statistics, general analysis and interpretation. Please be assured that any information given would be treated as strictly confidential.

This interview will take approximately forty-five (45) minutes to complete. Please respond by providing appropriate answers and comments where necessary. Your participation is very much appreciated. Besides strengthening the contribution to the growing literature on the subject matter, your responses will ensure that the environmental accountability practices in Ghana's mining industry is accurately represented in the final research report. If your outfit is interested in further information about the research and its outcome, please contact the undersigned student researcher. The student researcher will be delighted to provide you with a copy of the final research report. Thank you for your time, effort and expertise in this exercise.

Sincerely,

SGD.

George Tackie
PhD Accounting Candidate, UGBS, 10540057

SECTION A
Interview data/profile

A1	Company name:	
A2	Today's date:	
A3	Interviewee's name:	
A4	Interviewee's position:	
A5	Start time of interview:	
A6	End time of interview:	
A7	Taped (Yes/No):	
A8	Interview number:	

SECTION B
Measurement and indicators of environmental performance (EP)

B1	How does the entity measure its environmental performance (EP)?
B2	How does the entity account for and report its EP?
B3	Over the past five to ten years what have been the significant achievements in terms of the entity's environmental performance (EP)?

SECTION C
Nature and drivers of environmental accountability practices (EAP)

C1	What is the nature of the entity's environmental accountability practices (EAP)?
C2	What are the current issues affecting the entity's EAP?
C3	What phenomenon is being addressed under EAP? What aspects are not being addressed? Or cannot be addressed?
C4	Who are the persons or actors involved in the entity's EAP? What roles do they play? How do they interact?
C5	How long has the entity been significantly or strongly involved in addressing environmental issues?
C6	How are the entity's EAP arranged? And why those arrangements?
C7	What motivates management to account and report on these EAP? Core values, economic performance, stakeholder pressure, industry practice, industry sensitivity?
C8	To what extent has the entity's EAP contributed to the entity's EP and FP?
C9	To what extent has the entity's FP contributed to the entity's EAP?
C10	To what extent has the entity's EP contributed to the entity's EAP?
C11	To what extent would you regard yourself as an environmental activist/proponent?
C12	Will investors pay a premium for an entity with an exceptional environmental policy?
C13	Will investors apply a discount to entities with poor environmental performance?
C14	Do we have an Industrial Environmental Performance Metrics in Ghana?

SECTION D
Environmental reporting – nature, contents, approach and focus

D1	Is the entity's environmental reporting voluntary or mandatory?
D2	Does the entity have any standard way of reporting and disclosing its EAP?
D3	What determines the extent to which disclosures are provided in respect of EAP practices?
D4	What are management's motivations for EAP reporting practices?
D5	To what extent is the entity conversant with the Global Reporting Initiative (GRI) G4 standard reporting guideline?
D6	What data management tools are used to capture EA data?
D7	What is the appropriate format of environmental accounting reports?
D8	How frequently should environmental accounting information be disseminated to users?
D9	How would reporting environmental issues separately enhance accountability or improve the environmental performance of mining firms in Ghana?
D10	How are the entity's environmental reports linked to legitimacy, stakeholder, signalling, and institutional theories?

SECTION E
Stakeholder engagements and environmental accountability

E1	Who are the major and minor stakeholders in respect of the firm's environmental accountability (EA)?
E2	Who are the key stakeholders of the entity's environmental accounting reports?
E3	To what extent does management engage in dialogue with identified stakeholders in determining what EAP to report and how to report?
E4	Has there been any gap between the expectations of stakeholders and the contents of the entity's environmental disclosures? How has the entity addressed such expectation gaps in the past?
E5	How would you rank or prioritise the stakeholders of your firm and what would be the rationale for such ranking?

SECTION F
Background information of respondents

F1	Gender: 1. Male [ ] 2. Female [ ]
F2	Highest educational/professional qualification (tick as many as applicable): Doctorate's degree [ ] Master's degree [ ] Bachelor's degree [ ] Professional qualification/certification (ICAG, ACCA, CIMA, etc.) [ ]
F3	Position/Level in the firm: 1. Strategic (Top) [ ] 2. Tactical (Middle) [ ] 3. Operational (Lower) [ ]
F4	Name of firm:
F5	Nature of firm: 1. Large-scale mining [ ] 2. Small-scale/Alluvial mining [ ]
F6	Nature of ownership: 1. Foreign-owned [ ] 2. Ghanaian-owned [ ] 3. Both [ ]
F7	Nature of mine operation: 1. Commercial production [ ] 2. Pre-production [ ] 3. Exploration/prospecting [ ] 4. Contract mining [ ] 5. Affiliate [ ] 6. Associate [ ] 7. Others [ ]
F8	Date/Year in which firm was established:
F9	Number of mine operations/locations/sites in Ghana:
F10	How long have you been working in this firm?
F11	For the purpose of conducting this study, we will be very grateful if your financial statements (for the past 3 or 4 years) will accompany this questionnaire. 1. Yes, we will supply you with our financial statements [ ] 2. No, we will not supply you with our financial statements [ ]

Thank you once again for your time and effort in this exercise.

APPENDIX J: Operational definitions of key terms

Term	Operational Definition
Environmental accountability practices (EAP)	A multidimensional construct representing the extent to which initiatives, actions, activities, processes and projects of environmental sensitive companies impact their environment and how these companies are accountable for such practices while meeting the environmental expectations of their stakeholders and constituents. Environmental accountability practices (EAP) is measured from three constructs: environmental accounting systems (EAS), environmental management systems (EMS) and stakeholder engagement practices (SEP).
Social and environmental accountability (SEA)	A representation for socially and environmentally responsible management practice, occasioned by corporate reporting and disclosure, and by demonstrable responsiveness to the public interest.
Environmental accountability	The responsibility for an entity's environmental actions and the responsibility to report on those actions.
Environmental accounting system (EAS)	A system that measures the cost of the effect of an entity's activities on the environment. In effect, it entails determining environmental costs and benefits and how to account for such costs and benefits.
Environmental management systems (EMS)	The management of an organization's environmental programme in a comprehensive, systematic, planned and documented manner. It includes the organizational structure, planning and resources for developing, implementing and maintaining a firm's environmental policy.
Stakeholder engagement practices (SEP)	The process of seeking stakeholder views on their relationship with an organisation in a way that may realistically be expected to elicit them.
Environmental performance (EP)	A multidimensional construct representing the extent to which companies meet the environmental expectations of their stakeholders. Environmental performance is measured from three indicators: management performance, operational performance and environmental condition.
Firm performance (FP)	A measure of the performance of an entity from both quantitative and qualitative dimensions that reflect its effectiveness and efficiency in the achievement of firm objectives. Firm performance is measured using production outputs, efficiency level, profitability level, labour

	productivity, customer satisfaction, and regulatory compliance.
Environmental reporting (ER)	The responsibility to account and report on environmental actions and its effects on stakeholder interests.
Environmental management practices (EMP)	An initiative undertaken by the firm to minimise the adverse impact of its economic activities on the natural environment.

APPENDIX K: Excerpts of interview transcripts on stakeholders' perspectives

Stakeholder Group	Stakeholders' Perspectives			
	Motivation for EA	**Effectiveness of EA**	**Firm Performance Assessment**	**Stakeholder engagements**
Regulatory bodies (i.e. Minerals Commission, EPA)	*"we regulate and manage the utilization of mineral resources in the country. And coordinate policies that are related to the management of these mineral resources."*- MinCom1 *"if you submit that feasibility study report to the Minerals Commission, we will review and make recommendations to the Minister."*- MinCom1 *"profitability is an issue, because if the mines are not profitable government will not get taxes."*- MinCom1	*"we have an environmental department within the inspectorate division. They visit the mines weekly, to see the companies' environmental performance. They have assessment forms that are used to measure performance."*- MinCom 1 "*And so, if the law says that you must blast at a certain rate, you know? All that we do is to ensure that you comply with that, with that. And so, that is what we monitor. Even some of the companies what they are doing is that; they also doing, which is also good, and which is also beyond the law they are also doing what we call "participatory monitoring""*- MinCom 1	*"when we renew the feasibility and the mining lease is given to be signed,* the *company is given a number of years."*- MinCom 1 *"The mining sector is heavily regulated. Because, if you make a mistake, somebody will die."*- MinCom 1 *"the environmental department is in charge of that, they have a check list and annual peer review; annual review of the companies' operations. That is the one which constitutes the annual mines safety and all. So, they do mine audit annually. They look at everything; health safety and*	*"they are also doing what we call "participatory monitoring". So, in this case, they are also you know, trained some community members to also monitor;"*- MinCom 2 *"Individuals, groups, chiefs, whatever, don't have the surface right… if there are any other property on that land, that as a result of your mining that you undertake on it will affect that, the property of the person having the surface right, then you have to sit down with that person then negotiate and see the appropriate compensation."* MinCom 3

			the environment."- MinCom 1	
Mining Firms (i.e. Mining concession holders, mining firms' environmental managers)	*"the EPA has a mandate to check us every three months. They bring their equipment to check the water pollution, to check the air pollution and the trees, to make sure that what we did previously is not affecting the environment. But we also have our experts, employed who do those jobs before the Minerals Commission comes."*- MCH1 *"It is, and it is the EIA that the EPA will use to assess the overall, uh… environmental impact of the, the operations or activities, and then issues you a permit with those specific conditions."*- EM1 *"as a group we do things together, we have a common management practice, management standards across*	*"We are doing our best to not pollute the environment. So, can we say that the company has been successful in terms of its environmental performance."*- MCH1 *"And yours is also to ensure that your workers understand the environmental conditions and their impacts, and how to avoid or mitigate some of the impacts and so on"*- EM1 *"so, we have what we call legacy issues to deal with. Historic environmental problems that we are gradually working to make them better."*- EM5 *"As part of our global reporting, we do declare all our costs from start to finish."*- EM9	*"It helps to reduce cost… So, when you resolve all these environmental issues, you can also have your peace of mind to do your business."*- MCH1 *"if you have been for the past five, ten years, and you've never had an issue to the level that the EPA come in, and stop you from operating, or cancelling your permit or… then it means that you are in compliance, isn't it?"*- EM1 *"I get you, but in mining finances environmental rehabilitation cost is the least one."*- EM5	*"We always think of ourselves as part of the development of a nation, upon all the challenges… as I am talking to you now, we are running at a loss but we are still holding on to our social responsibility. One of our reason is that, we do not want to have agitations with the communities."*- MCH1 *"If we dialogue and I can tackle their challenges… If people around you are happy, they will serve you well and also protect you."*- MCH2 *"We have to look at the possible impact of the operations on the environment- positive and negative, not just so, you also have to in place,*

	the group we are all committed to."- EM5 *"if you look at our notice board, we have an environmental policy, which is signed by no mean person than the executive vice president for the region. And uh, as part of our values; one of our core values is to protect the environment and our communities"*- EM9			*mitigation measures for those impacts that you cannot avoid."*- EM2 *"Because when you buy a property you inherit both assets and liabilities so once you are getting your gold as you want, if there are any liabilities you have to clean them up as well."*- EM5
Community Partners	*"It all comes back to the cost of exploration, because when you are mining they use that cost of exploration to reduce your tax and so many things… but in exploration nothing is coming out so you don't need to spend so much on the environmental. That is the motive. But in actual sense you have to take the environmental very serious."- CP1* *"The most important thing is, if strict laws, it is in-between,*	*"Here, even the mining companies, take everything for granted. But in other companies, especially the countries that they are from and everything, they are particularly interested in the environment and everything than these Ghanaians."*- CP1 *"Mining firms do have policies, but the problem lies in following these policies."*- CP2	*"Firms consider energy savings not because they are environmentally friendly, but because they will want to reduce their cost of operation."*-CP2	*"Usually, stakeholders will have differing interests and it's difficult to satisfy all at a point."*- CP2 *"At the start of operations, these mining firms are keen to the concerns of stakeholders, but once they start operations, they tend to relent (often towards the communities)"*- CP2 *"Our mining laws have to be adjusted to favour all, instead of the big mining*

	because the other guys, like the Australians, they think that the environmental issues in their country are so strict that maybe your company or your concession can be taken away from you. They see the ones in Ghana as flexible so they are happy."- CP1 *"Mining firms are not motivated to be environmentally friendly because of their economic performance. These firms are very much concerned about minimizing cost and would usually view environmental activities as cost inflators. Their thinking is that they will improve their economic position better when relieved of these environmental activities."*- CP2	*"Usually, it is the big mining firms who follow these standards to the letter, unlike the smaller firms."*- CP2		*firms holding on to almost all the lands. This would aid in job creation, and it would help control galamsey operations, since they cause the most damage to the natural environment. There should be better incentives for being environmentally friendly."*- CP2
Environmental consultants (i.e. Mining experts)	*"In my own opinion, factor such as: the company's reputation, referrals, regulators, community and economic performance, in no*	*"the HSE departments documents its activities, and I am sure that they do so in an acceptable manner. They are*	*"A clear evidence is the reduced problems with the regulatory bodies, and definitely, this will help*	*"I really believe that most interferences have come from the communities in which they operate. They can make work very difficult*

	particular order, serve as motivators."- EC1 *"Maybe, you've done the economics, you've done the environmentals you are required to get all the requisite permits; then, from there, you then proceed to then go in and extract."*- EC3	*presented in the company's reports."*- EC1 *"I know that when a firm does well, it will help deepen its efforts towards the betterment of the environment."*- EC1 *"They have targets, they have budgets, for all of that-annually and quarterly"*- EC2 *"So, in our country, fine; the rules and regulations may be there on paper beautifully, but do they work on the ground? That's another thing all together."*- EC3 *"If the government just, or maybe the legislature just makes the laws, right? And then, we don't have enough resources to do these things; to back them up, in terms of enforcement"*- EC3	*improve our financial standing."*- EC1 *"The EPA has been up and doing in this regard-tracking environmental activities"*-EC1 *"many firms have been able to achieve their environmental targets from the previous months, because if you look at this AKOBEN rating? It's EPA targets that they set. there's a gradual improvement"*-EC2	*sometimes, especially as they are almost all the time demonstrating dissatisfaction over provisions made for them.*"-EC1 "*Because there are so many complications with community issues. Community issues in the mining sector, you really need to be there to understand the issues, and who is telling the truth. Yeah, because in most cases, uh…the moment a community person raises an alarm, and brings it to the press, it becomes a big issue"*- EC2

Mining Associations	*"For every organisation objectives for business have been set up, and not only that you also have to live in society so it had been structured such that if it is environmental management we know we have set up a policy, there is a vision that we have to meet. And meeting that aspiration you have to come out with the various strategies to meet it. So, one of the strategies is environmental management. We have the others, the safety, the sustainability and the others."*-MA1	*"we do follow the GRI and other reporting standards."*- MA1	*"I will say in the first place that it depends on your objectives and targets, then you can measure your performance. And quite apart from that you also benchmark yourself to the industry and some international standards and codes."- MA1*	"*stakeholder concerns and their expectations are always hard, therefore when we have the opportunity to meet together at one forum at least we get to know their needs. Once we know their needs we are able to meet their expectations. For the needs of the communities, it is just like a want. We have virtual needs and we have wants, and the wants are the ones we are not able to meet. Because we have to draw a budget to meet those needs"*- MA1
	"You see, government also looks at the community. So, when you're doing that you are complementing the efforts of the government. And when it comes to legal requirements, you know that when you don't meet them you are forfeiting your license."- MA1			*"a company's neglect for environmental stewardship you will not have your social license"*- MA1

Source: Researcher's construct based on interview Data (2017)