Diversity of Accounting Practices in the Extractive Industries Listed on London Stock Exchange: Standardisation Pathways.

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ABSTRACT

Even though extractive industries (EI) play key roles in the global economy, financial reporting of their activities has been subject of deep controversy for some decades now. In the absence of adequate regulation, several accounting methods have evolved which are used to account for pre-development costs which has been argued to impede comparability of accounts. With comparability being one of the key qualitative characteristics of accounting information, it is surprising that much attention has not been given to the extractive project even though there has been numerous calls for standardisation of practices. In response to these calls, this study seeks to examine the extent of diversity of accounting treatments for pre-development costs among extractive companies and explore the need and pathways for standardisation.

The research is underpinned by positivist research philosophy and employs quantitative methods to address the research aim and objectives. The study involves 256 extractive companies listed on the London Stock Exchange and focuses on eight pre-development cost components. Data on accounting policies and treatments of the cost components are collected from 2018 annual reports of companies and these data are used in constructing harmony and comparability indices. This research adopts the van der Tas (1988) H-index and Archer, Delvaille and McLeay (1995) disclosure-adjusted C-index to measure the level of harmony. It also uses Archer, Delvaille and McLeay (1995) decomposed C-index, van der Tas (1988) I-index and Archer and McLeay (1995) I-index to measure the extent of intra- and inter-method comparability in treatment.

The results confirm the diversity of accounting methods in the industries and find that for each of the eight (8) pre-development cost components analysed, there were some diversities in treatments even among users of the same accounting method. Apart from pre-licencing costs which the study finds greater tendency for them to be fully expensed by users of the different methods, for the other cost components the most common treatment is for them to be initially capitalised pending decision. The study finds that the level of harmony among users of each of the methods as measured by the H-index ranges from low to high. However, the harmony levels as measured by the disclosure-adjusted C-index are relatively lower. Full cost users exhibit the lowest level of harmony for most of the cost components. Additionally, this study identifies geological and geophysical costs, general administrative and overhead costs, licencing and other acquisition costs, and other exploration costs as “controversial” cost components because there is less harmony in their treatments.

Even though the intra-method comparability ranges between moderate to high levels, the inter-method comparabilities are rather low between pairs of different accounting methods and across all four methods. These highlight the adverse effects the choice of diverse accounting practices has on the extent of comparability in the treatment of pre-development costs. The findings underscore the need for efforts to harmonise diverse practices and to achieve standardisation in the extractive industries. For cost components identified by this study as controversial, it is recommended that clear guidance on how they should be treated are provided by the Board to reduce the exercise of discretion in their treatments.

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DEDICATION

I dedicate this thesis to my children, Alvin Freeman Brobbey- Owusu and Jayden Kingsam Brobbey- Owusu.

PUBLICATIONS RELATED TO THIS THESIS

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CHAPTER ONE
INTRODUCTION

1.1 Background

Accounting regulation for the Extractive Industries (hereafter EI) remains one of the most important yet outstanding issues on the agenda of the International Accounting Standard Board (IASB) (Gray, Hellman and Ivanova, 2019; Cortese, Moerman, Chang, 2022). Unlike other similarly controversial issues[1] which have received considerable attention from the IASB, the extractive project has been given low priority and therefore little or no progress has been made so far (Constantatos *et al.*, 2021). Although a proposal for a standard (Discussion Paper) was issued as far back as 2010 (Brady *et al.*, 2010), not much was done on it until July 2016 when the Board classified the project as 'Pipeline Project' to restart between 2017–2021 (IASB, 2016) and in September 2018 the Board eventually announced its commencement to decide whether it should replace IFRS 6 *Exploration for and Evaluation of Mineral Resources* with a revised or more comprehensive standard (IFRS, 2018).

This is startling to note that accounting regulation for the EI has not been prioritise given the important role the industry plays in the global economy (Global Policy Forum, 2006; Cortese, Irvine and Kaidonis, 2009; United Nations, 2017). As of 2010, 60% of the world's largest companies in terms of revenues were from this industry (Sigam and Garcia, 2012) and in 2018, out of the top twenty global companies, six were extractive companies with total revenue of over US $ 1.6 trillion and US $ 42.7 million net profit (Fortune, 2018). The revenues of the six extractive companies accounted for 57% of the 2018 Gross Domestic Product (GDP) of United Kingdom (US $2.83 trillion) and 7.8% of US GDP (US $20.5 trillion)(Country Economy, 2018). In the same year, 2018, the total revenue of the top 40 mining companies globally stood at US$ 683 billion (PwC, 2019) whilst that of the oil & gas sectors was US$ 2.47 trillion (Turak, 2020). Additionally, extractive companies represent a significant proportion of listed companies on major stock markets around the world. For instance, 49% of listed companies in Canada, 40% in Australia, 11% in Russia, 10% each in the UK and South Africa and 6% in the United States are extractive companies (Stadler and Nobes, 2020).

[1] IFRS 4 Insurance Contracts - the solution is IFRS 17 (issued in 2017); IFRS 14 Regulatory Deferral Accounts-an Exposure Draft on replacing it was issued in 2021.

Owing to the enormous size, the EI also attracts huge sums of investment yearly. The World Bank Group single-handed invested US $1,075 million in the EIs in 2015 and in 2016 they committed 5% of the total World bank financing which is US $3,099 million to the EIs (World Bank, 2016). In 2017, the oil and gas sector alone attracted investment of US $450 billion (in nominal terms) and this rose by 5% to USD 472 billion in 2018 (International Energy Agency, 2018). These statistics shed light on the significance of the EI and the scale of economic influence it has on the world's economy.

Given the economic significance and scale of investment the EI attract, the level of regulation attention that has been given it, can be described as woefully inadequate and this has resulted in the use of wide range of accounting methods. As such there have been many calls for standardisation with some dating as far back as 1905 (Luther, 1996). Though research interest in the accounting regulation for EI was high in some times past, when the issue was given low priority by the Board, less attention was given to it by researchers (Gray, Hellman and Ivanova, 2019). However, with the extractive project resurfacing on the active agenda of IASB, the IASB staff paper has reiterated the growing public interest in the project (IASB, 2019). Ongoing research covers a wide range of topics and one of the long-standing and controversial issues, which this research focuses on, is the diversity of accounting practices in the treatment of pre-development costs among extractive companies.

This study seeks to examine how components of pre-development costs are treated by extractive companies adopting different and same accounting methods in order to identify the most common practice, assess the level of harmony in treatment and the extent of intra and inter-method comparability to explore the need and pathways for standardisation. By this, the research aims at identifying the accounting methods extractive companies listed on the London Stock Exchange (LSE) adopt in treating pre-development cost components and how users of the different and same method treat each cost components to determine the most common practices, the level of harmony in treatment and how comparable these treatments are both among users of same and different methods.

This chapter provides the foundation for the thesis. It discusses the motivation, the research problem and the gaps in the literature. It also presents the research aim, questions and related objectives. A summary of the research methodology and methods

undertaken is provided. The chapter also emphasises the contributions, significance of the study and how the chapters are organised.

1.2 Thesis Motivation

Coming from a resource-rich country, Ghana, discussions on EI always interest me. My interest was heightened the day I read about the diversity of accounting practices used by extractive companies in accounting for pre-development costs. It was worrying to note that extractive companies can adopt different methods in accounting for similar transactions which can result in companies reporting different financial figures. Much as emphasis had been placed on the diversity of accounting methods, little or no attention has been given to on the level of (dis)harmony that exist within and between methods, and how these diversities can affect comparability both within-methods and between-methods. If the diversity is perverse, then resource-rich countries like my country, Ghana, and other stakeholders – investors and tax authorities may be at a disadvantaged and will not be reaping enough from their mineral resources since extractive companies can conceal their true financial performance or position through their choice of accounting method. My quest to understand the current practices in accounting for pre-development costs among extractive companies and offer possible solutions to the problem is what led me into researching on this topic. Furthermore, this research is motivated by the fact that the IASB has placed the extractive project back on its agenda and currently collecting information to help it make a decision on whether to start a project to replace or amend IFRS 6. The findings of this research are timely and will be helpful to the IASB in its attempt to standardise accounting practices in the EI.

In order to fully understand the issue of diversity of accounting practices in the EI on a global level, a suitable context with a wider coverage of extractive companies was needed and I settled on the London Stock Exchange for several reasons. First, the LSE is one of the two largest stock exchanges in Europe and seventh globally (Cherowbrier, 2019) with extractive companies listed on it originating from all five continents (Power, Cleary and Donnelly, 2017). Second, the LSE is the most important foreign source of equity for extractive companies as described by Luther (1996). Moreover, the nature of the research is such that sampled companies should operate under the same conceptual framework to minimise differences in accounting treatment influenced by applying

different conceptual frameworks. Since companies listed on LSE are required to apply IFRS under the European Union Regulation (EC) No 1606/2002, this issue is minimised because all sampled companies apply the same conceptual framework in the preparation of their accounts (Armstrong et al., 2010; De George, Li and Shivakumar, 2016).

Another decision regarding the context of this research was to decide on the sector within the industry to focus on. Extractive companies listed on the LSE operate both in the oil & gas and mining sectors and the issue of diversity of accounting practices in the industry pertains to both sectors. To ensure the issue is investigated and addressed in a more holistic manner, this research included companies operating in both oil& gas and mining sectors. Including the mining sector in this study offers a good opportunity to fill the gap in the accounting literature regarding the parsimony of research in the mining sector as reiterated by Power, Cleary and Donnelly (2017). These are the reasons why the LSE was selected as the suitable context of study for this research.

1.3 Research Problem

Notwithstanding the economic importance of the EI, the financial reporting of their economic activities has been a subject of contention for several years now (Field, 1964; Van Riper, 1994; Gray, Hellman and Ivanova, 2019). Pivotal among these financial reporting issues is how companies account for pre-development costs related to their investment activities (Brock, 1956; Flory and Grossman, 1978; Luther, 1996; Power, Cleary and Donnelly, 2017; Abdo, 2018; Gray, Hellman and Ivanova, 2019). Extractive activities are undertaken in phases[2] which involve prospecting, acquisition, exploration, evaluation, development, production, and decommissioning (International Accounting Standard Committee (IASC), 2000). The investment in each of these phases involves huge sums of money and are often characterised by high risks and uncertainty (Luther, 1996; Wise and Spear, 2000; Wise and Spear, 2002) especially during the early (pre-development) phases (Field, 1969; Abdo, 2018; Hellman, Ivanova and Pan, 2020).

[2] The phases and investment at each phase are explained in detail in Chapter Two.

There seems to be consensus on the treatment of expenditure at the development and production phases, but much of the debate revolves around how Prospecting, Acquisition, Exploration and Evaluation (E&E) expenditures, (collectively referred to as pre-development costs) are to be treated (Field, 1969; Katz, 1985; Chaudhry *et al.,* 2015) hence the focus of this study. The central issues, among other things, revolves around the accounting methods companies adopt in treating pre-development costs and whether these costs should be capitalised, expensed or initially capitalised pending decision (Lourens and Henderson, 1972; Power, Cleary and Donnelly, 2017). The accounting treatments for these pre-development costs are determined by the accounting method and choices within each method can have substantial effects on reported asset balances and profit figures (Lilien and Pastena, 1981, 1982; Abdo, 2018).

Historically, in the absence of adequate regulation and guidance, several accounting methods have evolved, and been employed by companies in accounting for these costs (Cortese, 2011; Abdo, 2016). Notable among them are the Successful Effort (SE) method, Full Cost (FC) method, Area of Interest (AOI) method and Expense all (EA) method (Gerhardy, 1999; Alfresdson *et al.,* 2009; Cortese, Irvine and Kaidonis, 2010). The use of variety of accounting methods presents problems for investors and other users comparing financial results of different companies in the EI (Abdo, 2016; 2018). Hence, it has often been argued that the problem of diversity of accounting methods impede comparability of financial statements (Most, 1974; Amernic, 1979; Karapinar, Zaif and Torun, 2012; Stadler and Nobes, 2020) which is one of the key qualitative characteristics of accounting information according to the Conceptual Framework. According to the IASB, for accounting information to be comparable "equal things must look alike, and different things must look different" (IASB, 2011, item Q23). This feature of accounting information allows users to identify similarities and differences between financial transactions and results and make informed decisions (Yip and Young, 2012). The choice of a particular accounting method dictates to a firm how its pre-development costs should be treated which implies that two firms may incur the same costs, but the choice of method may influence how the same costs will be treated

which will eventually result in different accounting figures which can mislead investors if decisions are based on them (Deakin, 1979).

If comparability remains an important qualitative characteristic of accounting information and promoting comparability is one of the key purposes of IFRS through eliminating diversity (Nobes and Stadler, 2021), then the diversity of accounting practices in the EI should be an issue of concern to all but not only investors and standard setters. It is therefore not surprising that several calls for harmonisation and standardisation have been made (Curle, 1905, cited in Luther, 1996; Gray, Hellman and Ivanova, 2019) and numerous attempts to standardise have been made at both national and international levels (Luther, 1996; Cortese and Irvine, 2010; Cortese, 2011). However, none of them has been successful due to how politically and economically powerful the EI is and the extent of lobbying that exists within it (Deloitte Touche Tohmatsu, 2001; Cortese, 2006; Cortese, Irvine and Kaidonis, 2007; Cortese, Irvine and Kaidonis, 2010). The economic strength of some of the extractive companies is such that they are richer and more powerful than the countries and bodies that seek to regulate them (Cortese, Moerman, Chang, 2022) and these equally add to the difficulty in regulating the industry. Unfortunately, IFRS 6 which was meant to remedy the situation to some extent did not offer sufficient standardisation and hence diversity persists in accounting by EI. Therefore, in order to reach a standardisation level, harmonising the widely diverse practice is required first. Regardless of how difficult it has been to regulate accounting practices in the EI, there are still some advocates who believe that there is the need for finality to be brought to this issue to ensure accounts of extractive companies become relevant to users in their investment decision making process.

1.4 Research Gap

To address the problem of diversity of accounting methods in the EIs, prior studies have sought to identify one superior method and recommend it to be used by all extractive firms and have advanced arguments in support of the proposed method (Field, 1969; Myers, 1974; Baker, 1976; Van Riper, 1994; Bryant, 2003; Misund, 2017).In instances where a single method has been recommended in the past, the implementation has faced opposition and ended up unsuccessful (Smith, 1981; Collins, Rozeff and Salatka, 1982; Benjamin and McEnroe, 1983; Gorton, 1991; Cortese, Irvine and Kaidonis, 2009;

Cortese and Irvine, 2010). Although, the use of a single accounting method by all extractive firms seems sound, the fact that its implementation has not been successful leaves room for further investigation. The thinking underlying the single method is that once a single method is used it will eliminate diversity and enhance comparability (Katz, 1985, Van riper, 1994). But this assumption is questionable, firstly, because given the complexity of extractive activities and the costs involved at each phase, companies can adopt the same accounting method but end up treating costs differently within a method. For this reason, there is the need to investigate whether the use of a single method means similar costs are treated similarly among firms. This issue has not been given much attention in the extant literature and this study seeks to fill this gap in the literature.

Despite the importance of the EI, it is surprising to note that there is scant literature related to their accounting practices in the recent times (Gray, Hellman and Ivanova, 2019; Stadler and Nobes, 2020; Constantatos *et al.*, 2021). In a recent review of existing literature on accounting for EI, Gray, Hellman and Ivanova (2019) note that "literature comprising international comparative studies on accounting practices across EI firms is very limited" (p. 80). Though prior literature have sought to identify the different accounting policies used by extractive companies (Brock, 1956; Coutts, 1963; Field, 1969; Lourens and Henderson, 1972; Stadler and Nobes, 2020), examine past attempts to standardise the different methods and why they have failed (Van Riper, 1994; Cortese, 2013), assess the value relevance of the various accounting methods (Bryant, 2003; Misund, 2017; Power, Cleary and Donnelly, 2017), examine compliance to IFRS 6 (Karapinar, Zaif and Torun, 2012; Abdo, 2016) and identify factors that influence the capitalise or expense decision of exploration and evaluation expenditures (Constantatos *et al.*, 2021), the issue on the extent of diversity of accounting treatments for components of pre-development costs and level of harmony as well as the extent of intra-method and inter-method comparability among extractive companies has not been given much attention.

This current study differs from previous related studies in the following respects: First, unlike previous studies such as Brock (1956), Field (1964), Lourens and Henderson (1972) which sought to examine accounting treatment without specific reference to the choice of accounting method, this study dives deep to analyse how companies treat

different components of pre-development cost with the aim of identifying diversities within and across methods as well as the level of harmony in treatments. None of the previous studies have explored the level of harmony in accounting treatments for pre-development costs among users of the same and different methods using statistical indices. This is necessary to determine the level of diversity that exist within a method and also identify cost components that pose the most challenge to users of different methods.

Second, though it has become almost acceptable that diversity of accounting methods in EI impedes comparability, empirical studies specifically examining the extent of comparability in the EI[3] appear limited if not non-existent. This study fills this lacuna by providing evidence on the treatment of pre-development cost components and the resulting effect on the extent of comparability in treatment. This will help to establish if the diversity of accounting method indeed has dire consequence on the comparability of reported figures and hence warrant the need for standardisation. Additionally, despite the substantial amount of studies on comparability in the accounting literature, most of these studies have focused on comparability between or within countries (Archer and McLeay, 1995; Archer, Delvaille and McLeay, 1995; 1996; Ali, Ahmed and Henry, 2006). As argued by van der Tas (1988), as the world become globalised, investors do not recognise national borders instead they view the world as one village. This perspective underscores the need for comparability studies that focus on other aspect apart from the country. Factors such as industry, sector, accounting method etc have been identified as suitable basis for assessing comparability (Jaafar and McLeay, 2007; Taplin, 2011; 2017). This study therefore offers a unique perspective on comparability studies by focusing on intra-method (within-method) and inter-method (between-method) comparability which to the best of the researcher's knowledge no other study has looked at. Results of inter and intra-method comparability should allow making recommendations on future pathway for harmonising the diverse accounting practices by EI.

[3] The EI has unique characteristics that distinguishes it from other industries (Luther, 1996; Wise and Spear, 2002)

1.5 Research Aim, Questions and Objectives

1.5.1 Research Aim

Against this backdrop, the aim of this research is to examine the extent of diversity of accounting treatments for pre-development costs among extractive companies and explore the need for harmonising diverse practices and to suggest pathways for standardisation.

1.5.2 Research Questions

The research seeks to answer the following questions:

i. How do extractive companies treat pre-development cost components?
ii. Are there (dis)harmonies in the way extractive companies in general treat pre-development cost components?
iii. Are there (dis)harmonies in the way extractive companies that adopt the same accounting method treat pre-development cost components?
iv. Are there (dis)harmonies in the way extractive companies that adopt the different accounting methods treat pre-development cost components?
v. What are the levels of harmony in accounting treatment for pre-development cost components?
vi. How comparable are the treatments of pre-development cost components within-methods and between (across)-methods?
vii. Is there the need to standardise accounting practices by EI?
viii. What are the pathways for standardising accounting practices in the EI?

1.5.3 Research Objectives

Specifically, the objectives of this study are to:

i. identify the current practices in accounting treatment for eight pre-development cost components;
ii. examine the level of (dis)harmony in accounting treatments for each pre-development cost components;
iii. assess the extent of intra-method and inter-method comparability in the accounting treatments;

iv. investigate if there is a need for standardising accounting practices by EI;

v. explore and suggest possible pathways for standardisation.

1.6 Summary of Research Methodology and Methods

Consistent with its aim and objectives, this research lends itself more to the positivist research philosophy and adopts a quantitative research design. It is carried out in several phases. First, sample of extractive companies listed on the London Stock Exchange for the year 2018 were identified. These companies operate in both the oil & gas and mining sectors and are listed on both the Main Market and Alternative Investment Market (AIM). The initial search identified a sample of 341 companies. Whilst some data were obtained from the annual reports, others were gathered from the company websites and other official documents.

The annual reports were reviewed to identify pre-development cost components mentioned in the reports and all eight (8) different costs components were identified. The dispersion of treatment for cost components by companies adopting each of the accounting methods helps to identify whether there are diversities in treatment within that method or not and also identifies the most common practice (treatment) for that cost component. This helps to address the first objective of the research. Additionally, for each cost components, the study employs institutional theory (IT) and positive accounting theory (PAT) to offer possible explanation why some companies treat costs differently from their method counterparts by reflecting on their size and ages compared to their average method counterparts.

In the next phase, to address the second, fourth and fifth objectives, this research employs the van der Tas (VDT) (1988) *Hirschman-Herfindahl* (*H) -index* and Archer, Delvaille and McLeay (ADM) (1995) disclosure-adjusted *C-index*. For each of the eight cost components, the index values are computed for users of each of the accounting methods and across all the accounting methods. The resulting index values suggest the level of (dis)harmony in accounting treatment among users of that accounting method and also help to identify cost components with the highest and lowest level of diversity in treatment. The level of diversity allows the study to conclude whether there is the need to harmonise the diverse accounting practices and offer possible pathways to achieve standardisation.

Finally, this research employs the van der Tas (VDT) (1988) *I-index* and Archer and McLeay (A&M) (1995) *I-index* and adopts and modifies Archer, Delvaille and McLeay (ADM) (1995) decomposed *C-index* (Between-method C-index and Within-method C-index) to measure the extent of intra-method (within-method) and inter-method (between-method) comparability of accounting treatments for each pre-development cost component. This helps in addressing the third, fourth and fifth objectives.

1.7 Significance of the Research

This research is important for several reasons. First, the issue of diversity of accounting methods in the EI is an age-long problem that has witnessed public outcry for decade for solution. Despite the industry being difficult to regulate because of its economic influence, the extent of lobbying and opposition; to ensure that its financial reports become relevant for decision making there is the need for research in this area to determine how the issue can be addressed. This study is one of such research which contributes to understanding the problem and offering solution.

Second, after years of prolonging actions on the extractive project, the IASB eventually brought it back on its agenda and made calls for research to help it decide whether to replace the IFRS 6 or amend it. This research is a response to their call. Third, while there is limited literature on accounting for EI, the few available concentrates on the diversity of accounting methods used in treating pre-development costs. Research on the accounting treatments within the different methods has not been given much attention. This is because, companies may adopt the same accounting method but within each method there are treatment alternatives which when selected can lead to disharmony in treatment and affect comparability in treatment. This is an aspect prior studies have not paid attention to which the current research seeks to address. Furthermore, most of the prior studies that have examined the diversity of accounting methods in the EI have not measured the level of harmony and extent of comparability both within and between-methods using statistical indices which help to clearly gauge level of diversity and comparability in treatment. This study is important because it provides empirical evidence in support of the level of (dis)harmony and comparability which results from the diversity of accounting methods in the EI.

Lastly, there has been increasing concern and debate about whether there is a need for a separate accounting standard for the EI. Whilst some argue that IFRS 6 should be

amended and maintained, others contend that IAS 38 Intangible Assets should be modified to include the accounting for extractive activities. There are still others who opine that there is the need for a separate standard for the EI because of its unique characteristics. This makes current research important since it highlights the gravity of diversities both within and between methods and their resulting impact on comparability and this help to reveal whether there is the need for standardisation regardless of the fierce opposition and lobbying that exist within the industry.

1.8 Contributions of the Study

This study makes the following contributions to literature and policy.

i. Firstly, while the issue of diversity of accounting methods have highly been researched, little attention has been given to the diversity of treatment that exist or could exist within methods. To the extent that previous attempts to harmonise accounting practices have sought to recommend one of the existing methods (thus SE) to be used by companies within the EI clearly shows the diversities that could exist within methods have been not ignored or not known. This study, unlike previous ones, goes beyond the diversity of accounting methods already identified in the literature to examine the diversity of accounting treatments both within and across methods for eight pre-development cost components. This study contributes to existing knowledge by providing evidence that the accounting challenges in the EI go beyond just diversity of accounting methods. There are also diversities in treatment even within each of the methods. And the diversity is perverse that there is the need for practices within methods to be harmonised to enhance comparability between users of the same method.

ii. Secondly, by examining the intra-method and inter-method comparability, this study contributes to the literature on financial statement comparability in the extractive industries in a unique way. Even though prior studies have argued that the diversity of accounting methods impedes comparability, studies specifically measuring the extent of comparability in the extractive industries is limited. The few studies which have measured comparability have added the extractive industries to other industries which makes the extent of comparability in the EI in particular unclear. This approach of

including extractive companies to sample with companies from other industries may be less appropriate given the uniqueness of the EI. To bridge this gap in literature, this study examines the extent of comparability in accounting treatment for pre-development costs for sampled companies operating in the EI alone and delves deep into the comparability among companies operating in each of the sectors (Oil & gas and mining). By this, this study therefore offers evidence on the extent of comparability in the EI and also provide empirical evidence to back the assertion that diversity of accounting methods impedes comparability.

iii. Third, much as the existing accounting and finance literature is flooded with studies on comparability, these studies have mainly focused on comparability both within and between countries, thus, intra-national or inter-national comparability. This study advances similar studies by offering different perspective on the issue of comparability by focusing on intra-method and inter-method comparability. With wide adoption of IFRSs, it is expected differences in accounting as results of national GAAP will be reduced significantly and for that matter differences may results from practices within sector, industry or even accounting method choice. In the light of this, this research offers unique evidence on comparability both within and across accounting methods. This study contributes to methodology in the sense that it adopt and modifies Archer, Delvaille and McLeay (1995) decomposed C-index and uses it to measure intra-method and inter-method comparability. To the best of the researcher's knowledge no other study has adopted decomposed C-index in this manner.

iv. One of the many challenges confronting financial reporting in the EI has been a lack of clear guidance on how pre-development cost components should be treated. However, studies examining the current practices not just the accounting method "labels" used in the annual reports appear sparse. Earlier studies (Brock, 1956; Coutts, 1963; Field, 1969; Lourens and Henderson, 1972) reported on current practices during their times, but recent evidence on current accounting treatment for pre-development cost components is generally limited if not non-existent. Knowledge about the current practice will be useful in the quest by IASB to harmonise the

different practices. This study therefore contributes to existing knowledge and policy by providing detailed evidence on how eight pre-development cost components are treated by extractive companies to identify the most common treatment (accounting practice) for each cost component. This can serve as a guide for future standard setting for the EI. Additionally, this study identifies cost components with the highest level of diversity such as G&G costs, licence and other acquisition costs and G&A costs, which will require special attention and clear guidance on their treatments from standard setters.

v. Fourth, this study has shown that failure to fully disclose information related to how cost components are treated can adversely affect the level of harmony and the overall comparability of accounts. With this, this study contributes to practice by highlighting the need for full disclosure of information if extractive companies' financial reports will be relevant to users.

vi. Lastly, with the extractive project back on the agenda of IASB, calls have been made to assist the Board to bring finality to financial reporting challenges in the EI. Whilst some researchers have argued that this is not worth the Board's time because of the extent of lobbying and powerful forces within the industries, others have called for revision of the IAS 38 Intangible Assets and the extractive industries accounting considered under this standard. This study also contributes to policy by providing evidence to back why there is the need for a separate accounting standard for the EI and goes ahead to suggest pathways for achieving standardisation. The suggestions in this study should be of benefit to the IASB in its quest to regulate the accounting practices in EIs.

1.9 Thesis Structure

The thesis is structured in eleven chapters. Following this introductory chapter is Chapter Two, a literature review chapter that presents a general overview of the extractive industries. Specifically, it seeks to describe the sectors, characteristics, importance and the different phases of extractive activities and the costs incurred at

each phase. It further explains the different accounting methods used in accounting for pre-development costs as well as arguments in support of each.

Chapter Three, a second literature review chapter which discusses literature related to diversity of accounting methods, the value relevance of the different methods, standard setting process and lobbying behaviour within the industry and finally development of IFRS 6 and the IASB extractive project.

Chapter Four, a third literature review chapter, provides discussions on accounting harmonisation and comparability. It defines and distinguishes the key terms used in the study such as harmonisation and harmony, standardisation and uniformity and comparability. It explains the different types of harmonisations. It presents the different statistical indices used in measuring accounting harmonisation and comparability and those employed in this study. It also reviews empirical studies on international accounting harmonisation and comparability.

Chapter Five discusses the theoretical framework used in this study, thus, Positive Accounting Theory and Institutional Theory. It elaborates on how these theories can be used to explain accounting choices within the EI and how harmonisation and standardisation can be achieved in such a powerful industry.

Chapter Six outlines the research methodology and methods. It begins with the research philosophy, proceeds to the research approach and then to the research design where methodological choice, research strategies and time horizon of the study are explained. The chapter concludes by looking at the research techniques and procedures where the sampling technique, sample selection, data collection and statistical methods used are discussed.

Chapter Seven presents the results of the initial analysis on accounting method choice. It shows the accounting methods adopted by extractive companies in the sample based on sector, market and country of origin and discusses whether the choice of method is different across these factors.

Chapter Eight presents the empirical results and discussions on the following pre-development cost components: pre-licencing costs, licencing and other acquisition costs. Chapter Nine outlines the results and discussions on Geological and Geophysical costs, exploratory drilling and well costs and other exploratory costs. Chapter Ten deals with Appraisal well and work costs, other evaluation costs and general administrative and overhead costs.

Finally, Chapter Eleven provides a summary of the key findings, conclusion, recommendations and limitations and directions for future research.

CHAPTER TWO
THE EXTRACTIVE INDUSTRIES IN CONTEXT

2.1 Introduction

This chapter provides an overview of the Extractive Industries (EI). It starts by discussing the definitions of the EI. This is followed by its structures, characteristics as well as its importance. The phases of investment in EI are also discussed in this chapter.

2.2 Definition of Extractive Industries

EI are involved in activities which lead to the extraction of non-renewable resources (United Nations Conference on Trade and Development (UNCTAD), 2007). They consist of firms which find and remove non-regenerative materials located near the earth crust (IASC, 2000). Sigam and Garcia (2012) define EI as comprising of companies that are involved in different processes that lead to the extraction of raw materials (non-regenerative in nature) from the earth, processing and utilization by consumers. Lourens and Henderson (1972) on the other hand describe the EI as a term synonymous to mining firms and in a broader sense includes the petroleum, gas and quarrying firms. Extractive activities involve the exploring for and finding minerals, oil and natural gas deposits, developing those deposits and extracting the minerals, oil and natural gas (IASB, 2004). Companies that are involved in extractive activities form the Extractive Industries.

2.3 Structure of the Extractive Industries

The EI is made up of two main sectors which are the oil and gas and the mining sectors (IASB, 2010; Sigam and Garcia, 2012; Chen, Wright and Wu, 2018). The oil and gas sector is also called hydrocarbon or petroleum sector whilst the mining sector is called mineral sector. Though, these two sectors bear some similarities, they are different in terms of some of their operations and processes (Wise and Spear, 2000; KPMG, 2010). Everett and Gilboy (2003) indicate that in terms of size, measured by total assets, market capitalisation and revenue, the oil and gas sector is bigger than the mining sector though the returns of the mining sector are generally more volatile. In agreement, Cameron and Stanley (2017) opine that it is misleading to assume that the two sectors are completely homogeneous.

2.3.1 Oil and Gas Sector

The operations of oil and gas companies are aimed at finding, extracting, refining and selling oil and gas (PwC, 2017). The activities of the oil and gas sector are integrated but typically consist of three/3 distinct segments, which are the Upstream, Midstream and Downstream (Cameron and Stanley, 2017).

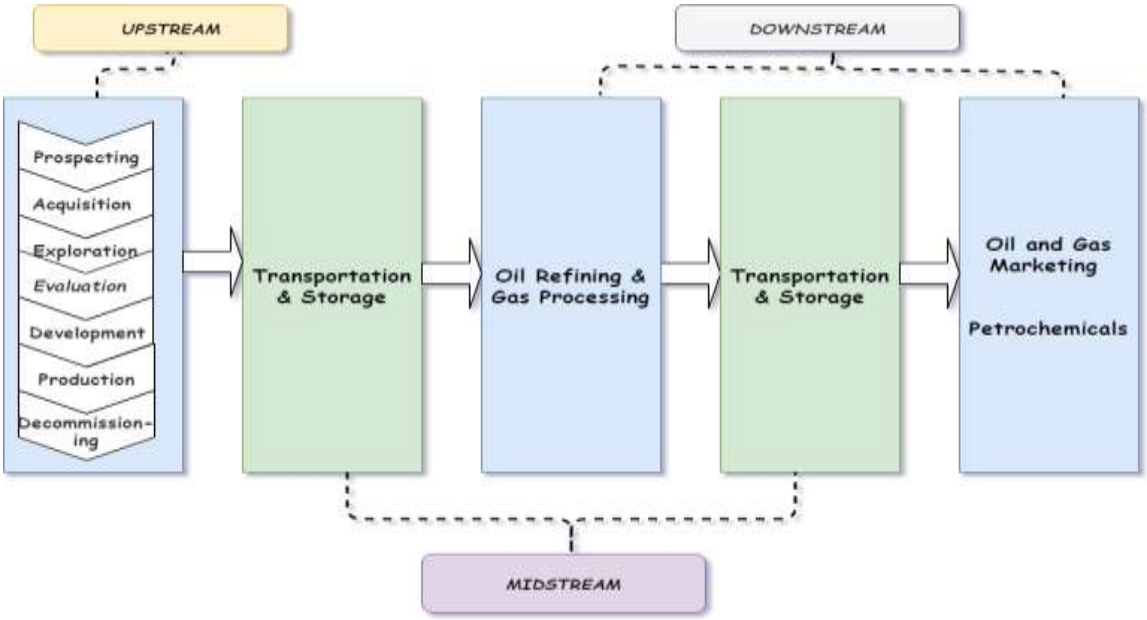
The Upstream activities are also called Exploration and Production activities (Jennings, Feiten and Brock, 2000) or Extractive activities (IASB, 2010). It involves the search for geological information through to acquisition and further to development and production (PwC, 2011). In other words, it starts from the point where the search for natural resources (hydrocarbons) begins to the point where the reserves are capable of being sold or to the point of production. The Upstream stage entails the following: Prospecting, Acquisition, Exploration, Evaluation, Development, Production and Decommissioning (Jennings, Feiten and Brock, 2000; IASB, 2010; Sigam and Garcia, 2012).

The Midstream segment involves processing, storing, marketing, and transporting commodities such as crude oil and natural gas. The midstream is mainly into transportation and storage and provides the vital link between the petroleum producing areas and the population centres where most consumers are located (PwC, 2017). The Downstream segment involves manufacturing the products through oil refinery, gas processing and petrochemical processes as well as selling these products to the consumer markets.

Oil and gas companies can be classified as either integrated or independent company based on the activities, they are involved in. An integrated company is involved in upstream activities as well as any other activities whilst independent company is basically involved in only upstream activities (Jennings, Feiten and Brock, 2000). Independent companies are also referred to as Exploration and production (E&P) companies (Gallun *et al.,* 2001).

The activities in each of the stages are shown in Figure 2.1.

Figure 2. 1 Oil and Gas Sector Structure



Source: (Sigam and Garcia, 2012, p. 3)

2.3.2 Mining Sector

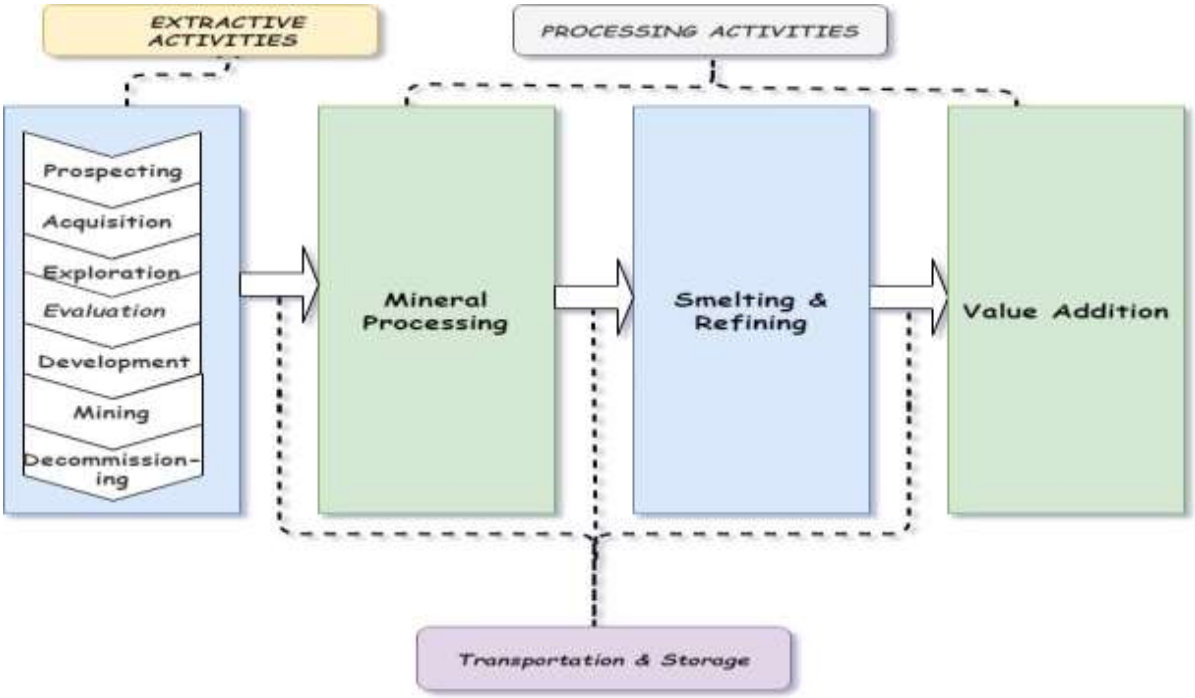
The activities in the mining sector can be grouped into two namely: the Extractive activities and Processing activities (Sigam and Garcia, 2012). The Extractive related activities are like the upstream activities in the oil and gas industry. The first stage of the extractive activities is broadly called the exploration stage which involves prospecting, acquisition, exploration, and evaluation. After the exploration stage, if it appears likely that exploitation is possible, then the development stage follows. The development stage involves the construction of mine, the processing plant, roads, rails, sewer and water lines, and housing to support operation.

The development stage is followed by the mining stage which involves exploitation of the mine which consist of the removal of mineral value in ore from the host rock. Mining can be done using any of the two extraction methods which are surface mining or underground mining. The choice of method is influenced by the size, shape and the depth of the ore body (Sigam and Garcia, 2012). Upon completion of mining activities, decommissioning and mine closure are carried out. This marks the end of the extraction related activities (Jennings, Feiten and Brock, 2000).

The Processing related activities start with the processing of the mineral or what is technically called beneficiation which involves removing unwanted materials from the mineral and getting the ores ready for further refinement. After beneficiation process, the concentrates are shipped to smelters or refineries to further extract the metal and prepare them for final use or for further value addition depending on their intended use. After this, the value addition activities are carried out to transfer them into shapes that can be sold out to final consumers.

The activities in each of the classifications are shown in Figure 2.2.

Figure 2. 2 Mining Sector Structure



Source: (Sigam and Garcia, 2012, p. 4)

2.4 Characteristics of Extractive Industries (EI)

Companies in the EI possess some distinct features which set them apart from those in other industries (Field, 1969; Cameron and Stanley, 2017; Power, Cleary and Donnelly, 2017). These features make EI companies difficult to be regulated with other

industries and hence they are exempted from a number of accounting standards[4] and require different set of regulation (Sunder, 1976; Luther, 1996; Epstein and Mirza, 2003). Their unique characteristics also create accounting challenges which at times result in conflicting applications of certain accounting principles and conventions such as matching, prudence (conservatism) and assets recognition (Karapinar, Zaif and Torun, 2012; Power, Cleary and Donnelly, 2017; Gray, Hellman and Ivanova, 2019). Most of these characteristics are predominantly evident during the extractive phases (Gallun *et al.*, 2001). These peculiar characteristics are discussed in some details in the following sections.

2.4.1 High Level of Risk and Uncertainty

The level of risk in the EI is significantly high because of the nature of their activities and the environments in which they operate (IASC, 2000; World Bank, 2016). Extractive activities particularly, pre-development activities are sophisticated with unpredictable outcomes (Cortese, Irvin and Kaidonis, 2009; Cortese, 2011) as well as their returns highly volatile (Everett and Gilboy, 2003). Wise and Spear (2002) in describing the EI, emphasized that risk is "endemic to the industry" (p. 3).

The search for natural resource deposits is a risky activity because there is no reasonable assurance that the so-desired natural resource will be discovered and most importantly in commercial quantities after investing huge sums of money and time (Field, 1969). Though, the entire extractive activities are seen as risky, the exploration and evaluation phase are arguably the riskiest given the high tendency that extractive firms discover dry hole rather than minerals in commercial quantities (Myers, 1974; Katz, 1985). The sources of risks at the early stages include uncertainty regarding land access and permits, mineral rights, environmental and health permits, huge capital requirements and discovering the economic resources in commercial quantities (Luther, 1996).

In his seminal book, "*The Wealth of Nations*" Adam Smith described the risks and uncertainty in extractive industries by likening extractive activities to a gamble or lottery by stating:

[4] The Extractive Industries are excluded from the scope of several relevant International Accounting Standards (IASs) and these include IAS 2 Inventories, IAS 16 Property, Plant and Equipment, IFRS 16 Lease [IFRS 16:3], IAS 38 Intangible Assets and IFRIC Interpretation 4 Determining whether an Arrangement contains a Lease (https://www.iasplus.com/en/standards).

> Mining, it seems, is considered there in the same light as here, as a lottery, in which the prizes do not compensate the blanks, though the greatness of some tempts many adventurers to throw away their fortunes in such unprosperous projects (Smith, 1775, p.137).

Cameron and Stanley (2017) also reiterated that:

> Conditions and assumptions that exist at the beginning of a project—at the time when laws are drafted, and contracts awarded—are almost certain to change over the course of the project investment (p. 40).

These quotes confirm that extractive activities are subject to so much uncertainty which makes them risky.

Similar to the Research and Development (R&D) phase in pharmaceutical industry, the early stages of extractive activities are considered risky (Luther, 1996; Gray, Hellman and Ivanova, 2019). But the difference between these two risky industries is that, unlike the pharmaceutical industry, where the success of a project significantly reduces the level of risk, in the EIs discovery does not necessarily eliminate risk because significant level of risk still exist during development and production stages (Field, 1969; IASB, 2010). At the development and production phase, risks emanate from the volatility of products' selling prices, high proportion of fixed costs, uncertainty of returns, reliability of machinery and safety of employees[5] (Luther, 1996; Gray, Hellman and Ivanova, 2019).

One of the accounting implications of this feature of the EI is that, shareholders request for extensive disclosure in annual report to ensure that management is putting enough measures to prevent and manage these inherent risks (Wise and Spear, 2002). This high-level disclosure in financial reports increases agency costs. Another accounting

[5] Considerable risks exist during the production stage of extractive business which are related to the reliability of machinery and installations and the safety of employees. Notably examples are the BP Deepwater oil leak disaster in the Mexican Gulf in 2010 and the collapse of two/2 dams in Samarco (Brazil) disaster in 2015. These events led to great damages and exposed these extractive firms to high level of risk. These are but are few of the risky events EIs are exposed to which makes their operations risky (Gray, Hellman and Ivanova, 2019).

problem this feature creates is how such high level of risk and uncertainty should be recognised and measured in the books of account.

Luther (1996) notes, among other things that, the high level of risks and uncertainty in EI create conflicts when applying accounting principles such as matching, realisation and prudence. The risky and uncertain nature of extractive activities requires extractive firms to be prudent in accounting for their operation (Wise and Spear, 2002)

2.4.2 Finite Live

By their very nature, oil, gas and mineral resources are non-regenerative which implies they are not renewable and will eventually get exhausted (IASC, 2000). Each extractive project has a finite life though the license/permit can be renewed, the natural resources cannot. This poses serious accounting challenges since it is a violation of going concern assumption. In the preparation of accounts, businesses are presumed to be going concern which implies they will continue to exist into the foreseeable future without being forced to discontinue operation to make use of their resources. By having finite lives, extractive projects cannot fulfil this assumption. In dealing with issue of finite lives, Luther (1996) proposes the use of joint venture schemes whilst Gray, Hellman and Ivanova (2019) recommend the creation of portfolio consisting of extractive projects with different lives. By these, though individual projects may have finite lives, the company or group will not.

2.4.3 Historical Cost and Capital Intensity

The EI is characterised by capital-intensity projects with long lives (Gallun *et al.,* 2001; Deloitte Touche Tohmatsu, 2003; Karapinar, Zaif and Torun, 2012; Cameron and Stanley, 2017). Each phase of extractive activities involves huge sum of investment. Exploration and evaluation costs are estimated between $20 million to $150 million and it takes an average of three to ten years to complete whilst development costs range between $100 million to over $150 billion and take two to four years to complete (Sigam and Garcia, 2012, p.5).

This huge capital outlay poses some accounting challenges, in the sense that unlike in most industries where cost of an item or transaction represents the fair value received, in the EIs costs incurred do not necessarily reflect the value received. This is because

an extractive firm can incur a huge cost but since discover dry hole in which case the value received, and costs incurred are not commensurate (Luther, 1996).

Additionally, the huge nature of the initial investment makes them highly material such that the way they are accounted for can bring significant difference in the financial status of extractive firms. For this reason, a decision to either capitalize or expense such an expenditure should not be discretionary but should be regulated so as to ensure uniformity.

Apart from the huge initial capital requirement needed to embark on extractive activities, it is quite difficult to establish a direct link between these initial costs and future revenues from operations. The lack of direct relationship between cost (risks) and revenue (rewards) coupled with the delay between expenditure and revenue makes it quite challenging to apply the matching principle (Luther, 1996; IASB, 2010). This makes historical cost which plays an important role in most industries less useful in the EI. Additionally, the way the huge capital outlay at extractive phases are accounted for can significantly affect the financial results of the extractive companies (PwC, 2011; Abdo, 2016).

2.4.4 High Level of Regulation and Accountability

One other feature which distinguishes EIs from other industries is the extent of regulation and accountability they are subjected to. They face high regulation and greater public accountability pressure for several reasons, amongst them is the notion that a country's natural resources belong to all the citizens and for that matter, these stakeholders have keen interest in how these resources are managed and therefore should be accounted for by extractive companies and government (Perdue and Pavela, 2012). EIs also face greater accountability pressures because their extractive activities have negative externalities on the environments in which they operate. Some of these negative environmental impacts are: the large use and contamination of local water sources, oil spills on water bodies, altering of landscapes, discharge of carbon dioxide, gas flares and other toxic chemicals (Gamble *et al.*, 1995; Miranda, Chambers and Coumans, 2005; Bloomfield, 2012). These externalities place demand on the extractive firms to spend millions of dollars to ensure safety during operations and environmental restoration after their extractive activities.

Over the years, several initiatives and civil society coalitions have been formed to ensure that companies (especially EIs firms) operate in socially responsible and transparent manner (McDevitt, 2017). For instance, Global Reporting Initiative (GRI)[6], Extractive Industries Transparency Initiative[7] (EITI) and Publish What You Pay[8] (PWYP) coalition are few of such initiatives/coalitions formed with the objective of strengthening governance to improve transparency and accountability in the EIs (Batchelor and Hearn, 2013; Bickham, 2015; GIZ, 2016; McDevitt, 2017).

The accounting implication of this feature is the demand for more transparent and accountability on their operations to ensure equitable distribution of the benefits from these natural resources they are extracting and the safety of the environment and the people who work and live in such areas. Extractive firms are expected to prepare Environmental, Social, and Governance (ESG) reports. These ESG-related issues have accounting implications such as creating liabilities in the books of extractive firms and requiring ESG disclosures in annual reports (Gray, Hellman and Ivanova, 2019). It is therefore not surprising that, over the past years, the EIs have been deemed to have the highest environmental and social impacts which is reflected in high Corporate Responsibility rate (KPMG, 2017).

2.5 Importance of Extractive Industries (EI)

The importance of the EI to the economies of the world cannot be overemphasized. It plays a significant role in the economies of 81 countries and therefore accounts for a quarter of global Gross Domestic Product (GDP) (Schrecker, Birn and Aguilera, 2018; United Nations, 2021). The formal mining sector alone employs more than 3.7 million workers and up to 100 million people make a living from artisanal mining (United Nations, 2017). Though the world as a whole depends on the extractive industries but

[6] Global Reporting Initiative (GRI) is an independent international organization established in 1997 to promote sustainability reporting. Its Sustainability Reporting Standards require the disclosure of sustainability information to inspire accountability, help identify and manage risks, and enable organizations to seize new opportunities (https://www.globalreporting.org/Information/about-gri/Pages/default.aspx).

[7] EITI is a standard that requires countries to publish timely and accurate information on management of their natural resources such as how operating licenses are given, how much is collected in terms of taxes, royalties and other contributions and how these monies are used. It requires periodic reconciliation of amounts paid by extractive firms and those received by the host countries. This initiative places responsibility on both host countries and extractive firms (https://eiti.org/homepage).

[8] Publish What You Pay (PWYP) is an international movement formed to advocate for revenues from oil, gas and mining to be used to improve the livelihood of people (www.publishwhatyoupay.org/about/).

the economic lives of most low- and middle-income countries depend heavily on the extractive industries (Roe and Dodd, 2017).

The EI are also huge in terms of size and are highly influential[9] because of the amount of wealth they control across the globe (Cortese, Irvine and Kaidonis, 2007; 2010). They attract huge amount of investments from across different parts of the world from developmental organizations to corporate entities and individuals and therefore proper accountability of these investments is crucial. The globalised nature of extractive industries coupled with their cross-border activities and the significant risks and uncertainties that are associated with the industries makes harmonisation of their accounting practices a necessity, but the very nature and influence of the industries thwart these harmonisation attempts.

2.6 Phases of Investments in the Upstream Segment of the Extractive Activities

Though the oil & gas and Mining sectors differ in some respect, they share similarities in terms of the nature, risks and rewards of their extractive or upstream activities (UNCTAD, 2007; IASB, 2010a; KPMG, 2010). There is a widespread classification of the distinct phases of investment in extractive activities by standard setters, governing bodies, and practitioners. The US Regulation S-X Rule 4-10[10] and FASB ASC section 932-360-25[11] grouped these investment phases into four, which are Acquisition, Exploration, Development, and Production (Katz, 1985; Jennings, Feiten and Brock, 2000) whilst The UNCTAD categorises them into Exploration, Development, Production and Decommissioning (Sigam and Garcia, 2012). Field (1969), on the other hand, grouped them into five phases namely Prospecting, Acquisition, Exploration, Development , Production .The IASB and its predecessor, IASC classifies them into Prospecting, Acquisition, Exploration, Evaluation, Development (construction), Production and Decommissioning (IASC, 2000, p. 5; Deloitte Touche Tohmatsu, 2003) though IASB (2010) classified acquisition as part of exploration. At each phase,

[9] Further details provided under section 1.1.

[10] Rule 4-10 Financial Accounting and Reporting for Oil and Gas Producing Activities. It was a set of rules to be adhered to by Oil and Gas firms in US who were into upstream activities.

[11] FASB Accounting Standards Codification Topic 932, Extractive Activities — Oil and Gas: These are requirements introduced into US GAAP by SFAS 19 Financial Accounting and Reporting by Oil and Gas Producing Companies.

extractive companies undertake different activities and are exposed to varied risks (Luther, 1996; Wise and Spear, 2002).

Investments in the EI present some challenges to policy maker owing to their complexities (Cameron and Stanley, 2017) and Abdo (2016) opine that because of the magnitude of investment needed in the EI , careful consideration should be given before such investments are undertaken. While variety of classification of investment phases in the EI have been given by different authors and bodies, this thesis adopts the classification by IASC/IASB since it is more elaborate and gives an in-depth chronology of the various stages of extractive operation. These investment phases are explained in the sections that follow.

2.6.1 Prospecting Phase

At this phase, extractive firms search a large area for geological information to enable them identify areas with potential mineral deposits for possible exploration (Deloitte Touche Tohmatsu, 2001; Gallun *et al.*, 2001). It involves carrying out broad topographical, geological and geophysical reconnaissance survey[12] to identify an area of interest and analysing past geological data for areas which have been previously explored (IASB, 2010a).The main aim of this phase is to obtain information which will help to narrow the initial broad areas of interest into smaller areas of concentration upon which further exploration might be justified (Lourens and Henderson, 1972).

The Prospecting costs include geological and geophysical expenses, thus, cost of aerial photography and gravity, magnetometer and seismograph surveys, salaries, supplies and access costs (Gallun *et al.*, 2001). Prospecting can be undertaken by a company's own staff or by outside professional prospectors. If professional prospectors do the prospecting, the company will need to compete on the open market with other companies to acquire the right to explore and develop the particular area of interest. In this case, the costs of prospecting may be included in the cost of acquisition of right (Lourens and Henderson, 1972).

[12]Reconnaissance survey is geological and geophysical study covering a large or broad area (Gallun *et al.*, 2001)

Prospecting costs form a significant percentage of producers' pre-development cost[13] regardless of whether it is carried out by company's staff or by a professional prospectors (Brock, 1956) and for that matter how they are treated in the books of account of extractive firms can have great implications. For this reason, Lourens and Henderson (1972) opined that the accounting treatment for prospecting costs should be consistent irrespective of whether they are incurred internally or externally.

Prospecting costs have been described as a high risk expenditure because of the technical nature of the activities involved and low probability of these activities leading to discovery of commercial deposits (Haddow, 2014). Since prospecting is risky and difficult to link to certain successful discoveries some researchers (such as Field, 1969) are of the view that prospecting costs should be written off (expensed) when incurred. Others like Myers (1974) hold a contrary view and posits that since success is uncertain, such costs should be carried forward as deferred expenditure until outcome is known then these costs can be matched to resultant revenues. In support of the latter view, Lourens and Henderson (1972) contend that as much as prospecting is viewed as very risky commensurately high rewards are possible.

The 2010 Discussion Paper of IASB extractive project expressed the view that, prospecting costs should be expensed as incurred unless it is certain that they lead to the creation or acquisition of intangible asset. This is because they do not constitute an enforceable rights for the extractive company (IASB, 2010a).

Prospecting leads to acquisition of right which enable extractive firms to undertake detailed exploration.

2.6.2 Acquisition Phase

After identifying an area with potential deposits (prospect), companies in the extractive industries then have to obtain a legal right to explore the prospect, develop, and produce any minerals available there (IASC, 2000; Gallun *et al.*, 2001). This phase is called the acquisition phase and the expenditure incurred here are called acquisition costs. Acquisition costs may be cost of a lease or outright purchase of mineral rights or land. Included in these costs are lease bonuses, option to purchase or lease properties, portion

[13] Costs incurred before decision to develop is established otherwise called pre-production costs by other researchers (Gerhardy, 1999).

of costs applicable to minerals when land and mineral rights are purchased in fees, brokers' fees, recording fees, legal costs, and other incidental costs incurred in obtaining mineral rights (Lourens and Henderson, 1972; Jennings, Feiten and Brock, 2000). The legal rights which allow extractive firms to explore a prospect come in different forms such as property titles, lease or concession arrangements, production sharing contracts (PSCs)[14] with governments (IASB, 2010, para 3.13 p. 50). This implies that, for acquisition the extractive firm can either purchase the minerals, obtain a lease or enter into a joint venture the government of the host country.

The IASB extractive project team proposes that Acquisition costs of legal rights should be capitalized as assets and subsequent expenditure related to such activities should also be treated in the same way as they meet the definition of asset prescribed by the Conceptual Framework thus the cost gives the entity control and also future economic benefits is expected (IASB, 2010a; KPMG, 2010). Acquired legal rights met the criteria to be capitalized as intangible asset under IFRS (IASB, 2010a) whilst in the US GAAP acquisition costs are initially capitalized as unproved property (Jennings, Feiten and Brock, 2000). After the extractive firm acquires the legal right, it then moves to the exploration phase.

2.6.3 Exploration Phase

Exploration is defined as "the detailed examination of a geographical area of interest that has shown sufficient mineral-producing potential to merit further exploration" (IASB, 2010a, p. 164). Unlike the prospecting phase where extractive firms undertake broad investigation, at exploration phase, the entities undertake detail examination of an area of interest for specific deposits (Field, 1969). It involves the in-depth probing into an area that is presumed to have minerals (Lourens and Henderson, 1972; IASC, 2000). At this phase, for oil and gas firms, detailed geological and geophysical work is done to evaluate the area of interest which involves drilling exploratory wells, driving shafts, tunnelling and removal of overburdens. In addition, more closely spaced seismic surveys are done and test wells may even be drilled (Gallun *et al.*, 2001; PwC, 2011). For hard metal mining firms, exploration activities help to define and delineate specific

[14] PSC is a contract between a national oil company of a host government and a contracting entity to carry out oil and gas exploration and production activities in accordance with the terms of the contract, with the two parties sharing the oil and gas produced.

ore body and to determine the quantity and grade of ore. This usually involves taking cores for analysis, sinking exploratory shafts, geological mapping and geochemical analysis, cutting drifts and crosscuts, opening shallow pits and removing overburden in some areas (Gallun *et al.*, 2001; IASB, 2010a).

Costs at this phase include cost of detailed Geological and Geophysical (G&G) works, salaries and wages, supplies, transport, rental of equipment, costs of carrying and retaining undeveloped properties, such as delay rentals and ad valorem taxes on properties as well as dry-hole contributions and bottom-hole contributions (Gallun *et al.*, 2001; Jennings, Feiten and Brock, 2000).

Exploration costs may be incurred either before or after the acquisition of rights. For this reason, some industry participants do not distinguish between prospecting, acquisition and exploration. They are collectively called exploration phase, and this is the viewed taken by UNCTAD (Field, 1969; IASB, 2010; Sigam and Garcia, 2012).

Accounting treatment for exploration costs are numerous and varied. One school of thought advocates exploration costs to be expensed when incurred, others hold the view that, they should be capitalized as deferred expense pending outcome of exploration and if favourable then they are reclassified as asset and if not then they are written off. The third view is for exploration costs to be capitalized regardless of the outcome of exploration (Brock, 1956; Field, 1969; Lourens Henderson, 1972). After exploration, extractive firms then need to determine the technical feasibility and commercial viability of the mineral deposits and this stage is known as Evaluation phase.

2.6.4 Evaluation Phase

After extractive firms have discovered mineral deposits, they do not start development and production immediately because not every deposit is commercially viable to be exploited. In order to assess the technical feasibility and commercial viability, extractive firms undertake evaluation activities.

For mining firms, during evaluation phase, they drill, trench, and examine samples to assess the quantity and grade of the mineral deposits. The methods and treatment processes to be used for extractions are tested. A more elaborate economic feasibility evaluations are also undertaken to determine if development will be commercially worthwhile. And for oil and gas firms, evaluation activities involve drilling appraisal

wells to gain more information about the size and features of reservoirs and how to build the reservoir to get best recovery. After these detailed economic evaluations to determine whether development of the reserves is commercially justified (Gallun *et al.*, 2001; IASB, 2010a).

Just like exploration costs, evaluation costs are either expensed as incurred, capitalized pending outcome of evaluation or fully capitalized based on the accounting method by an extractive firm.

2.6.5 Development Phase

After evaluation, if commercial quantity exist which can economically be feasible to exploit, then extractive firms will start with development. Development is "the establishment of access to the mineral reserve and other preparations for commercial production" (IASB, 2010a,p. 165).This phase extends to even production phase. It is the phase where the access and mineral-handling facilities needed for production are built (Field, 1969; Lourens and Henderson, 1972). During development for mining firms, access to mining sites must be constructed, shafts sunk, underground drifts are developed, permanent excavation made and advance removal of overburden and waste rocks. And for oil and gas firms, after access routes have been constructed, platforms and drilling wells are constructed (Field, 1969; IASB, 2010a).

During the development phase, installation of infrastructure such as machineries, equipment and facilities have done. It is sometimes called the construction phase, but it is mostly classified under development phase. Development costs include costs of development wells to produce proved reserves as well as costs of production facilities, such as lease flow lines, separators, treaters, heaters, storage tanks, improved recovery systems, and nearby gas processing facilities and labour costs. At this phase, the risks level is considerably low but not completely removed[15] (Field, 1969, p. 17) and hence it is likely that development cost will directly generate future economic benefits to the extractive firms and for that matter expected such costs to be capitalised.

[15] Risks still exist but not as high as at exploration phase. Risks at this phase include changes in market prices or competitive conditions and errors in estimating original reserves as well as individual application of development efforts may be unsuccessful (Field, 1969, p. 17)

2.6.6 Production Phase

The production phase is where the actual extraction of natural resource and related processes needed to prepare the resource to state suitable for transportation and sales (IASB, 2010a). It involves getting the natural resource from beneath the earth to the surface and gathering, treating, processing, and storage in the field (Jennings, Feiten and Brock, 2000). Production costs include labour to operate the wells and facilities, repair and maintenance expense, materials and supplies consumed, ad valorem taxes and insurance on property, and severance or production taxes. Production costs of extractive firms do not pose much accounting challenge since most of them are treated as operational costs and hence expensed when incurred. There is no controversy about how production costs should be treated unlike cost incurred before production collectively called pre-production costs (Gerhardy, 1999).

2.6.7 Decommissioning Phase

After exploitation of mineral resources, the production installation, equipment, buildings must be removed as well as restoring the site to an environmentally sound condition. This phase is called Decommissioning phase (Sigam and Garcia, 2012). These phases differ in terms of the nature of activities, duration and the magnitude of investment needed. Some of them occur concurrently, for instance prospecting, acquisition, exploration and evaluation, such that they are a times not distinguished but collectively called exploration (IASC, 2000).

2.7 Focus of This Thesis- Pre-development Phases

This research focuses on the following phases: prospecting, acquisition, exploration, and evaluation which are collectively called "Pre-development activities" or "extractive activities" and their associated expenditure referred to as "Pre-development Costs". Pre-development activities are the area of interest of this current study because of the controversies associated with accounting for these phases of activities. Previous studies have looked at pre-production activities (Field, 1969; Lourens and Henderson, 1972; Gerhardy, 1999) which includes development costs. But much of the controversies about accounting for extractive industries starts at the prospecting phase and ends after evaluation. By the time a firm decides to develop a mine, it means the firm knows there exist commercial mineral deposits which have been evaluated and are economically

feasible to exploit and this reduces the uncertainty (risk) associated with development phase considerably (Field, 1969). This makes periods prior to development the main areas of the controversy and hence the need for this study to focus on these pre-development activities.

2.8 Accounting Methods for Pre-development Costs

The process of discovering natural resources is a prolonged series of activities characterised by huge investments and high risks and uncertainties (Myers, 1974; Cairnie, 1985; Luther, 1996; Wise and Spear, 2000; 2002). High risk and large capital outlays have been described as the combined features of the EIs which have caused complex and inconsistent application of the accounting principles and conventions in these sectors (Brock, 1983 IN Malmquist, 1990). The stages of investment as discussed in the previous sections involve Prospecting, Acquisition, Exploration, Evaluation, Development (construction) and Production. Extractive firms start off not knowing exactly what the outcome of the extractive activities will be. After identifying a prospect, thus an area with potential mineral deposits, extractive firms acquire the right to explore, develop and produce if the discoveries exist in commercial quantities and are economically viable to exploit (Gallun *et al.*, 2001; Abdo, 2016).

Each phase of the extractive activities involves huge sums of investment and for that matter by the time the decision to develop an area for production is made, several millions of dollars would have been spent (Cortese, Irvine and Kaidonis, 2010; Sigam and Garcia, 2012). These costs have predominantly been accounted for using historical cost convention (Bryant, 2003). Before a decision to develop is made, extractive firms are mostly not sure about the outcome of their activities that is whether they will get commercially viable discovery from the huge investment made (Wise and Spear, 2000). This makes the pre-development phase highly risky compared to the other phases. This has historically resulted in the choice of different accounting methods for EIs (Bryant, 2003; Misund, 2017; Power, Cleary and Donnelly, 2017).

The accounting methods used in the EIs include Full Cost (FC) , Successful Effort (SE), Area of Interest (AOI) and Expense All (EA) (Flory and Grossman, 1978; Gerhardy, 1999; Abdo, 2016). The sections that follow explain these different accounting methods and discuss the arguments for and against each of the methods.

2.8.1 Successful Efforts (SE) Method

The SE method was used several years before the introduction of the other methods (Myers, 1974; Jennings, Feiten, and Brock, 2000). Under this method, extractive companies capitalise costs that directly linked to commercially viable and technically feasible discoveries. Any other costs not directly linked to successful discoveries are fully expensed (Flory and Grossman, 1978; Amernic, 1979; Bryant, 2003; Cortese, Irvine and Kaidonis, 2010) . In other words, under the SE method whether a cost is capitalised or expensed depends on the outcome of the extractive activities. If a project is successful, all costs directly related to that discovery are capitalized and the capitalized costs are subsequently depleted, depreciated and amortized (DDA) against revenue from that project as production occurs (Flory and Grossman, 1978; IASC, 2000; PwC, 2011). On the other hand, if a project is unsuccessful, all costs incurred on such a project are immediately written off (Myers, 1974; Misund, 2017). Where the outcome of a project is uncertain, the exploratory costs incurred are put in a suspense account, sometimes referred to as "construction-in-progress" (FASB, 1977,para 116, p. 45), and carried forward till, the outcome is determined before finally decision on whether they should be capitalized or expensed is made (Katz, 1985; Gerhardy, 1999). There should be a direct relationship between pre-development costs and successful discovery of mineral reserves for such costs to be capitalized as assets otherwise they should be expensed.

In capitalizing costs incurred on successful discoveries, the SE method captures them on field by field basis using relatively smaller cost centers as such as well, lease, pool or minor management unit (Brock , 1956; Myers, 1974; Lilien and Pastena, 1981; PWC, 2011). Gerhardy (1999) argues that cost centers used under SE method are mostly "smaller" than the reporting entity and are numerous (p. 52).

The choice of SE method by an extractive firm affects its financial reports in several ways. Firstly, given the inherent risks in the EIs and the low success rate (Wise and Spear, 2002) there are high tendencies for most of the initial costs incurred during exploration to be expensed. These huge costs when incurred initially reduce the firms' assets, and when they end up being written off, they increase expenses and subsequently reduce net income (Baker, 1976; Amernic, 1979). This means for small extractive firms who want to grow their assets and operate profitably, if other options exist, this method

would not be an appealing one for them. This is therefore not surprising that the SE method is mostly used by big and well-established extractive firms who can easily write off huge pre-development costs and still remain profitable (Amernic, 1979; Johnson and Ramanan, 1988; PwC, 2011). Apart from the SE method being conservative (Van Riper, 1994; Cortese, Irvine and Kaidonis, 2010), it has also been described as a method which reflects the inherent risks and failures involved in the search for mineral reserves (FASB, 1977, para 151).

2.8.2 Full Cost (FC) Method

Though, the FC method is believed to have come to being in the late 1950s (Myers, 1974; Malmquist, 1990) it was not widely used until the late 1960s (Baker, 1976; FASB, 1977). Its proponents claim it was developed to "correlate true relationship between costs of discovery and the pricing of oil and gas reserve and the sales from these reserves" (APB, 1972, p. 281). Under the FC method, all pre-development costs incurred by extractive firms during prospecting, acquisition, exploration and evaluation are capitalised whether they directly lead to commercial discovery or not (Gerhardy, 1999; KPMG, 2017). This means no direct link needs to be established between pre-production costs and successful discovery before cost can be capitalised. Whilst the FC method does not require capitalisation of costs to be dependent on successful discovery (Abdo, 2018), under the US GAAP, it limits capitalised amount to the value of mineral reserves available in that particular cost centre (FASB, 1977; Lilien and Pastena, 1981).

Users of the FC method accumulate their pre-development costs into large cost centre such as large geographical area or country or even continent and this forms the basis for amortisation (Brock, 1956; Field, 1969; Flory and Grossman, 1978). Both successful and unsuccessful pre-development costs are all capitalised into the large cost centre, and then depreciated, depleted and amortised as production occurs (Bryant, 2003; PwC, 2017). By capitalising both successful and unsuccessful pre-development costs, users and proponents of the FC method, believe both successful and unsuccessful exploration efforts play key role in discovering reserves and generating future economic benefits (Brock, 1956). And for that matter, these costs must be capitalised and matched against future revenues instead of expensing them in the period in which they are incurred (Abdo, 2018).

The FC method also impact the financial reports in several ways. By capitalising all pre-development costs as asset, it helps extractive firms who use this method to build their balance sheet by increasing their assets values (Baker, 1976; Malmquist, 1990). Whether these assets will generate future economic benefits for the firms is a question mostly put across by opponents of this method. This initially capitalisation for future amortisation also impacts income statement by defer expenses into the future which implies current income is in a way smoothened (Flory and Grossman, 1978; PwC, 2011; 2017). There is evidence that, this method is widely used by new, small and growing extractive firms (Amernic, 1979; Katz, 1985; Power, Cleary and Donnelly, 2017).

2.8.3 Area of Interest (AOI)

The Area of Interest (AOI) method was a method developed by Australian Accounting Standard Board (AASB) for their extractive industries in AAS7 (previously DS 12/308) and AASB 1022 (Gerhardy, 1999). The proponents of the AOI method argue that the method is justified on the basis that it ensures "proper matching" of revenue and related costs (Whittred, 1978, p.155).

Under this method, pre-development costs are allowed to be either written off as incurred or carried forward contingent on certain conditions. The AAS 7 and AASB 6 which recommended the AOI method, allow the costs incurred during Exploration and Evaluation[16] (E&E) phases on a particular area of interest to be either expensed as incurred or partially or fully capitalised. Before the E&E asset to be recognized the following conditions should be satisfied:

a. the rights to that particular area of interest should be current (not expired) and
b. at least either:
    i. the E&E expenditures are expected to be recovered either through successful developments and exploitation or sales of the area of interest; or
    ii. as at the end of the reporting period the E&E activities in the area of interest have reached a stage where reasonable assessment of

[16] The terms "exploration" and "evaluation" respectively replaced the terms "prospecting" and "investigation" used in the February 1973 of an exposure draft, ED 3 *Accounting for the Extractive Industries* to describe the initial pre-production stages (Gerhardy, 1999,p. 54).

> the existence of economically recoverable reserve or deposit is not possible or active and significant operations in continuing in the area of interest.
>
> (AASB, 1989, 2004)

By these conditions, the method allows extractive firms to carry forward pre-development costs for an area of interest where there is a reasonable probability of success (Gerhardy, 1999). The determination of reasonable chance of success is very difficult in an industry like the EIs and write off those costs relating to areas which fail to produce economically recoverable reserves.

For any one area of interest, the exploration and evaluation costs are carried forward so long as a reasonable probability of success in that area exists. If the search is unsuccessful or evaluation produces a negative result, the costs associated with the area are written off.

The AOI method adopts cost center called the area of interest and it is defined as "an individual geological area which is considered to constitute a favorable environment for the presence of a mineral deposit or an oil or natural gas field or has been proved to contain such deposit or field" (AASB, 1989, para 7). The area of interest can be a single mine, deposit or a separate oil or gas field. This definition of the area of interest has been criticized for being vague and giving room for management discretion which can lead to the adoption of variety of possible cost centers (Gerhardy, 1999). Wise and Spear (2000) opined that the area of interest used a cost center in the AOI method has no precise geological definition and can range from as small as a single deposit to as large as a country or perhaps the world.

The AOI has been argued to lie between SE method and the FC method (Gerhardy, 1999). Whilst the distinction between the AOI and FC method is quite clear, it is not so easy to differentiate between the AOI and the SE method (Gerhardy, 1999). Some researchers opine that the AOI method is a special type of SE method with cost center called “area of interest” (FASB, 1977; IASC, 2000).

Though the distinction between AOI and SE method looks quite difficult to make, Gerhardy (1999) commenting on accounting policy survey on Australian extractive firms in 1997 indicated that the two methods in practice were different in the way

initial pre-development costs are treated. Whilst under AOI method, pre-development costs were carried forward until proved successful or otherwise, under the SE method pre-development costs are written off until decision to develop is made. Only costs incurred after the decision to develop are capitalized (Gerhardy, 1999).

2.8.4 Expense All (EA) Method

Under the EA method, all pre-development costs are expensed as incurred (Brock, 1956; Power, Cleary and Donnelly, 2017). No such costs are capitalized all because their future outcomes are uncertain. This method has been described as an extreme treatment for pre-development costs just as the FC method (Gerhardy, 1999).

This method applies strictly the conservatism principle and it is believed to have been widely used before 1930s (Brock , 1956). This was partly because of the high inherent risks in the EIs and inadequate technology to predict the outcome of exploratory activities during the pre-development phases (Wise and Spear, 2000). The inability to link these costs to discovery made it prudent to write off these costs in the income statement as and when incurred. However, during the 1930s and 1940s technological advancements made it relatively easier for managers to predict the outcome of their pre-development activities and this led to minimizing the rate at which all pre-production costs were expensed.

Proponents of this method believe that apart from the method being consistent with the conservatism principle, it saves time by eliminating the problem of looking for the appropriate cost centre to assign pre-development costs to and the controversy of which cost centre is the most appropriate (Brock, 1956). They also argue that the time pre-production costs are expensed do not really matter. Over a given period of time and with a fairly constant development plan, annual charges to expense will be approximately the same whether pre-development costs are currently written off or capitalized and later charged to income statement through period amortization (ibid.). Since the EA method expenses all pre-development costs including those which may linked to future benefits, it results in lower income and asset balances (Power, Cleary and Donnelly, 2017).

2.9 Chapter Summary

This chapter has presented a general overview of the EI by describing the different sectors that it consists of, explained the features which distinguish it from other industries which add to the challenges of financial reporting. The economic importance, phases of extractive activities and the magnitude of investment needed at each phase are also discussed. The chapter ends by looking at the different accounting methods used in accounting pre-development costs.

CHAPTER THREE
ACCOUNTING FOR EXTRACTIVE INDUSTRIES

3.1 Introduction

The chapter reviews existing empirical studies on accounting for the extractive industries. It discusses studies on diversity of accounting methods, calls for harmonisation, the standard setting process for the industries and the extent of opposition and lobbying against such efforts.

3.2 Empirical Research on Accounting Diversity in the Extractive Industries

Earlier studies, such as Brock (1956) and Field (1969), on accounting for the EI sought to evaluate financial reporting and the diversity in accounting practices in these industries. Brock (1956) studied how geological and geophysical (G&G) exploration costs were accounted for and the accounting practices used in accounting for acquisition, development, and disposition of leaseholds in the petroleum industry in the United States. Using personal visits and questionnaires to gather his data, he identified that out of the three accounting policies available, 65% capitalize cost directly attributable to discovery, 35% expensed all exploratory costs and none of the sample firms capitalized all exploration costs though some (at least four) had followed this method in the past. Brock did not use the term Full Cost (FC), Successful Efforts (SE), as being used today, in his study, but his explanations made them obvious which methods he was referring to. Brock also discovered that, regardless of the policy used by the firms, most firms (75%) expensed geological and geophysical costs when such activities are carried out by their own staff. Based on the findings of his research, he concluded that there were divergent accounting practices in the petroleum sector in the United States (US). Extensive as his study was, Brock limited his research only to oil and gas industry disregarding the mining industry.

Field (1969) extended the literature on the EI by increasing the scope of his study to include the oil and gas, coal and precious metal (minerals) which covers the entire extractive industries as defined by IASC (IASC, 2000). Field's research which was commissioned by the American Institute of Certified Public Accountants (AICPA) was aimed at studying the accounting methods used by firms in the EI, the investors' need for information and the general accounting theory applied in the industries. His study

identified, among other things, that the extractive activities are complex in nature and highly risky. Reviewing the annual reports of 256 extractive firms for the period 1964, Field observed that just a small minority of firms made positive disclosure of their accounting policies. He also documented that there was variety of accounting practices in the extractive industries and attributed it to the unique and uncertain nature of the industries. He found out that most companies capitalize successful exploration costs during the exploratory phase and few companies, mostly petroleum industry, capitalize all exploration cost regardless of outcome. His recommendation supported the SE methods. He also recommended that in order to enhance the usefulness of financial reports in the face of these diversities, "disclosure of unusual or particularly significant transactions" (p. 132) is a necessity. He, however, did not define what "unusual or particularly significant transactions" mean which leaves room for discretion. Similar to Brock (1956), Field's study was limited only to US extractive firms.

In 1971, the Accounting Principles Board (APB) committee which was tasked to review the recommendation of Field (1956) and determine the most appropriate accounting practice for the extractive industries recommended that oil fields should be used as cost centre and hence concurred that the SE method was a superior method (FASB, 1977 para 67).

In 1974, after Meyers, whose research was commissioned by Ad hoc committee for FC companies, studied accounting methods in the oil and gas industry and simulated the results of accounting for the two methods and concluded that the FC methods meets the needs of users of financial statements better than the SE method (Meyers, 1974). Meyers (1974) findings supported the FC method and were consistent with that of Coutts (1963) whose research was commissioned by the Canadian Institute of Chartered accountants.

Before the issuance of Statement No. 19, a number of studies on the extractive industries sought to review accounting practices in the industries and debated on which method was superior. Most of these studies used qualitative approaches to achieve their objectives. Techniques such as review of financial statements, company policy documents and previous studies were used as source of data for research (see Brock, 1956; Field, 1969). Interviews and questionnaires were used in most of the studies for data collection (Brock, 1956).

Luther (1996) in discussing the diversity in accounting practices internationally selected four countries which are Australia, Canada, UK and South Africa. In his review, Luther focuses on oil and gas as well as mining firms and examines how accounting regulation and practices had evolved and he explored the important issues which were running through the sample countries. He analysed legislative documents and reviewed standard setting proceeding and established that there was international diversity in accounting practices and that the controversy on the diversity in accounting methods and difficulty in harmonizing is not only because of the accounting complexity of the industry but also politically motivated.

More recent studies by Karapinar, Zaif and Torun (2012) and Abdo (2016) also confirmed that the diversity in accounting practices still exists up to date. Karapinar, Zaif and Torun (2012) examined the degree of compliance with IFRS 6 among 5 Turkish and 5 global extractive firms. They observed that 4 out of the 5 global firms used SE method whilst the other one used FC method and for the Turkish firms 2 used SE method but the remaining 3 did not disclosure the method they used. In his study, Abdo (2016) also investigated whether IFRS 6 has harmonized accounting practices in the extractive industries. Through content analysis of annual report of 118 oil and gas firms, he concludes that 47% of firms state they use the SE method, 28% the FC method, 9% the areas of interest method, and 16% do not specify a particular method which confirms diversity.

Power, Cleary and Donnelly (2017) examined the accounting policies for, and value relevance of, the exploration assets of firms listed on the London Stock Exchange from both the oil and gas and mining sectors. They observed that the accounting policies used by oil and gas firms range from the relatively conservative SE method to the most aggressive FC method whilst those of mining firms range from the SE method to the most conservative Expense All method. They also confirmed this diversity in accounting practices using sample firms from UK.

Overall, the findings of these earlier studies on accounting for extractive industries have underscored the diversity in accounting practices within the extractive industries and how users of each method support their chosen method using accounting principles. However, none of these studies has addressed the diversities that can exist within each method. This study aims to undertake this initiative in studying the diversities within

accounting methods to determine the level of harmony, and extent intra and inter-method comparability in treatments.

3.3 Value Relevance of the Different Accounting Methods

Some studies have focused on the value relevance of the different accounting methods and how changes or proposed changes has affected key company variables. Value relevance refers to the ability of the reported figure to predict the market value of the share (Misund, 2017). This section reviews related literature on this subject.

Arguably, the proposal for a change in accounting methods for oil and gas in the US through FASB statement No. 19 can be said to have triggered strong and widespread reaction than has ever been witnessed and was described as "the most politicalised accounting argument ever" (Van Riper, 1994, p. 56). Consequently, the issue of the Exposure Draft (ED) and the actual Statement No. 19 attracted a lot of attention from researchers. A number of studies assessed the impact of such proposed change in regulation on the extractive industries. Sunder (1976) extended the literature on the accounting for extractive industries by analysing the effect of using the different methods on various accounting variables. Using simplified analytical model, Sunder established that FC income is relatively more identical to their Cash flow than those of SE and the average capitalized assets of FC firms are relatively more stable and higher than those of SE firms. The average Returns on Assets (ROA) and Debt to Equity ratio of SE firms were found to be higher than those of FC firms. Sunder also proposed a model for converting FC income to SE income and vice versa. His study sought to distinguish between accounting variables based on the accounting method used. It was quite clear from his studies that different accounting methods result in different accounting variables. But Sunder's study is limited because he used simplified assumptions which may not be very realistic using actual data.

Dyckman and Smith (1979), Collins and Dent (1979) and Lev (1979) are some of the studies that examined the impact of the proposed and new regulation on the stock market. The findings of these studies were conflicting in the sense that whilst Collins and Dent (1979) and Lev (1979) reported that the 1977 Exposure Draft had a negative impact on returns of FC firms, Dyckman and Smith (1979) found an insignificant effect on stock prices. These differences in results could potentially emanate from their choice of samples and their statistical techniques. Whilst Collins and Dent excluded Canadian

firms based in the US and used non-parametric tests, Dyckman and Smith included them and used parametric tests. Lev's study is considerable different from those of the other two authors in the sense that whilst they were concerned with permanency of stock price (whether the change was reversed after some time) and hence studied series of weekly stock returns for longer period such as 9 to 11 weeks for Dyckman and Smith (1979), and 28 weeks for Wetherly and Dent (1979), Lev (1979) used daily data for 7 days employing the famous market model. Given the volatile nature of the oil and gas industry studying stock returns for a longer period of time and attributing it for a single event in the past can be quite misleading so in that light Lev shorter period approach looks more robust and likely to have given an unbiased result.

When the recommendation of FASB to eliminate FC was overruled by the Security and Exchange Commission (SEC), Smith (1981) investigated the information effects of the reversal of Statement No. 19. Using the Reverse hypothesis method, the market model, and daily returns of 145 sampled firms, Smith reported that there was change in share price of FC firms when there was proposal for the FC method to be eliminated but when the decision was overruled the change in share price was reversed. This is just an expected result as the elimination of FC method would have meant that FC companies would write off significant sums of capitalised E&E costs, thus reducing their net book value significantly and causing them to suffer significant losses due to the writes off.

Johnson and Ramanan (1988) in their study of discretionary change in accounting method from SE to FC by oil and gas companies between 1970 to 1976 discovered that firms that change from SE to FC method were characterized by significantly higher levels of capital expenditures and debt financing in the year of FC adoption when compared to those who retained SE that is FC adoption. Their research was one of the few earlier studies on accounting practices in the extractive industries which used multiple periods (7 years) but their study was skewed in the sense that, they only examined switch from SE to FC but not the reverse which can equally be very fascinating. This implies that companies may switch between accounting methods if such change allows them to change the structure and appearance of their financial positions.

Using Ohlson (1995) model, Bryant (2003) conducted a study using 112 oil and gas firms over the study period 1994 to 1996. The study examined the value relevance of

the FC and SE methods of accounting using specifically in the area of exploration and development and concluded that both methods better explain firm value but comparatively, assuming stock prices are constant, FC firms' earnings and book values have higher explanatory power than those of SE's and hence over a long period of time FC method is more value relevant than SE. The assumption used by Bryant to arrive at this conclusion is highly unrealistic because for an industry like the oil and gas stock prices cannot remain unchanged for even a day and that accounts for one of its uniqueness.

Boone (2002) and Asekomeh *et al.* (2010) researched disclosure of oil reserves using present value and historical cost measures. Boone (2002) documented those errors in the present value method is on the average less than those on the historical cost measures and for that matter present value method explains more across firms and across time variation in stock prices. Asekomeh *et al.* (2010) also found a similar result stating that supplementary disclosures on the present value of reserves are more value relevant than historical cost disclosures.

Misund (2017) also studied the impact of accounting method choice and market value in the extractive industries using 3517 oil and gas firms and Ohlson (1995) model, he reported that cash flow measures are significantly associated to company returns than earnings. Which implies that the stock market lack confidence in companies' reported earnings figures. On the contrary, Power, Cleary and Donnelly (2017) documented that income statements of the main market-listed extractive firms are value relevant regardless of the accounting policy. They concluded by stating that flexibility in accounting for exploration expenditure is necessary to facilitate the disclosure of value relevant accounting information.

The above studies offer conflicting results which do not allow drawing one pattern of value relevance of financial statements and reported figures of extractive industries firm. However, what is certain is the diversity in accounting policies and practices by these companies result in different and incomparable accounting figures; a practice that does not allow an easy investments decision making. The complexities, uncertainties and uniqueness of the extractive industries underlie such diversity in research results. Therefore, it is key to research to what extent harmonisation of accounting practices by extractive industries is an urgent need and what sort of harmonisation may offer

stakeholders what they need without causing much distortion to the reporting companies.

3.4 Calls for Harmonisation and Standardisation of Accounting Practices

The gravity of the problem of diversity of accounting practices and its resulting issue of hindering comparability has compelled calls for harmonisation to be made over the past decades. Notable among these calls was the one by Curle in as far back as 1905 when he said:

> I hope that the time is approaching when the system of standardisation will be extended to mining costs and mining accounts. At the present the methods for each of these are legion and seem designed to conceal rather than reveal the financial position; but there must be some one method, in accounts especially, which is best of all (Curle, 1905, p. 29 cited IN Luther, 1996, p. 67).

In 1959, Smith and Brock commented that accounting for mining presents such severe problems that the accounts are "regarded rather lightly inside and outside the industry" (Smith and Brock, 1959; p. 14 cited IN Luther, 1996, p. 68).

In 1969, the Australian Poseidon boom and subsequent investor losses rekindled the interest in properly regulating the EI (Luther, 1996). Lourens and Henderson commenting on the boom stated:

> That some investors made a wrong decision is now clear; what is not clear, although frequently assumed in retrospect is that the published financial reports in some way contributed to such losses. If so, it was argued the time had come to make a stand on the issue of uniform accounting principles for the extractive industries (Lourens and Henderson, 1972, p. 4).

In the early 2000s, the IASC also reiterated the problem and the need for unifying accounting practices in the extractive industries by stating that:

> There is currently great diversity in accounting and disclosure practices by the extractive industries enterprises. Also, in many countries extractive industries accounting practices differ

> significantly from accounting practices used by enterprises in the other industries. These factors make it difficult for users to compare financial statements issued by mining and petroleum enterprises in different countries or by such enterprises and other enterprises in the same country (IASC, 2000, p. 4).

3.5 Past Attempts to Harmonise and Standardise Accounting Practices in Extractive Industries

Following these numerous calls for harmonisation, attempts have been made over the years to regulate the accounting practices in the EIs both at the national levels as well as at international levels but unfortunately, none of them has been successful (Luther, 1996; Gray, Hellman and Ivanova, 2019). One of the major attempts was in the USA during the oil crisis in 1973. Following the Organization of Arab Petroleum Exporting Countries (OAPEC) decision to cut oil supply to USA and other countries for supporting Israel during the Yom Kippur War (6 -25 October 1973), there was shortage of oil which forced the price of oil to rise from US$3 per barrel to nearly $12 globally (Painter, 2014). This crisis resulted in an exposure draft that was issued which endorsed the SE method as the only method to be used by all oil and gas firms. This proposal to eliminate FC method was vehemently opposed by FC user firms mining

Another major attempt to standardise accounting practices in the EIs was by the IASC in 1998 (Wright and Skousen, 2010) when a committee set to look into the matter also recommended the SE method as the preferred method and this was again opposed by FC extractive firms (Cortese and Irvine, 2010; Cortese, Irvine and Kaidonis, 2010). As a result of intense lobbying the standard which was issued that is, International Financial Reporting Standard (IFRS) Number 6, *Exploration for and Evaluation of Mineral Resources*, rather codified the existing diversity (Zeff, 2002; Cortese, 2011). As a result, the IFRS 6 could not resolve the problem of diversity in accounting methods in the EIs (Karapinar, Zaif and Torun, 2012; Abdo, 2016).

In spite of the numerous calls and the repeated attempts to standardize accounting practices in the extractive industries, diversity in accounting methods still persist up to date. Recognising the need for finality to be brought to the extractive issue, IASB put the issue back on its agenda and more recently in 2018, the IASB staff reiterated the growing public interest in extractive project and the need for work to start on it (IFRS,

2018). These are clear indications for the need of research to investigate into the diversity in accounting practices in the EIs.

3.6 Obstacles to Successful Harmonisation and Standardisation of Accounting Practices

Several factors have been documented as the cause for failure of past attempts to regulate the EIs in order to achieve harmony. In his review, Luther (1996) claims that the persistence of diversity of accounting methods in the EIs is the outcome of a strong link between powerful vested interests of large politically sensitive companies, intense political lobbying by smaller exploration-type companies, technical accounting complications, and a perception that, given the limitations of historical cost accounting, the cost of regulation and standardization would not be justified. Cortese, Irvine and Kaidonis (2009) noted economic consequences arguments have been used to support the flexibility of choice of accounting methods, which implies that the choice between the methods will help companies present the results of operations in a way that reflects their operating environment and circumstances. They further observed that the apparent reluctance of regulators and standard setters, including the IASB, to impose restrictions on this flexibility may well be because of the economic significance and associated political influence of the companies involved.

In a related study, Cortese, Irvine and Kaidonis (2010) in their critical investigative study of comment letters, applying critical discourse analysis and regulatory capture theory observed evidence of hidden coalitions between powerful players. The standard setting process thus has the potential to be captured by those being regulated, leading to the codification of existing practice under IFRS 6. Another study by Cortese and Irvine (2010) investigated the disparity between inputs and outputs of the IFRS 6 standard setting and used a black box metaphor for the standard setting process. They concluded that looking at the output which retained the FC and the input which demanded the elimination of FC, there must be invisible forces responsible for this. Noël, Ayayi and Blum (2010) in a similar study examined the international accounting standard setting process from an ethical perspective concluded that the composition of IASB and their approach do not meet the criteria of discourse ethics. Cortese (2013) examined a cross section of the constituents of the extractive industries comment letters

and other interactions with the process and concluded that key players can influence standard setting process and hence the process is politicized.

It is clear from these discussions that regulation in the EI have failed owing to the powerful influence of the players, political interest, economic consequences argument and intense lobbying by firms in the EI who are likely to be affected by any such regulation. It is therefore worth noting that, current and future attempts to regulate the EIs will suffer the same fate if not approach in a different way. It is for this reason, why this study employs the notion of institutional isomorphism by DiMaggio and Powell (1983) and Positive accounting theory of Watts and Zimmerman (1978) as theoretical lenses to explain the results and explore how standardisation can be achieved in EI in the face of resistance and opposition.

3.7 Standard Setting Processes and Lobbying Behaviour

The study by Luther (1996) which reviewed the development of accounting regulation by EI reveals the several attempts to standardise accounting practices and how most of them have not been successful. He concluded the lack of harmony in regulating the extractive industries is more politically motived than mere accounting and may not be altogether rational or conclusive.

Cortese, Irvine and Kaidonis (2007) subjected the entire IFRS 6 standard setting process into intense scrutiny by examining the players who were involved in the setting of IFRS 6 through the review of publicly available information (comment letters). Using critical investigative approach, they realised there was coalitions among the standard setters and lobbying bodies and that it how the process was influenced. Nichols (2008) study examined several aspects of the harmonization process by giving historical and current background of IAS in the oil and gas industry, then description of the IFRS 6 and then comprehensive extractive project and concluded that companies should expect changes as international convergence financial reporting approaches.

Whittington (2008) studied the role of Conceptual Framework of IASB, whether there is harmony or discord? Reviewing various discussions papers and conceptual framework, Whittington underscored the need for the Conceptual Framework to be revised so deal with some cultural differences since that it is needed for smooth adoption and acceptance of IFRSs. He also argues on the need for revisit on the

objective of financial reporting as indicated by 2006 discussion paper which he described limiting stakeholder only to providers of finance. This view of Whittington suggests that perceptions of users of financial reports will be helpful in standardizing accounting practices in the extractive industries. This view agrees with literature on the construction of accounting standards being an undemocratic process, thus involving stakeholders in engineering new accounting standards seems key for acceptance of such standards and a way of harmonising diverse accounting practices.

Their 2009 paper, Cortese, Irvine and Kaidonis (2009), sought to describe the history, current and the future state of accounting for extractive industries. Assessing the responses of constituents to the Issue Paper, they revealed that economic consequence argument was used to retain FC method. This study revealed that the effort of IASB was a mere replication of that of FASB and it seems that given the relative strength of the extractive industries the past is likely to repeat itself in the future.

Cortese, Irvine and Kaidonis (2010) described how powerful players in the extractive industries influence the outcome of the IFRS 6. The study used critical discourse analysis to analyse the comment letters of some key players and identified that the regulatory process was captured. The study is limited because the sample size of 52 comment letters out of 300 could be biased. Given that only 52 out of 300 commented were used in their study, which gives room for research to find out why the response rate was that low? Could it be because of short time for comment (3 months-16 January to 16 April 2004)? Lack of interest? Alternative ways of expressing opinion? Similarly, Jorissen *et al.* (2013) examined the constituents' participation in accounting standard setting by analysing 7442 comments letters and they observed increase participation over time. They also identified geographic biases in constituents which might induce criticisms.

Cortese and Irvine (2010) investigated the disparity between inputs and outputs of the IFRS 6 standard setting and used a black box metaphor for the standard setting process. They concluded that looking at the output which retained the FC and the input which demanded the elimination of FC, there must be invisible forces responsible for this. Noël, Ayayi and Blum (2010) in a similar study using Habermasian philosophy to examine the international accounting standard setting process from an ethical

perspective concluded that the composition of IASB and their approach do not meet the criteria of discourse ethics.

Cortese (2013) examined a cross section of the constituents of the extractive industries comment letters and other interactions with the process and concluded that key players can influence standard setting process and hence the process is politicised. Therefore, it can be stated that the standard setting process is questionable, and the lack of stakeholders' involvement in setting new accounting standards could be the reason for the failure of the many attempts by standard setting bodies to harmonise accounting policies and practices by extractive industries' companies.

3.8 Development of IFRS 6 and IASB Extractive Project

Given the diversity of accounting practices in the EI, the IASC, the predecessor of IASB set up a committee in 1998 to look into financial reporting for extractive companies and propose a potential method for inclusion in IAS. By November 2000, the committee published an Issue Paper Extractive Industries which noted that due to the variety of accounting methods, comparability of financial statements of extractive companies is difficult (IASC, 2000). The steering committee proposed that FC method should be eliminated and that companies should be allowed to capitalise costs and only expense costs that are related to unsuccessful projects. Invariably, the committee endorsed SE method and call for FC to be discontinued (IASC 2000; Cortese, Irvine and Kaidonis, 2009; 2010).

Similar to the opposition and resistance that characterised the attempt in the US to eliminate FC and allow SE, it was not possible for single accounting method to be agreed on. As argued by Cortese, Irvine and Kaidonis (2009), any attempt to regulate the EI will receive fierce opposition from industry players, national standard boards and other affected parties. Nevertheless, IASB initiated a research project in April 2004 to deal with accounting for EI and this project was carried by members of national standard setters from Canada, Australia, Norway, and South Africa assisted by advisory panel from extractive companies, accounting firms, users and security regulators across the globe.

A couple of months after, thus, June 2004, IFRS 6 was issued as a temporary standard with limited scope (IASB, 2004). The IFRS 6 was to serve as interim standard until

"the board completes its comprehensive review of accounting for extractive activities" (IASB, 2004: BC2). Companies could start adopting the IFRS 6 for the periods beginning on or after 1st January 2006.

The IFRS 6 was so laxed that it allowed companies to continue using their accounting policies they were using before adopting the standard. This also allowed companies to continue using their recognition and measurement practices that was in existence even before adopting the standard. As such, many have described that the IFRS 6 merely codified the existing diversity in practices (Cortese, Irvine and Kaidonis, 2009; Abdo, 2016). In addition, the standard did not define or include any specific accounting methods or policies which means companies could adopt varied accounting policy (Nobes and Stadler, 2021). Further to these, unlike other IFRSs with mandatory disclosure requirements, IFRS 6 did not include any mandatory disclosures (Constantatos *et al.,* 2021). The limitations of the IFRS 6 was pronounced that one may ask what the essence of the standard was. It was not surprising that four members of IASB disagreed because IFRS 6 allowed companies to continue using varied accounting practices which results in inappropriate recognition of assets (Constantatos *et al.,* 2021).

In April 2010, a Discussion Paper (DP) with findings from the research project committee set up in 2004 was published (IASB, 2010) and the Board indicated that the DP is the first step towards a possible IFRS to deal with the financial reporting issues in the EI (IASB 2010: para p 2: 12). The Board maintained that since IFRS does not permit choice in accounting treatment and so this exercise of choice will not be allowed in the EI (IASB 2010: para 4.7: 72). The DP recommended the Australian "area of interest method" and required acquisition of legal right of exploration as the basis for recognising asset. Any further costs incurred on E&E would be capitalised as "enhancement of the legal rights" and do not constitute a separate asset (IASB, 2010: 53).

Responses to the DP were invited to aid the IASB determine the next steps for IFRS 6. The main theme from the responses was that either the Board should develop a separate standard for EI or include it in a broader project for accounting for intangible assets. Years after receiving responses to the DP, the project was given low priority by the

Board, and it was just in July 2016 when the project was classified as Research Pipeline Project (IASB, 2016).

The research project for EI began in 2018 and national standard setters that contributed to the 2010 Discussion Paper and other stakeholders were asked to inform the IASB of any significant changes in extractive activities, especially in view of oil and gas markets' volatility (IASB 2019). At IASB meeting in March 2019, the feedback was presented, and this was further discussed in September 2019. There were conflicting views regarding the scope of the project. Whilst some advocated for improving existing recognition, measurement, and disclosure requirements of IFRS to foster consistency and comparability in financial reporting, other asked for withdrawal of IFRS 6 and including the extractive project to the intangible assets project. There were still others that believe nothing should be done since they think IFRS 6 is working well (Constantatos *et al.*, 2021).

Others also contend that standardisation of the EI will be difficult so the Board should rather consider additional disclosure requirements to help users fully understand the accounts of extractive companies (IASB, 2019; Nobes and Stadler, 2021). Similar recommendations were given by Field (1969) and Wise and Wise (1988). The latter opined that "Any progress towards more meaningful and useful financial information must come from increased supplementary disclosure of those items relevant . . . (and) conventional financial statements should be downgraded in their importance" (p. 30). re-echoed this. At present the IFRS 6 is still in use and diversity of accounting practice persists (EFRAG, 2020).

3.9 Critical Evaluation of the Related Literature

It is evident from the above review that the issue of diversity of accounting practices in the EI has been given considerable attention in the past, but there still remains some unanswered questions or unresolved issues and that is what this study sets out to address. Though this current study is closely related to the works of Abdo (2016; 2018), Power, Cleary and Donnelly (2017), Stadler and Nobes (2020), Constantatos *et al.* (2021), and Nobes and Stadler (2021), it is different in several regards.

Abdo (2016) apply content analysis to examine whether 122 oil and gas companies around the world comply with IFRS 6 and finds that there are some compliances with

the standard, however there are still some who differ in their compliance. This study confirms the existence of diversity accounting practice among oil and gas companies around the world. Though this study documents evidence of compliance with IFRS 6, it fails to acknowledge that compliance with a standard like IFRS 6 that gives flexibility can end up undermining harmony in treatments of transactions. This is because IFRS 6 allows companies to continue with their existing accounting methods which means once a company continues to apply its old accounting method, they are complying with the standard however the end up treating cost components differently from other similar companies adopting different accounting methods. This study does not offer much evidence on the level of harmony in accounting treatment among users of same and different methods. Abdo (2018) reviews existing literature to confirm the existence of diverse accounting methods in the EI and highlights the historical controversies and concludes that there is the need for a comprehensive accounting standard for the EI to deal with the existing diversity. Despite this study providing useful historical evidence about the controversy and the need to a standard, it does not offer clear guidelines on the pathways to standardise practices in the industry. This current research fills this gap by identifying clear pathways for standardising practices in the EI.

Power, Cleary and Donnelly (2017), using listed extractive companies on the LSE just like this current study, examine the accounting policies and the value relevance of their exploration assets. They find that companies take advantage of the flexibility offered IFRS 6 to adopt diverse methods in accounting for E&E They find that the income statements of Main Market-listed extractive firms contain value relevant information regardless of the policy followed by the firm. However, for the AIM-listed oil & gas companies only the Full Cost method provides value relevant information on exploration assets and only Expense All method users provide value relevant information in the mining sector. They conclude that flexibility in accounting for exploration expenditure is necessary to facilitate the disclosure of value relevant accounting information.

The conclusion of Power, Cleary and Donnelly (2017) leaves room questions such as: How does the flexibility to choose different accounting method affects level of harmony in treatment of pre-development costs? Do users of the same accounting method treat pre-development cost components the same way? How comparable are treatments of

pre-development costs among users of diffeerent accounting methods. These are few of the questions that Power, Cleary and Donnelly (2017) did provide answers to which this current study seeks to address.

Stadler and Nobes (2020) and Nobes and Stadler (2021) also investigate the diversity of accounting practices in the EI and find that variety of methods are adopted by companies. Stadler and Nobes (2020) hand-collected data on accounting policies from the annual reports of companies from 10 countries and find that most of the companies report to use successful efforts and full cost methods the way companies apply them are not consistent with the US definitions. They also find that policy choices are influenced by country of origin or listing of the company. Extending the literature, Nobes and Stadler (2021) review the notes to accounts of companies that adopt IFRS to identify policy choices used and find that eleven distinguishable accounting methods are used by these companies. They conclude that "This great degree of permissiveness is prima facie likely to damage the comparability of financial reporting in this major sector" (Nobes and Stadler, 2021, p.11). In offering solution to the problem, they recommend that E&E costs should be put within the scope of a revised IAS 38 that requires deferral of the costs of development until appraisal for viability at the level of a project. Insightful as the conclusion of their study is, Nobes and Stadler (2021) do not provide evidence on how the use of diverse method undermines comparability of accounts. To address this gap, this current study examines how they use of different methods impede both intra and inter-method comparability.

Similarly, Constantatos *et al.* (2021) explore the accounting policies used by 1096 companies from eight countries and examine the accounting treatment of E&E expenditure and the factors associated with the decision to capitalise, impair or expense these expenditure. They confirm the existence of diverse accounting methods and also find that there is a general inclination to capitalise and recognise significant amounts of internally generated E&E expenditure. Constantatos *et al.* (2021) did not offer clearly the which particular pre-development cost component has greater tendency to be capitalise. A clearer and more specific insight would have been useful. To address this, this current research dive deep to identify how eight different cost components are treated by users of various methods. By this, cost components with greater tendency to be capitalised can be identified and appropriate recommendation can be offered to

address the problem. They propose that the IFRS 6 should be revised or amended without offering clear guidelines on which aspects of the standard to be revised. This current study will extend the literature by offering clear pathways to standardise practices in the EI.

Though a large body of literature has been devoted to the issue of diveristy of accounting practices in the EI, there still remains other areas that need to be explored to gain full understanding of the issue and address it adequately. And this study aims to address some of these unexplored issues such as how different pre-development cost components are treated by users of various methods, the level of harmony in treatment of these methods and how comparable are these treatment. Findings from these areas will help to offer suggestions on pathways to standardise practices in the EI.

3.10 Chapter Summary

The chapter has reviewed literature on accounting for the EI. It discussed prior studies on diversity of accounting methods, calls for harmonisation, the standard setting process and the extent of opposition and lobbying that has characterise accounting regulation in the industry. Specifically, it has revealed that there is limited research regarding accounting treatment for pre-development costs among extractive companies adopting different accounting methods. Similarly, little is known about the extent of harmony in accounting treatment for pre-development costs, and the resulting effect on both intra- and inter-method comparability. This research therefore seeks to address these gaps in the literature.

CHAPTER FOUR
ACCOUNTING HARMONISATION, STANDARDISATION AND COMPARABILITY

4.1 Introduction

As economies and stock markets become globalised and investments transcend national borders, there is an increased need for financial information to be harmonised and financial statements to be comparable (Moulin and Solomon, 1989; Hoarau, 1995). This keen interest is hinged on the premise that accounting harmonisation can help to reduce differences between accounts prepared in different countries and allow users of financial statements to make comparisons of economic and investment opportunities and hence make informed investment decisions (Turner, 1983).

This chapter reviews literature on accounting harmonisation, standardisation, and comparability. It starts by defining the key terminologies used in this research and discusses the arguments related to accounting harmonisation. It further describes the methods of measuring accounting harmonisation and discusses the different aspects of accounting harmonisation research studies that have been conducted in the extant literature as well as the accounting issues examined. This chapter is organised as follows: the next section defines the key terminologies in this research such as harmony and harmonisation, standardisation, uniformity, and comparability. The types of harmonisation, arguments for and against harmonisation, method of measuring harmonisation are presented in sections 4.3, 4.4, and 4.5 respectively. Section 4.6 provides critical evaluation of related literature to identify the research gap being addressed by this study. Section 4.7 discusses the indices employed in this research and section 4.8 offers concluding remarks.

4.2 Definition of Key Terminologies

In this section, terms such as harmony, harmonisation, uniformity, standardisation, and comparability as used in the accounting literature and this thesis are defined and their relationship to standardisation, uniformity and comparability are further discussed.

4.2.1 Harmonisation and Harmony

Though there is no single universally accepted definition for accounting harmony and harmonisation as these concepts have been defined differently in prior studies, there

seems to be an underlying theme running through the definitions. Notable among them is consensus that harmony is a "state" whilst harmonisation is a "process" (van der Tas, 1988; Tay and Parker, 1990; van der Tas, 1992; Emenyonu and Gray, 1996). One of the earliest definitions of harmonisation was offered by Arpan and Radebaugh (1985), who define it as a process of setting boundaries to the degree of variation among accounting practices. Similarly, Doupnik (1987) describes it as the process by which differences in financial reporting practices among countries are reduced. van der Tas (1988), on the other hand, gives a basic definition when he defines harmonisation as a coordination, thus a tuning of two or more objects. Whilst Tay and Parker (1990) describe it as a process of moving away from total diversity of practice, Adams, Weetman and Gray (1993) define it as a process of improving the comparability of financial statements by limiting the degree to which accounting practices can vary. Similarly, Saudagaran and Meek (1997) describe harmonisation as a process by which differences in accounting practices among countries are reduced with a view to making financial statements more comparable and decision useful across countries. Mcleay, Neal and Tollington (1999) define it slightly different as a movement towards similarity in the choice between alternative accounting treatments.

Hoarau (1995), on the other hand, offers an additional variation to the definition by describing harmonisation as a "political process" which aims at reducing accounting practice differences across the globe to achieve compatibility and comparability (p. 218). In agreement, Nobes and Parker (2002) describe harmonisation as a process of enhancing compatibility of accounting practices by setting bounds to their degree of variation.

Similar to harmonisation, harmony has also been defined in different ways in the accounting literature. For instance, Tay and Parker (1990) define harmony as a point between the state of total diversity where firms adopt different accounting methods/practices and a state of total harmony (uniformity), where all companies adopt the same accounting method or practice. van der Tas (1992) also define accounting harmony as a certain degree of co-ordination of financial reports themselves (financial reporting practice) or financial reporting standards. In differentiating between harmony and harmonisation, Emenyonu and Gray (1996) indicate that harmony is a measure of a state at a point in time whilst harmonisation is the process when harmony at different

time periods are compared. Mcleay, Neal and Tollington (1999) interpret full harmony as a state when the distribution of accounting methods used is the same for all countries whilst Aisbitt (2001) and Rahman, Perera and Ganesh (2002) consider whether different companies disclose the same items, and Jaafar and McLeay (2007) consider full harmony to occur when similar companies are comparable.

It is evident from these definitions that harmonisation is a process which seeks to limit the degree of diversity in accounting practices by setting boundaries to ensure financial statements are comparable. This implies that for complete harmony to be achieved regarding a particular financial statement item, the process of harmonisation must ensure all companies in all countries adopt the same accounting method. However, this assumption is refuted by Archer, Delvaille and McLeay (1996) who argue that this assumption neglects the fact that companies' choice of different accounting method may be justifiable based on the economic circumstances they are confronted with. As an alternative, they offer a more mathematical definition which defines international harmony to exist when, "… other things being equal, the odds of selecting a given accounting method are identical in each country" (Archer, Delvaille and McLeay, 1996, p. 3). This notion of international harmony espoused by Archer, Delvaille and McLeay (1996) was built on by Mcleay, Neal and Tollington (1999) who contend that international harmony should be perceived as a state in which companies located at different countries around the world adopt accounting methods which are both suitable for their operating circumstances and recognisable internationally.

On the other hand, Jaafar and McLeay (2007) offer different perspective to the discussion by arguing that instead of viewing harmonisation to have occurred when all companies use the same accounting method, it should be explained as 'presuming that accounting will be fully harmonized when all firms operating in similar circumstances adopt the same accounting treatment for similar transactions, regardless of their domicile' (p. 157). Though their definition is similar to that of Mcleay, Neal and Tollington (1999) in that it takes into consideration the operating circumstance of the companies, it differs in the sense that country of domicile of a company is disregarded, rather all companies are seen as belonging to one global village. This view is consistent with one of the ways van der Tas (1988) sees international harmony which is "…the degrees of comparability of financial statements of companies regardless of their

countries of origin" (p. 165). Similar view is shared by Taplin (2004) who indicated that harmony in European community can be assessed by viewing all companies as belonging to the same "nation" disregarding their country of origin (p. 58). According to van der Tas (1988), this view is consistent with how international investors see harmonisation and view the whole investment market.

4.2.2 Standardisation and Uniformity

Standardisation and uniformity are concepts closely related to harmonisation and harmony in the accounting literature. Similar to harmonisation and harmony, standardisation is a process whilst uniformity is a state. The concepts of harmonisation and standardisation have been used interchangeably in the accounting literature (Emenyonu and Gray, 1996), but van der Tas (1988) underscore that harmony and rigid uniformity should not be viewed as synonyms. However, Tay and Parker (1990) distinguish between the two by describing standardisation as a movement towards uniformity whilst harmonisation is a movement away from total diversity of practice. For Tay and Parker, the main difference between harmonisation and standardisation rest with the level of flexibility or strictness in the application of accounting rules and practice. Whilst standardisation applies to situations where regulations and practices are increasingly strict or rigid, and ultimately aim at a state of uniformity, harmonisation applies less strict regulations and aims at harmony. Similarly, Choi, Frost and Meek (1999) define standardisation as the imposition of a rigid and narrow set of rules, and this may even apply a single standard or rule to all situations. In agreement, Emenyonu and Gray (1996) view standardisation as a movement away from total diversity towards total uniformity. Likewise, McLeay, Neal and Tollington (1999) contend that standardisation is a movement towards uniformity whereas harmonisation movement towards similarity in the choice between alternative accounting treatments.

Conversely, Most (1994) offers slightly different perspective to the definition of these concepts. He defines uniformity as the elimination of accounting alternatives, whilst standardisation is the reduction of alternatives yet retaining a high degree of flexibility of accounting responses. But harmonisation is just reconciling the different accounting and financial reporting system by putting them into a common broad classification, so that their form become standard whilst contain retains significant differences. Cañibano and Mora (2000) describe harmonisation as a more realistic and conciliatory approach

which seem more achievable than rigid standardization. Conversely, Goeltz (1991) asserts that even full harmonisation is neither practical nor true valuable.

An interesting perspective is offered by Barbu (2004) who claims that harmonisation and standardisation are two main stages of accounting standard setting process at international level with harmonisation at the beginning of the process and standardisation at the end, whilst a process the author calls "normalisation" is located in between the harmonisation and standardisation (p. 5). In describing the proposed stages of standard setting process, Barbu (2004) indicates that when there is diversity in accounting practices, harmonisation process ensures harmony (comparability) is achieved. After harmonisation, rules must be made stricter so that accounting choices will be less and the process in achieving this level of rigidity is the normalisation process. At the tail end of the continuum is uniformity, and the process that leads to this state is standardisation. At this point, accounting choices do not exist and under extreme cases limited to only one and there is unique and universal application of rules.

It is evident from the existing accounting literature that, standardisation is a process which leads to uniformity- where rules are stricter and results in adoption of single accounting rule with universal application where accounting choices cease to exist especially at the state of total uniformity (Samuel and Piper, 1985; Choi and Mueller, 1992; Tay and Parker, 1992; Cañibano and Mora, 2000; Barbu, 2004).

This study is therefore framed on the concept of accounting harmonisation and standardisation proposed by Tay and Parker (1990), Barbu (2004) and Jaafar and McLeay (2007). By this, harmony is defined as as a point between the state of total diversity where firms adopt different accounting methods/practices and a state of total harmony (uniformity), where all companies adopt the same accounting method or practice. Thus, the process of moving away from diversity by eliminating the diverse practices is referred to as harmonisation. But the ultimate goal is to achieve standardisation where there is movement towards uniformity and regulation are strict and rigid. By this, this study views accounting practices as standardised when all firms operating in the extractive industries (similar operating circumstances) adopt the same accounting treatment for similar transactions (pre-development expenditures), regardless of their country of origin and there is regulation in place to ensure companies do not deviate from the defined practices.

4.2.3 Comparability

Historically, countries around the world have had their own national accounting standards which they have cherished dearly as part of national sovereignty. But in the quest to be part of globalized economy, where businesses are required to operate and attract investors beyond their national borders, there is an urgent need for a common set of accounting and financial reporting standards that can be used and appreciated by different people around the globe (Barth, 2013). The adoption of accounting standards that require high-quality, transparent, and comparable information is welcomed by all users of financial statements. Without a common set of accounting and financial reporting standards, it is difficult to compare financial information prepared by entities located in different parts of the world. The process of resource allocation depends on comparisons of investment alternatives. A time-series comparison of financial statements of a business entity enables investors to form an intelligent opinion concerning the value of their investment and to manage it rationally. A cross-section comparison of financial statements helps shareholders and other stakeholders form a judicious opinion regarding the comparative value of their equity and interest and efficiently manage their interests. More so, cross-section comparability raises the efficiency level of national resource utilization and of international wealth allocation (Revsine, 1985; Hoarau, 1995; Radebaugh, Gray and Sidney, 1997). This has made comparability an important concept in financial reporting. Because of its importance, the IASB and FASB, have from their inception pursued it as one of their key objectives with the most recent joint conceptual framework revision project classifying comparability as one of the enhancing qualitative characteristics of financial information (FASB, 2010; IASB, 2010).

According to the Conceptual Framework of accounting, comparability enables users to identify similarities and differences among items, both between different periods within a set of financial statements and across different reporting entities (IASB, 2018). Consistent application of methods to prepare financial statements helps to achieve comparability. For information to be comparable, like things must look alike and different things must look different (IASB, 2010). DeFranco, Kothari and Verdi (2011) interpret comparability to mean that similar set of economic events should produce similar accounting amounts among firms that prepare their financial statements in accordance with the same accounting standards. Similarly, Barth, Landsman, Lang and

Williams (2012) regard accounting amounts as comparable if they explain the same variation in economic outcomes.

Gill and Rosen (2007) argue that any accounting standard which allows similar transaction to be treated in different ways or allows the use of different methods may impede comparability. Whilst some researchers argue in favour of flexibility in the choice of accounting method (McLeay, Neal and Tollington, 1999; Power, Cleary and Donnelly, 2017), others believe otherwise (Emenyonu and Gray, 1992; Misund, 2017). Those in favour of flexibility of choice contend that it allows firms to select the methods that are most appropriate for the specific circumstances (Archer, Delvaille and McLeay, 1996; McLeay, Neal and Tollington, 1999; Power, Cleary and Donnelly, 2017; Taplin, 2017). On the contrary, those who contend against flexibility of choice of accounting methods opine that flexibility poses a number of challenges for users of financial statements (Amernic, 1979; Abdo, 2018). They argue that flexibility which leads to diversity gives room for firms to manipulate their earnings and overstate their assets values (Flory and Grossman, 1978; Deakin, 1979; Bryant, 2003; Misund, 2017; Abdo, 2018) and this provokes serious concerns about comparability of financial statements (Most, 1974; Amernic, 1979; Bryant, 2003; Abdo, 2016; Misund, 2017; Abdo, 2018). The adverse impact on comparability has been a subject of numerous discussions because of the importance of comparability as a qualitative characteristic of accounting information.

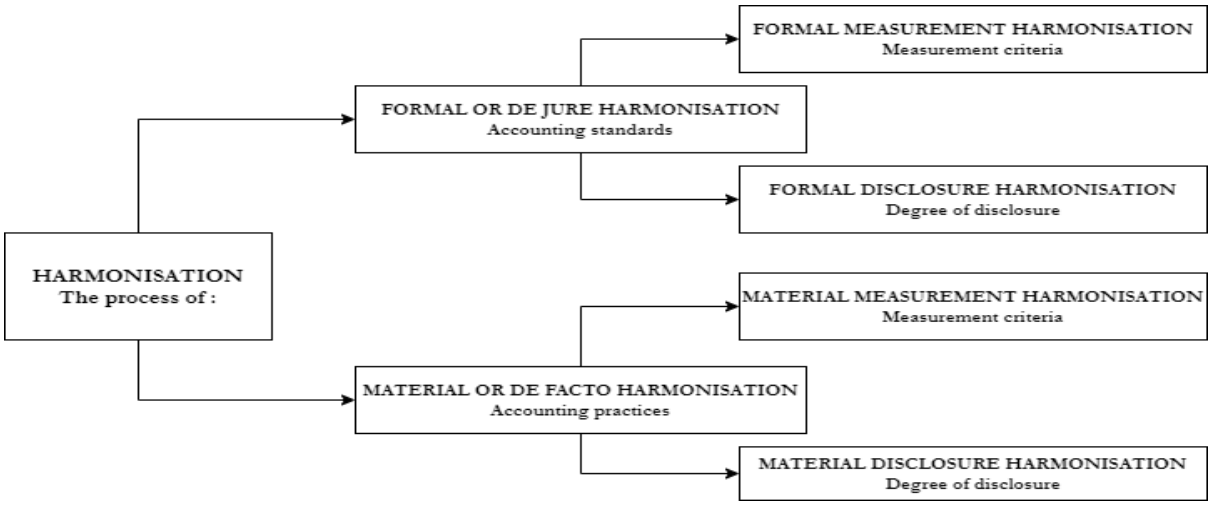
Flower and Ebbers (2002) opine that accounting policy choice also impacts comparability. Ding *et al.* (2007) further supported the argument of Flower and Ebbers (2002) when they underscore that any mandatory accounting policy changes are often expected to result in changes of accounting practice and affect comparability of accounts. In order to increase comparability, Kirkpatrick (1985) proposes that as the number of alternative accounting practices reduces harmonisation (comparability) can be enhanced. van der Tas (1992) contends that when the choice made by companies between alternative accounting methods is clustered on one or only a small number of accounting methods, comparability improves, even when the number of available methods remains the same. Parker and Morris (2001), on the other hand, argue that the convergence of accounting standards is one of the key drivers of comparability between financial reports. Jaafar (2004) also suggests that for users of financial reports to be

able to make comparison of financial information, there must be a full disclosure on the accounting policies used by the companies and the changes in these policies as required by IAS 8 *Accounting Policies, Changes in Accounting Estimates and Errors*.

4.3 Types of Harmonisation

van der Tas (1988), in his exploratory article, distinguished between two main types of harmonisation and these two seem to have become popular in the accounting literature. He groups them into "harmonisation of financial reports" which he also refers to as "material harmonisation" and "harmonisation of standards" which is also called "formal harmonisation" (p. 158). In the accounting literature, material harmonisation is also called "de facto" harmonisation whilst formal harmonisation is called "de jure" harmonisation (see Tay and Parker, 1990; Cañibano and Mora, 2000; Pierce and Weetman, 2002). This section discusses these types of harmonisation and their sub-classifications as illustrated on Figure 4.1.

Figure 4. 1 Types of Harmonisation



Source: (Cañibano & Mora, 2000, p. 352)

As can be inferred from Figure 4.1, harmonisation can aim at either accounting standards or accounting practices. If the process aims at harmonising accounting standards or regulation, it is called formal harmonisation. van der Tas (1992) defines formal harmonisation as the degree of co-ordination of financial reporting standards whilst Cañibano and Mora (2000) describe it as harmonisation of accounting regulations. But harmonisation process aimed at harmonising accounting practices or financial reports is called material harmonisation. In a more structure sense, van der

Tas (1992) defines it as the degree of co-ordination of the financial reports themselves (financial reporting practice). In distinguishing between material harmony and formal harmony, van der Tas further adds that material harmony refers to the harmony of the accounting methods actually applied in the financial reports which widely known as the accounting practice which includes the amount and detail of data actually provided in the financial reports. Whereas formal harmony refers to the harmony of the financial reporting standards (legal or other requirements or guidelines).

van der Tas (1992) argues that material harmonisation might be important for users of financial statements reading the financial reports of different companies and willing to compare them, whilst formal harmonisation could help in achieving harmonisation of financial reports (material harmonisation) and also for companies with financial reporting obligations in several countries. Though formal harmonisation can result in material harmonisation (Rahman, Perera and Ganeshanandam, 1996), it is not always the case as formal harmonisation which gives room for more accounting choice can lead to material disharmony (Cañibano and Mora, 2000). Material harmonisation can occur without being influenced by formal harmonisation and this is called "spontaneous harmonisation" (van der Tas, 1988, p. 158).

Formal and material harmonisation can be further classified either according to the degree of disclosure, which is called disclosure harmonisation, or according to the accounting methods employed which is called measurement harmonisation (van der Tas, 1992a; 1992b). Disclosure harmonisation is about the amount and detail of data provide in the financial statement, for instance, whether or not to disclose directors' remunerations or whether or not to disclose how pre-development expenditure by phases. Measurement harmonisation, on the other hand, relate to the way in which transactions and events are reflected in the financial report and consist of the choice of alternative methods of recognition, valuation, income determination, calculation, and presentation. For instance, the choice between alternative accounting methods for pre-development expenditure, stock valuation etc.

This thesis is concerned with material or de facto harmony and looks more at measurement harmony because it examines accounting treatment (practices) for pre-development costs among extractive companies to assess the extent of harmony in practice among users of the different methods.

4.4 The Need for Accounting Harmonisation

The issue of accounting harmonisation has been a subject of great controversy for some time now and its importance cannot be overemphasised especially that companies have become global and their quests for external funding have increased. Whilst some researchers have vehemently advocated for accounting harmonisation, others think it is unnecessary, a mere waste of time and money (Goeltz, 1991; Nobes and Parker, 2004).

4.4.1 Arguments for Accounting Harmonisation

Advocates for accounting harmonisation contend that there are compelling empirical evidence in support of the use of common standards or accounting practice by companies from different countries improves comparability of financial information and brings benefits to capital market, international investors, and analysts (see Palea, 2007; Daske *et al.*, 2008; Li, 2010; Landsman, Maydew and Thornock, 2011; Daske *et al.*, 2013). Radebaugh and Gray (1997) argue that the calls for international accounting harmonisation emanate from a wide range of interested groups and organisations such as trade unions, governments, investors, banks, accountants, auditors, creditors, and general public. Nobes and Parker (2002) reclassify these beneficiaries as regulators, preparers, and users of financial information.

For its advocates, as companies become globalised, their need for investors outside their home countries becomes inevitable. And for such external funds to be attracted and accessed at lower cost, there is a compelling need for investors to be provided with financial information in an internationally comparable manner which show the quality of earnings and assets of their company (Diamond and Verrenchia, 1991). This is because the investment decision is not an easy one and requires careful analysis and comparison of different investment opportunities on the market before a final decision can be made. This process will be impeded if financial reports are not harmonised and hence not comparable (Cairns, 1994; Saudagaran and Meek, 1997). As underscored by Moulin and Solomon (1989), the reduction of differences between accounts prepared in different countries is increasingly seen as beneficial, as investment transcends national boundaries. As diversities in accounting practice persist, they result in incomparable financial information even for similar transactions (Walton, 1992; Norton, 1995) which can hinder the users of financial reports ability to uncover the true financial state of the companies and may be misled in their decision.

Sharpe (1999) posits that accounting harmonisation helps to decrease investment risks and cost of capital and costs involved in multiple reporting. Additionally, it limits contradictions arising from differences in financial position and performance because of disparity in accounting standards and accounting practices applied in the preparation of accounts. Similarly, Saudagaran and Diga (1998) suggest several benefits which includes cost savings for multinational companies, improving comparability of cross-border financial reports, and enhancing accounting standards and practices quality. According to Gleeson (1998), regulators and international bodies such as IASB, FASB, OECD, have join the call for accounting harmonisation because it will accrue a number of benefits which includes protecting investors, ensuring efficient capital market operations, and promoting free trade and investment. Being aware of the potential benefits of harmonisation, these international bodies and agencies have invested considerable amount of time and resources in this process (Emenyonu and Gray, 1992; Roberts, Salter, and Kantor, 1996) which justifies its need.

4.4.2 Arguments against Accounting Harmonisation

Conversely, there have been arguments against the need for accounting harmonisation. Briston (1989) have questioned the value and feasibility of harmonisation whilst Choi and Levich (1991) suggest it is unnecessary. Samuels and Oliga (1982), on the other hand, caution that the process may be detrimental in certain perspectives. Though Mueller (1967) speculates that globally accepted accounting standard may be a possibility in the future, he cautions that there may be justifiable reasons, such as environmental differences, why adopting a single uniform accounting standards may not be an appropriate action to take. Similar thoughts are shared by Choi (1981) who indicated some environmental differences may justify such disparities in accounting practices and standards and hence there is no need for harmonisation. Rahman, Perera, and Ganesh (2002) also assert that if financial information are not comparable, then it may emanate from peculiar market and firm characteristics and not necessarily the accounting standards or practices and under such situation if companies are compelled to adopt standards and practices not suitable for their circumstance it may result in poor quality financial reporting.

Unlike Mueller (1967) who feels harmonisation could happen in the near future, Goeltz (1991) strongly believes it is a mirage and may never happen. He buttresses his point

with the fact that nations have vested interests in preserving their own standards and practices because these are evolved with time and have become part of their histories. He further argues that uniform accounting standards may not be able to handle national differences and culture and for that matter see internationally accepted accounting standards as unrealistic approach to resolving a complex issue.

In a study of behavioural effects of accounting diversity, Choi and Levich (1991) observe that half of financial analysts interviewed did not find accounting diversity to be a challenge whilst the remaining half indicated accounting diversity affects their capital market decisions hence the harmonisation may be justifiable. In rebutting the argument in support of harmonisation Goeltz (1991) maintains that analysts have other alternative ways of adjusting accounts to a common standard on which they base their investment decisions. But Goeltz loses sight of the cost and time involved in using the alternative way which may be needless when accounts are adequately harmonised.

Though, there seems to be lack of consensus on the issue of accounting harmonisation in the academic literature, international accounting bodies still appear interested in achieving that, no wonder, they initiated a joint convergence project in 2005 (see Whittington, 2008) and there is also continuous push and progress in the adoption of global accounting standards (IFRSs) with about 166 jurisdictions, including all of the G20 jurisdictions, using the standards (IFRS, 2018).Additionally, given that extractive companies are international in nature and those listed on major stock markets in UK/Europe, Canada, South Africa and Australia follow IFRS and roughly engage in similar investment activities, their stakeholders require a common accounting language to understand and compare their reported figures. To achieve this, there is need for diversity to be eliminated and hence the need for harmonisation and standardisation of accounting practices in the EI.

4.5 Methods of Measuring Accounting Harmonisation and Comparability

In pursuit of harmonising accounting practices and standards to promote comparability and reap the other incidental benefits that come with them, several methods have been employed to measure the degree of accounting harmony in the literature. It has been reasoned that accurate measurement of the level of accounting harmony is particularly useful to accounting policy makers and standard setters because it helps in identifying areas of diversity which deserve attention and hence efforts can be directed there (Pierce

and Weetman, 2000). Additionally, harmonisation methods can be used to assess the progress or success of international standardisation of accounting practices. Earlier harmonisation measurement methods were based on descriptive statistics and variance analysis (see Nair and Frank, 1981; McKinnon and Janell, 1984; Doupnik and Taylor, 1985) which are quite problematic and the challenges with these approaches have been well emphasised by Tay and Parker (1990) and van der Tas (1992a).

van der Tas (1988) spearheaded the new era of measuring accounting harmonisation and harmony at both national and international levels in the accounting literature using indices. Under the index approach, two groups are identified, and they are the concentration-based index and the Combinatorial-based indices. Though the two are similar in some respect, they differ in other regards. Whilst concentration-based indices show increase in harmonisation as accounting choice is reduced and more companies concentrate on fewer options available, combination-based indices measure the number of pairs of companies that adopt a comparable accounting policy relative to the total number of pairings that would be possible if all firms were to produce comparable accounts (Jaafar, 2004). One major limitation with indices is that no significance tests have been devised to measure the statistical significance of the index values as well as their variations (Tay and Parker, 1990). This section discusses some of the harmony and comparability indices used in the accounting literature.

4.5.1 H-index

In the accounting literature, van der Tas (1988) was the first to apply the concentration-based index, Hirschman-Herfindahl (H) index, which was quite popular among industrial economists in measuring industry concentration. He used it to measure harmony at both national and international levels. Regarding international harmony, van der Tas (1988) suggests two viewpoints. One is to view all the sample companies as coming from one country and measuring the level of comparability of financial reports of these companies. This means country of origin does not matter. The second viewpoint is where level of international comparability is the measure of how companies in one country apply the same or limited methods compared to companies in other countries. He opines that the former is the way international investors compare financial reports, that is the country of origin of companies does not matter. He maintains that when the first viewpoint of disregarding country of origin of companies

are used, the H-index is appropriate in measuring international harmony and harmonisation.

By this the level of concentration of accounting policy choice among sample companies determines the extent of harmony among them. Which implies that, as alternative policy choice clusters around one or two methods, then harmony level will be high and vice versa. The H-index is computed as follows:

$$\boldsymbol{H - index = \sum_{i=1}^{n} p_i^2}$$

$$\boldsymbol{H = Herfindahl\ index}$$

$$\boldsymbol{p_i = the\ relative\ \ frequency\ of\ accounting\ methods\ i}$$

$$\boldsymbol{n = number\ of\ alternative\ accounting\ methods}$$

The index value varies from 0 for extreme diversity to 1 for absolute harmony of accounting methods, and the trend in index values over time shows the level of harmonisation. Comparing the H-index to other methods he called the "rough method", van der Tas (1988) argues that H-index is simple, easy to calculate and provide more information than methods he termed that use reflective frequency of accounting method or sum relative frequencies (p. 159). He further added that when only two accounting methods are involved the "rough method" yield the same index value as the H-index but when more than two accounting methods are involved then the H-index is a better measure of harmony and harmonisation. Regardless of its merits, H-index values and their variations, just like other concentration indices values, cannot be test for statistical significance, a limitation van der Tas (1992) acknowledged. van der Tas (1998) points out another limitation with the H-index as it is not able to accommodate multiple reporting[17].

[17] Multiple reporting means that a company gives additional information based on an accounting method other than its primary accounting method (van der Tas, 1988, p. 158)

4.5.2 I-Indices

4.5.2.1 van der Tas (1988) I-index

Consistent with the second viewpoint put across by van der Tas (1988) when has been explained earlier, he introduced the I-index. It is used to measure the degree of harmony of accounting policy choice across different countries. It is seen as the international version of H-index. The I-index is computed by multiplying the relative application frequency of each particular accounting method in one country by the corresponding relative frequency of the same method in the other countries, and subsequently adding together the results of all alternative methods. One advantage with the I-index is that it gives equal weight to each country regardless of the number of companies in the sample, however, it does not allow for multiple reporting (Taplin, 2004). Mathematically, I-index can be computed as:

$$\textbf{van der Tas (1988)}\ I-index = \sum_{i=1}^{n} (f_{i1} \text{ x } f_{i2} \text{ x } \ldots . f_{im})$$

$f_{i1} =$

$the\ relative\ \ frequency\ of\ accounting\ treatment\ i\ of\ accounting\ method$ **1**

$n = the\ total\ number\ of\ alternative\ accounting\ treatments$

$m = the\ number\ of\ accounting\ methods$

4.5.2.2 van der Tas (1988) Corrected I-index

One limitation with the I-index is that the index value tends to be zero as the number of countries increase since the additional relative frequencies will almost always be fractions, leading to a skewed distribution over the range 0-1. In dealing with the skewness problem, van der Tas (1988) suggested a correcting factor of (m-1)th root to be applied which results in a corrected I-index formulated as:

$$\textbf{van der Tas (1988)}\ corrected\ I^{*} - index = \sum_{i=1}^{n} (f_{i1} \text{ x } f_{i2} \text{ x } \ldots . f_{im})^{1/(m-1)}$$

Even with the correcting factor, Emenyonu and Gray (1996) point out that result of the I-index can be misleading where all the companies from a particular country adopt one method which is not used at all by any of the companies from the other countries. Archer and McLeay (1995) also criticise van der Tas's corrected I-index by contending that the correcting factor "*1/(m-1)*" is inconsistent with the I-index being a version of H-index as the "*1/(m-1)*" is not equal to exponent used in the H-index which is 2. In order to make the I-index analogue of the H-index as stated by van der Tas, Archer and McLeay (1995) propose a different correcting factor which "2/*m*" and hence an adjusted I"-index which is formulated as:

$$\textbf{Archer and McLeay (1995)}\ \boldsymbol{I-index} = \sum_{i=1}^{n} (\boldsymbol{f_{i1}}\ \mathbf{x}\ \boldsymbol{f_{i2}}\ \mathbf{x}\ \ldots.\ \boldsymbol{f_{im}})^{\mathbf{2/m}}$$

Because the I-index involves multiplication of the relative frequencies, the index is sensitive zero proportion (relative frequencies). In such cases, whilst Emenyonu and Gray (1996) suggest that I-index is not computed, Herrmann and Thomas (1995) recommend changing the proportions from 1 and 0 to 0.99 for unanimous method (s) and 0.01 for non-practised method. Regardless of these limitations, the I-index remains one of the widely used indices in harmony and harmonisation studies (see Emenyonu and Gray, 1992; Garcia Benau, 1994; Herrmann and Thomas, 1995).

4.5.3 C-Indices

4.5.3.1 van der Tas (1988) C-Index

In addressing one of the limitations of the H-index which is its inability to take into account multiple reporting, van der Tas (1988) introduced a combinatorial-based index called the C-index which he argues can resolve the above-mentioned limitation. The C-index, as a measure of comparability, was later used to quantify international harmony (van der Tas, 1992a). With the C-index, he asserts that the level of comparability of financial reports in a country can be measured by relating the number of 'compatible' pairs of companies to the number of pairings possible (van der Tas, 1988, p. 163). Hence two reports can be deemed to be comparable if both companies apply the same accounting method or if one or both of them give additional information to aid comparison. Taplin (2004) explains the C-index to mean the probability that two

companies selected randomly (without replacement) from the sample have accounts that are comparable. By definition, C is the ratio of the actual number of pairwise comparisons in a set of financial reports to the maximum possible number of comparisons. The van der Tas C-index is computed as:

$$\textbf{van der Tas (1988) C-index} = \frac{\sum_{j=1}^{j} x_j(x_j - 1)}{x_{++}(x_{++} - 1)}$$

Where:

x_j= the number of firms applying method j

j= total number of alternative accounting methods

x_{++}= total number of firms

Similar to the H-index, the C-index ranges between 0 where different methods are applied by each company, hence no pairs of financial reports are comparable and 1, where all companies adopt the same accounting method or treatment. The similarity between the H and overall C indices is well documented (van der Tas, 1988), however, the C-index has an advantage over the H-index in the sense that it allows multiple reporting. But the C-index has been criticised for giving more weight to countries with a larger number of sampled companies (Taplin, 2004). Archer, Delvaille and McLeay (1996) also criticise that with large number of companies and full disclosure, the C-index value approaches 1/n when there is an equal distribution of accounting policy choices, where "n" is the number of accounting methods applied. Krisement (1997) also reveals that when the number of companies observed increased from 100 to 200, with relative frequencies maintained at 60:40, the index value changes from 0.516 to 0.51759. It could be argued that such a small variation is unlikely to affect conclusions drawn from the index.

4.5.3.2 Archer, Delvaille and McLeay (1995) Disclosure-Adjusted C-Index

Non-disclosure regarding accounting policy has been highlighted in the literature as an issue which can be inhibit the interpretation of harmonisation results (see Archer, Delvaille and McLeay, 1995; Morris and Parker, 1998; Pierce and Weetman, 2000).

Archer, Delvaille and McLeay (1995) offer two potential interpretations of behaviour of non-disclosers, and they are firstly, to make a "default assumption" which implies assuming the non-disclosers have used the method applicable to its circumstances as required by laws of the country. When this assumption is made, the financial reports of these non-disclosing are deemed to be comparable with others prepared using that method. The second assumption is to presume that the financial reports of the non-disclosing are not comparable with those prepared by other methods regarding the item under consideration. Additionally, non-disclosure may occur simply because it is not applicable to the companies. In this case, Morris and Parker (1998) and Pierce and Weetman (2000) recommend that accounts should be seen as comparable with other accounts since the financial position would not change regardless of the accounting treatment used among alternatives. As a result, the accounts of each non-discloser categorised as not applicable are comparable with those of all other non-disclosers and also with every disclosing firm, at least with respect to the item in question. However, Pierce and Weetman argument does not stand for oil and gas companies that use different accounting methods. This is because FC companies capitalise expenditure that SE companies write off, therefore the size of intangible assets is different between users of these two methods.

Archer, Delvaille and McLeay (1995) therefore modified the basic C index by including firms which do not disclose their accounting policy. The adjusted C index is referred to as Archer, Delvaille and McLeay (ADM) C-index in this thesis and is computed as:

Archer, Delvaille and McLeay (1995) disclosure-adjusted C-index =

$$\frac{(\sum_j x_{+j}(x_{+j}-1))+(x_{+\mathrm{na}}(x_{++}-x_{+na}))}{x_{++}(x_{++}-1)}$$

Where:

x_{+j}= the number of firms applying method j

$x_{+\mathrm{na}}$= total number of firms for which the policy item is non-applicable

x_{++}= total number of firms including non-disclosers and non-applicable

4.5.3.3 Archer, Delvaille and McLeay (1995) Within-Country C-index

Apart from including non-disclosers, Archer, Delvaille and McLeay (1995) argue that the C index can be decomposed to allow distinction between comparability within countries and between countries. The within-country index is the ratio of the number of pairs of comparable companies operating within a country to the total number of intercompany comparisons that can be made between firms operating in that country, if all companies select the same accounting method. For an international sample, within country comparability overall may be measured by aggregating across countries. Using the notation in Archer, Delvaille and McLeay (1995), the formula is:

$$\textbf{Within} - \textbf{country C index} = \frac{\sum_i \sum_j (x_{ij}(x_{ij} - 1))}{\sum_i (x_{i+}(x_{i+} - 1))}$$

4.5.3.4 Archer, Delvaille and McLeay (1995) Between-Countries C-index

On the other hand, the between-country index is indicated by the ratio of the number of pairwise comparisons that may be made between companies selecting the jth accounting method, but operating in different countries, to the maximum number of such comparisons that may be made. The index formula is expressed as follows:

$$\textbf{Between} - \textbf{country C index} = \frac{\sum_i \sum_j (x_{ij}(x_{+j} - x_{ij}))}{\sum_i (x_{i+}(x_{++} - x_{i+}))}$$

Where:

$x_{ij} = \ the\ number\ of\ firms\ adopting\ accounting\ method\ j\ in\ country\ i$

$x_{i+} = the\ total\ number\ of\ firms\ in\ the\ country\ i$

x_{+j} *= the total number of firms adopting method j*

x_{++} *= the total number of firms*

Archer, Delvaille and McLeay (1995) contend that their between-country C index is more robust than index measuring international harmony. However, Krisement (1997) criticised Archer, Delvaille and McLeay's (1995) model, as the within and between country components do not sum to the value of the total index. This therefore fails the

requirement that Krisement (1997) cites that the index shall be decomposable additively into the contributions of enterprises in a segment.

4.5.3.4 Taplin (2004) T-Index

One index which is relatively new compared to the other indices in the literature is the T-index proposed by Taplin (2004). Taplin describes this index as a generalization of the I-index for two countries but also share features of the H and C-indices. He further adds that the T-index does not possess the "undesirable properties" of the I-indices for more than two countries (Taplin 2004, p. 58). He argues the T-index resolves the multiple reporting challenges associated with the I-index and the unequal weighting problem with the C-index. The T index is easily interpreted as the probability that two randomly selected companies have accounts that are comparable, or as the average comparability of pairs of companies.

The formula for T-index is given as:

$$\mathbf{T} = \sum_{i=1}^{N} \sum_{j=1}^{N} \sum_{k=1}^{M} \sum_{l=1}^{M} \propto_{kl} \boldsymbol{\beta}_{ij} \boldsymbol{\rho}_{kl} \boldsymbol{p}_{ij}$$

Where

$\propto_{kl}$ is the coefficient of comparability between accounting methods k and l,

$\boldsymbol{\beta}_{ij}$ is the weighting for the comparison between companies in countries i and j,

$\boldsymbol{\rho}_{kl}$ is the proportion of companies in country i that use accounting method k,

$\boldsymbol{p}_{ij}$ is the proportion of companies in country j that use accounting method l, and there are N countries (labelled 1 to N) and M accounting methods (labelled 1 to M).

The T index will be between 0 (no two companies are comparable) and 1 (all companies are comparable with each other). Taplin (2004) argues that though the formula for T-index looks complex, but its strength is in its flexibility which emanates from its ability to specify which accounting methods are comparable and the probability that the companies should be selected form a given pair of countries. Whilst Archer, Delvaille

and McLeay (1995) between-country C-index is based on random selection without replacement, T-index is based on random selection with replacement.

Though Taplin (2004) argues that the T-index is superior to other indices, the T-index has not been employed much in empirical studies for several reasons. First, the T-index has been described as complex (Taplin, 2004). Second, there is subjectivity in the weighting needed in generating the T-index. Unlike the H, I and C indices which offer clear simple and straightforward guidance on how weights are assigned, in generating the T-index, Taplin (2004) suggests three natural weighting schemes to be given to countries – either companies are weighted equally, or countries are weighted equally, or countries are weighted according to the total population number of companies in each country (p. 64). The use of different weighting schemes may result in different T-index values. These may be part of the reasons why the T-index seems unpopular in the literature unlike the H, I and C indices. For these same reasons, The T-index was not employed in this study.

4.6 Critical Evaluation of Related Studies

The issue of accounting harmonisation has received much attention for several decades now with earlier researchers focusing on methods of harmonisation, the importance of harmonisation as well as its obstacles and inherent problems (Turley, 1983; Turner, 1983; Moulin, 1988). This section, however, focuses on prior research[18] which are related to the measurement of international accounting harmonisation.

Nair and Frank (1981) was one of the earliest studies to ascertain the impact of harmonisation efforts of the IASC. They assessed the effect of IASs 1 to 10 on accounting practices of 37 countries using Price Waterhouse surveys for three years. Employing analysis of variance (ANOVA), they observed that the period of IASC's existence saw an increase in harmonisation of accounting standards among sampled countries. This study has been heavily criticised in the literature because for most of its critics the data source was problematic in the first case (Nobes, 1981) because some of the survey questions were not properly crafted demanding a mixture of regulation and practice information in one question. He further added that even when the data are

[18] Appendix A provides a summary of some of the prior studies on accounting harmonisation and the areas examined.

correct, by simplifying answers to a category, results may be misleading as they have to be simplified for processing and hence any analysis from it cannot be relied on. Tay and Parker (1990) underscore the risk of using data for purposes which differs from its original purpose. van der Tas (1992) classifies Nair and Frank's study as one which sought to measure harmonisation, he queries that their method was not suitable in measuring de jure harmonisation (harmony).

Adopting a more reliable approach in terms of data source, Evans and Taylor (1982) studied the effect of IASs 2, 3, 4, 6 and 7 on accounting practices in five countries. They collected data from annual reports of sample companies between 1975 and 1988. Using percentages in respect of compliance, they observed that IASC had a very little effect on accounting practices in selected countries. Their approach can also be criticised based on methodology since the use of descriptive (percentages) was not robust enough. Disregarding the problems with PWC data, Doupnik and Taylor (1985) employed it in addition to their own data collected using questionnaire to examine how 16 western European countries conform to using IASs 1 to 8. They observed that though many differences still existed in the accounting practices in the sampled countries, some increase in compliance with IASs was found.

However, Nobes (1987) challenged the increase in compliance with IASs finding. In a related study, Nobes (1990) studied the effects of IASs on US listed companies and found that for three areas of disclosure where there were IASC requirement but no US GAAP, compliance level was less than 50%. Though, Tay and Parker (1990) argued that Evans and Taylor (1982) and Doupnik and Taylor (1985) studies sought measure de facto harmonisation, van der Tas (1992) rebutted that those studies were on compliance of IASs and not necessarily harmonisation. And further added that even though compliance and international harmonisation are related in a way they are totally different concepts and indicated that compliance can be high, but harmonisation may be low when IAS allows different methods to be used.

A new era of measuring accounting harmonisation was championed by van der Tas (1988) when in his exploratory article, he introduced three (H, I and C) indices which can be used to measure harmony and the level of harmonisation. He employed these indices to measure the extent of harmonisation on accounting for deferred tax in the UK, accounting for investment and valuation of land and buildings in the Netherlands,

and accounting for investment tax credit in the US and Netherlands. van der Tas observed high and low levels of harmonisation for some of the periods. After reviewing this study with other five papers, Tay and Parker (1990) highlight some problems related to van der Tas study which includes issue of data sources and operationalisation of concepts. In response, though van der Tas (1992) agreed with Tay and Parker (1990) on the distinction between harmonisation of regulation and that of practice as well as the harmony and uniformity, he describe their distinction between harmonisation and standardisation as "less appropriate" (p. 212). As an alternative approach, Tay and Parker (1990) suggest the use of statistical significance test such as Chi-square test, a method which has been used by Herrmann and Thomas (1995) and García Benau (1994).

Archer, Delvaille and McLeay (1995) proposed a decomposed version of the C-index for between and within-country comparability and used them to measure the degree of harmony at 1986/87 and 1990/91 for deferred tax and goodwill for 89 companies from Belgium, France, Germany, Ireland, Netherlands, Sweden, Switzerland, and UK. They observed that lowest level of comparability exists when the accounting methods are assumed to be distributed equiprobably over the companies, the outcome of a random selection of accounting policies. Aisbitt (2001) use the Archer, Delvaille and McLeay decomposed C-index to examine the usefulness in measuring harmony and harmonisation of several aspect of financial statements of four Nordic countries (Denmark, Finland, Norway and Sweden) between 1981 and 1998. In discussing her results, she highlighted some problems with interpreting the indices which she categorised as problems relating to causal inference and properties of the indices and concluded that based on these issues the interpretation of the indices is very complex. The work of Archer, Delvaille and McLeay (1995) has been built on by Pierce and Weetman (2002).

Canibano and Mora (2000) proposed a bootstrapping test of the C-index as a way of measuring the significance of the change in its value since that has been highlighted in the literature as one of its major limitations. They consider a sample of eighty-five global players from thirteen countries and analyse their financial statements with regard to four accounting issues (deferred taxation, goodwill, leasing and foreign currency translation), providing estimates of the significance of de facto accounting

harmonization for the periods from 1991/2 to 1996/7. Similarly, in addressing the issues with existing indices, Taplin (2004) proposed the T-index which he argues is a generalisation of all existing indices and also deals with their problems. The T-index was used by Souza *et al.* (2015) in studying the degree of comparability in accounting choice regarding investment properties among Brazilian and Portuguese listed companies for the periods 2010 to 2012 and they found that despite the accounting choices allowed by IAS 40, the accounting practices of companies in these countries were on the average comparable.

Regardless of the extent of the diversity of accounting practices in the extractive industries, studies using indices to examine the level of harmony and comparability seems scanty. The closest attempts have been by Lilien and Pastena (1981), Karapinar, Zaif and Torun (2012) and Abdo (2016). None of these studies used indices. Though Lilien and Pastena (1981) claimed to be measuring intra-method comparability, their study was just a measure of differences in accounting figures after change in accounting method. There was no evidence in the study to support their claim of intra-method comparability. The study basically compared the adjustments made by the sampled companies after they changes their accounting methods. The authors used the magnitude of adjustment as a measure of comparability, and this is highly contestable.

Karapinar, Zaif and Torun (2012) and Abdo (2016) on the other hand, examined the degree of compliance with IFRS 6 and not the level of harmony and comparability. And as highlighted in the extant literature, compliance does not necessarily mean there is harmony (see van der Tas, 1992) since there can be high degree of compliance but if the accounting standard allows more choices, then the level of harmony will be low.

It is evident that that there is appears to be limited studies assessing the level of harmony and comparability in accounting treatment of pre-development cost components using statistical indices. Even though there have been claims that the use of diverse method impedes comparability empirical evidence supporting remains scarce. This makes research investigating the level of harmony and comparability of accounting treatments for predevelopment cost components worthy of attention. Apart from filling the gap in literature, this study helps to identify areas of great diversity in the accounting for pre-development costs so that standardisation efforts can be directed there appropriately.

4.7 Indices Employed in this Study

It is evident from the literature that though the use of indices to measure accounting harmony and harmonisation comes with some limitations, they remain one of the useful ways of achieving this purpose. In order to deal with limitation associated with each of the indices, this study where possible applies more than one index appropriate to measure the level of harmony and comparability.

4.7. 1 Measuring Level of Harmony under Each Accounting Method.

First, in measuring the level of harmony in accounting treatment for each pre-development cost component for each accounting method, this study uses the van der Tas H-index and the Archer, Delvaille and McLeay (1995) disclosure-adjusted C-index. The H index is used to measure the extent of harmony in accounting treatment for each pre-development cost component for companies adopting each of the accounting methods. The H-index is computed using only companies that disclose how a particular cost component is treated. Taking into consideration companies that disclose their accounting method but not disclose how they treat each of the cost components; this study uses the Archer, Delvaille and McLeay (1995) disclosure-adjusted C-index.

4.7. 2 Within-Method (Intra-Method) Comparability

After determining the level of harmony under each of the accounting methods, this study proceeds to measure the level of comparability of the accounting treatment for each of the expenditure items. Following Archer, Delvaille and McLeay (1995), this study adopts the within-country C index and modifies it to measure the within- method (intra-method) comparability. In this case instead of "country of origin" as used by Archer, Delvaille and McLeay (1995), this study measures comparability both within and between methods (country substituted with method). As such in place of within-country comparability, this study measures within-method comparability. This modification is supported by the assertion of van der Tas (1988) who posits that international harmonisation can be viewed from two ways - international harmony is the degrees of comparability of financial statements of companies regardless of their countries of origin, or by viewing international harmonisation as when there is convergence among countries on how a specific item is treated. He argues that the former is the way international investors view harmonisation (p. 165).

Reflecting on this and the objective of this current study, this research adopts the former view and assess harmonisation regardless of the country of origin. This view is further confirmed by Taplin (2004) who states that in assessing harmony in European community, one can view all companies as belonging to the same "nation" disregarding their country of origin (p. 58). Against this backdrop, and because oil and gas companies are international in nature, this study treats the sample companies as belonging to the same community. This makes a valid assumption because of the following reasons. Firstly, since the sample companies are all from the LSE, it means they operate under the same stock market regulation, and they all have to meet the same requirement. Moreover, once they are listed on the LSE, they are all expected to use IFRS in preparing their accounts and we do not expect the nation of origin to significantly impact the way they prepare their accounts (De George, Li and Shivakumar, 2016). Shifting focus from country of origin, this study investigates the extent of comparability of accounting treatments of pre-development costs among companies using the same accounting method (within-method/intra-method). This helps to measure the extent to which companies that adopt the same accounting method treat pre-development expenditure in a comparable manner. The expectation is that, for companies using the same accounting method, there should not be disparities in the way they treat the same pre-development cost component; if there is and hence their treatments are not comparable then attention needs to be drawn there regarding regulation of the industries. This is because companies can adopt the same accounting method whilst, owing to availability of accounting choices and alternatives, diversities may be pronounced within the methods.

4.7. 3 Between-Method (Inter-Method) Comparability

Similarly, this study investigates the extent of comparability of accounting treatment for pre-development cost among companies adopting different accounting methods. In doing so, Archer, Delvaille and McLeay (1995 between-country) C-index is adopted and modified for this purpose. Based on the argument advanced earlier the country of origin is disregarded instead emphasis is place on the accounting method used. Taplin (2004) explains the between country C-index as the probabilities that two companies selected at random without replacement have accounts that are comparable if the two companies are selected in such a way that they must not belong to the same country. In

similar spirit, we define our between-method C-index as the probability of randomly selecting (without replacement) two companies who do not use the same accounting methods but treat pre-development expenditure in a comparable manner. Though Archer, Delvaille and McLeay (1995) contend that their between-country C index is more robust than I-index measuring, other authors have identified limits with this index. In order to avoid any biases from the use of one index, this study in addition, employs the van der Tas corrected *I-index* and Archer and McLeay (1995) adjusted *I-index* to measure the extent of between-method comparability. These three indices should enable the researcher to determine the extent of between-method comparability in accounting treatments of pre-development expenditure. Table 4.2 shows the different indices employed in this study and what they are used for.

Table 4. 1: Indices Employed in This Study

Measure level of harmony
van der Tas (VDT) (1988) H-index
Archer, Delvaille and McLeay (1995) disclosure-adjusted C-index
Measure the level of comparability within methods (Intra-method Comparability)
Archer, Delvaille and McLeay (ADM) (1995) Within-method C-index
Measure the level of comparability between methods (Inter-method Comparability)
Archer, Delvaille and McLeay (ADM) (1995) Between-method C-index
van der Tas (VDT) (1988) corrected *I*-index
Archer and McLeay (A&M) (1995) adjusted *I*-index

4.8 Chapter Summary

This chapter has defined the key terminologies used in this research such as harmony and harmonisation, standardisation, uniformity, and comparability. The types of harmonisation, arguments for and against harmonisation, method of measuring harmonisation have also been discussed and also reviewed research studies on accounting harmonisation and the various harmonisation issues examined. The chapter discussed different harmonisation indices that have been used in the literature and addresses the indices that this study will employ. Next chapter discusses the theoretical framework of this study.

CHAPTER FIVE
THEORETICAL FRAMEWORK

5.1 Introduction

It has been argued that in complete and perfect markets there is no demand for accounting information (financial reporting) and its regulation (accounting standards). However, the existence of imperfect and incomplete markets underscore the need for financial reporting and accounting standards to mitigate the market imperfections (Fields, Lys and Vincent, 2001). The demand for accounting information and its regulations at times results in the exercise of accounting choice (discretionary behaviour) by management of reporting entities.

Accounting choice is defined as "any decision whose primary purpose is to influence (either in form or substance) the output of the accounting system in a particular way, including not only financial statements published in accordance with GAAP, but also tax return and regulatory filings" (Fields, Lys and Vincent, 2001, p. 256).

The choice of accounting method is an accounting policy issue that is determined by several factors which include organisational structure, political pressure, the market, regulatory framework, financial and contracting structures, operating circumstance, and managerial preferences (Watts and Zimmerman, 1978; 1986; 1990).

The extant literature contains two main theories that are often used in explaining accounting choice and they are Positive Accounting Theory (PAT) and Institutional Theory (IT). The PAT predicts accounting choice from the wealth effects the choice has on key stakeholders whilst emphasizing agency conflicts (Watts and Zimmerman, 1986). PAT seems popular in the accounting literature and has been employed in several studies to explain accounting choice (see Inchausti, 1997; Meyer, Karim and Gara, 2000; Bradshaw, 2004). Similar to PAT, IT has also been employed in several studies to explain accounting choice (see Mezias, 1990; Carpenter and Feroz, 1992; Covaleski and Dirsmith, 1995; Ang and Cummings, 1997; Dillard, Rigsby and Goodman, 2004).

PAT appears to be an appropriate theory to explain the accounting choices and the underpinning reasons for managers to select certain accounting method/choice hence will be useful in explaining the diversity of accounting treatments for pre-development

expenditure incur by extractive companies. Thus, managers of the extractive companies in the pursuit of their own interest may select the accounting treatments which will help them achieve their personal goals instead of the goals of the principals (shareholders or other stakeholders).

IT, on the other hand, explains how organisations adopt similar structures and processes under the pressure of institutional environments in search for legitimacy (DiMaggio and Powell, 1983). This theory is appropriate for the current study because it will help us identify if any of the institutional pressures account for the differences and similarities in accounting treatment for pre-development costs among extractive companies and how new standards and standardisation pathways can be implemented.

This study adopts the Positive Accounting Theory by Watts and Zimmerman (1978; 1986; 1990) and Institutional Theory specifically institutional isomorphism by DiMaggio and Powell (1983) to understand the extent of diversity of accounting treatments for pre-development costs among extractive companies and explore the pathways for standardisation. Both theories are discussed in some details in the following sections.

5.2 Positive Accounting Theory

Accounting can be described as having two main functions, thus, producing information for decision making and appropriating of financial results of operation (Collins *et al.*, 2009). Each of these functions has impact on wealth of stakeholders of an organisation. The information impacts the evaluations of projects and control of management whilst the appropriation impacts wealth through dividend payments (Bushman and Smith, 2001). Because of the wealth effects of accounting, managers often tend to influence the accounting system of organisations to achieve their desired results. And this is the focal point of Positive accounting theory (PAT), thus, predicting the choice of accounting methods/rules according to the wealth effects on key stakeholders (Watts and Zimmerman, 1986). PAT assumes that accounting is part of an agency contract between a principal (stakeholders/shareholders) and an agent (management) where the two parties agree on the accounting choice to be made and the compliance to the agreement is monitored by an external person or entity, that is external auditors (Watts and Zimmerman, 1990). However, the separation of ownership (principal) from control (agent) implies that the discretion of accounting choice rests

largely on the agent. This allows the agents (management) to make choices that maximise their wealth instead of those of their principal. Management, who are the agents, have self-interest in reported earnings of their organisation (Gordon, 1964) and their self-interests play an important role in the choice of accounting method, the accounting treatment of certain cost components and the extent of lobbying for and against certain accounting regulations (Meyer and Rowan, 1977; Watts and Zimmerman, 1978; 1990).

Watts and Zimmerman (1986; 1990) highlight three factors that influence management's choice of an accounting policy. These factors are the compensation plan (bonus plan hypothesis), the lending arrangements (debt/equity hypothesis) and the political visibility of the organisation (political costs hypothesis). That is management prefer accounting choices that increase their level of compensation, increase the discretion of the agent through safeguarding lending agreement and avoiding political pressure on the organisation.

Specifically, under the bonus plan hypothesis, Watts and Zimmerman suggest that one key element of management self-interest relates to incentive compensation plans—bonuses and shares (Milne, 2002). To the extent that the compensation plans rely on the corporate's reported earnings, management would accept accounting standards or choice that increase the value of current after-tax incentive income instead they will lobby against or reject any accounting standard or choice which lowers current after-tax earnings on which their bonuses is calculated (Watts and Zimmerman, 1978, 1990; Irvine, 2008). Thus, in order to maximise their bonuses, they are more likely to choose accounting procedures that shift reported earnings from future to the current period.

In relating the bonus plan hypothesis to the research problem, which is the diversity of accounting practices in the EI, it can be argued that managers of extractive companies with compensation plan dependent on earnings will tend to apply less conservative accounting methods and treatments. With this they will prefer to capitalise pre-development costs instead of fully expensing them, with the motive of augmenting the reported earnings. By capitalising costs, the reduction in earnings that would have resulted from writing off costs against earning is avoided which helps organisation to report higher after-tax earnings on which managers' compensation plan depends.

The second hypothesis is the debt/equity hypothesis. Under this hypothesis, Watts and Zimmerman (1986; 1990) argued that managers are more likely to choose accounting methods that decrease the debt-to-equity (gearing) ratio to avoid breaching debt covenants. Which implies any accounting choice which increase debt to equity ratio further will be lobbied against or rejected.

The proposition based on the debt/equity hypothesis is that managers prefer accounting methods or treatments which will not worsen/increase their debt-to-equity ratio to avoid breaking debt covenants. By this less conservative accounting method or treatment which avoid full writing off of pre-development costs will be preferred by managers because when pre-development costs are fully written off, it lowers earnings which in effect lowers equity figure (denominator) in the gearing ratio resulting in higher debt to equity ratio. This can put the company at risk of breaching debt covenant if any. Based on this assertion, if the debt/equity hypothesis should hold true for extractive companies, then managers should prefer to adopt less conservative accounting method or treatment in accounting for pre-development cost components.

With regard to the Political cost hypothesis, Watts and Zimmerman (1986; 1990) contend that in order to avoid political pressure, larger organisations choose accounting methods/treatments which allow them to report conservative earnings (Zimmerman, 1983; Milne, 2002) instead suspicious profits which will draw attention of political powers to them for scrutiny. For political cost hypothesis to be valid under this circumstance, it should be observed that larger extractive companies should be seen to be adopting and applying more conservative accounting method or treatment which will reduce their reported earning in order to avoid political pressure. By this, relatively bigger extractive companies should be more conservative in their choice of accounting method and treatment of pre-development costs. In applying conservative accounting method or treatment, larger extractive companies would prefer methods or treatment which will lead to writing off costs to reduce reported earning instead of capitalising costs which will result in higher reported earnings with the believe that reduced reported earnings will divert attention from them whilst higher reported earnings will draw attention of political powers to them.

5.3 Institutional Theory (Isomorphism)

DiMaggio and Powell (1983) applied the concept of isomorphism to identify why organisations are similar and adopt similar structures and managerial methods and noticed that organisational structures are outcome of compliance with their institutional environments. Thus, organisations adopt similar structures such as accounting methods under the pressure of institutional environments in search for legitimacy (Ghio and Verona, 2015; Touron, 2005; Collin *et al.,* 2009). In order for organisations to adopt similar structures and methods, DiMaggio and Powell (1983) identified three possible mechanisms to achieve institutional isomorphic change which are coercive, mimetic, and normative isomorphism, these are the three pillars of the Institutional Theory. The three mechanisms function differently, and they are important to notice in order to fully understand how decision makers are influenced by institutions. Hassan (2005) opines that isomorphism and legitimacy are the factors that account for development of several organisational practices (such as accounting methods).

First and foremost, DiMaggio and Powell (1991) note that coercive isomorphism originates from "both formal and informal pressure exerted on organisations by other organizations upon which they are dependent and by cultural expectations in the society within which the organisations function" (p. 67). An organisation may feel such pressures as force, as persuasion, or as an invitation to join in collusion. Coercive mechanism emerges from rules preserved in the regulatory systems (Irvine, 2008), contractual obligations with other actors (Ashworth, Boyne and Delbridge, 2009) and from external institutional demand (Guler, Guillen and Macpherson, 2002). These pressures are exerted on the organisation to change course in order to meet national and market requirements and implies penalties in case of lack of organisation's response to the change requirements (Collin *et al.,* 2009; Seyfried, Ansmann and Pohlenz, 2019). Collins *et al.* (2009) offer resource-dependency explanation to coercive isomorphism and explain that an organisation which depends on another for resources may be put under pressure to behave or structure itself in a certain way else they will not get the needed resources or will be penalised. This implies that adherence to norms due to resource dependency could produce similarity in accounting choice. Under coercive mechanism, change can be enforced by a powerful constituent such as customers, financiers, suppliers and competitors, auditors or government legislation or a group of key stakeholders (Tuttle and Dillard, 2007; Collin *et al.,* 2009). Power remains the main

driver in coercive isomorphic change (Touron, 2005) and pressures for change are exercised through regulations and laws (Hassan, 2005). Relating this to the current study, the sample extractive companies are all listed on the London Stock Exchange which means they are governed by the same stock market regulation, and they are further categorised into main market-listed and AIM-listed companies which narrows down the regulation to market level. The regulation for each market differs and are relevant to the companies listed on the market.

With this, if coercive isomorphism remains valid in this context, then it is proposed that extractive companies listed on the same market (be it main market or AIM) and adopt the same accounting method should treat pre-development costs in the same way to reflect coercive pressure as postulated by IT. Also, the choice of adopted accounting method will be narrowed down by the stock market regulations and preference, so we expect smaller number of methods being adopted and choices within each method to be almost similar.

The second institutional change mechanism proposed by DiMaggio and Powell (1991) is mimetic isomorphism. Mimetic isomorphism predicts that organisations tend to copy each other in order to appear legitimate in their organisational field (Granlund, Lukka and Mouritsen, 1998). By copying, organisations tend to model themselves after similar organisations in their industry who are legitimate or successful (DiMaggio and Powell, 1991). Mimetic mechanism often emanates when organisational technologies are not well understood, goals are unclear and the environment in which organisations operate are surrounded by great uncertainties (Seyfried, Ansmann and Pohlenz, 2019). In response to these, organisations tend to copy or "borrow" practices from other organisations (Tuttle and Dillard, 2007). This may happen in the case of newly established organisations who lacks practical experience or in the case of troubled organisations that search for solutions by copying practices of other successful organisations.

Mimetic isomorphism features in accounting with regards to new entrants choosing an accounting policy. It is common that where no accounting standard applies like in the EIs, organisations especially new entrants select accounting policy based on common industry practice or model their policy after other existing organisation. Watts and Zimmerman (1990) noted that some managers choose their accounting procedures

based on what others are doing which reflects mimetic isomorphism. As noted by Seyfried, Ansmann and Pohlen (2019), the high uncertainty in the extractive industries lends the industries to mimetic isomorphism.

By this definition and the idea of mimetic isomorphism, it is expected that extractive companies operating in the same sector (either oil & gas or mining sector), same country or listed on the same market will imitate each other in their choice of accounting method and treatment for pre-development costs. Specifically, extractive companies adopting the same accounting method will copy each other and hence treat components of pre-development costs in the same way.

The third source of change is through normative isomorphism and this stems from alignment with professional values. With this, norms and practices are adopted because they are prescribed by professional bodies members of an organisation belongs to (Seyfried, Ansmann and Pohlenz, 2019). Professionalisation is the bedrock of normative isomorphism. Collins (1979), DiMaggio and Powell (1991) explained professionalisation as "the collective struggle of members of an occupation to define the conditions and methods of their work to control and establish cognitive base and legitimation of their occupational autonomy" (p. 70). The authors further identified formal education and elaboration of professional networks as the two aspects of professionalisation which form the basis for normative isomorphism. Relating normative pressure to accounting choices, it is expected that accounting choices within organisations will be made by accounting practitioners. These accounting practitioners' judgement on what a good accounting practice is will be influenced largely by their education and the professional bodies they belong to. Collin *et al.* (2009) note that there is the need to consider industry or sector factors influence on normative pressure. Thus, in the exercise of judgement based on their professional affiliation and training, accounting practitioners consider industry and sector factors relevant in the context. This implies accounting practitioners belonging to the same sector or industry are likely to share ideas and adopt similar methods and make similar choices. By this, it is expected that accounting choices in the extractive companies operating in the same sector will be narrow because the interpretation of a good accounting choice will be made by accounting professional taking into consideration industry or sector factors.

Institutional theory has been used widely in accounting research to understand the forces that influence individuals within a social organisations (Dillard, Rigsby and Goodman, 2004; Tuttle and Dillard, 2007), analyse the adoption of International Accounting Standards (Touron, 2005), explain the emergence of different accounting methods and practices (Carpenter and Feroz, 1992; Fogarty, 1992), explain organizational choice of different accounting systems (Collin *et al.*, 2009), and examine accounting de jure harmonization process (Ghio and Verona, 2015). It is therefore an appropriate theory to adopt to understand the diversity of accounting treatment for pre-development costs and explore pathways for standardisation. This is because, IT allows investigation beyond economic forces, to understand more closely the evolution of systems (accounting) and their enabling and constraining influences on actors within these systems (Tuttle and Dillard, 2007). Seyfried, Ansmann and Pohlenz (2019) posit that IT has proven to be useful in providing a wide theoretical base for an in-depth understanding of structural problems as well as increasing the likelihood of constructive change. This study therefore complements PAT with IT to explain its results.

5.4 Chapter Summary

This chapter has explained the theories that are employed in explaining the results of this research. The aim is not to test these theories but used as theoretical lens to offer explanation for how companies choose their accounting methods and reasons for choosing different treatment options. It is used to explore how standardization can be achieved by a supposedly powerful industry like the EI.

CHAPTER SIX
METHODOLOGY AND METHODS

6.1 Introduction

This chapter details the methods and methodology applied in the research. In doing so, the study follows the research onion framework proposed by Saunders, Lewis and Thornhill (2019). [19] The chapter commences by first of all establishing the assumptions and philosophy of the research, which is then followed by the discussion of the research approach. The research design consisting of the methodological choice, research strategies and the time horizon of the research are outlined in the next sections. The population, sample, and sampling techniques as well as data and data collection techniques employed are also explained in the subsequent sections. The chapter goes further to describe the different harmony and comparability indices employed in this research.

6.2 Research Philosophy and Philosophical Assumptions

In undertaking a research, one of the key considerations is the selection of the right research philosophy. Saunders, Lewis and Thornhill (2019) define research philosophy as the system of beliefs and assumptions about the development of knowledge (p. 130). In similar fashion, Creswell (2013) describes it as the use of abstract ideas and beliefs that inform our research (p. 16). Researchers make some philosophical assumptions which underpin research. These assumptions comprise of assumptions about nature of realities the researcher encounters during the research (ontological nature), assumptions about human knowledge or grounds of knowledge (epistemological nature), assumptions about the human nature or the extent and ways the researchers own values influence the research (axiological nature) (Dillard, 1991; Hopper *et al.*, 1995). These philosophical assumptions, whether made consciously or unconsciously, have far-reaching impact on the research (Burrell and Morgan, 1979; Grix, 2004; Holden and Lynch, 2004; Johnson and Clark, 2006; Creswell, 2013; Burrell and Morgan, 2016). They influence the researcher's understanding of the research questions, the choice of methods and how findings are even interpreted (Crotty, 1998).

[19] The research onion details all the steps that a researcher needs to go through in developing research methodology.

According to Saunders, Lewis and Thornhill (2019), there are five research philosophies in business and management, and they are positivism, critical realism, interpretivism, postmodernism and pragmatism. Each of these philosophies has a different perspective on ontology, epistemology, axiology, and methodology (Creswell, 2009; Lincoln, Lynham and Guba, 2011; Kaushik and Walsh, 2019). Two of these philosophies – positivism and interpretivism, are explained in detail after which the choice of research philosophy for this research is discussed.

6.2.1 Positivism

Positivism is regarded as one of the most dominant and oldest philosophies (Richards, 2003; Morgan, 2007). Positivism is grounded in an ontological assumption of realism which views reality as objective "out there" (Chua, 1986b, p. 583) and "independent of human subjects" (Hopper *et al.,* 1995, p. 527). By this, it assumes nature of reality to be external to individual and exists independently of a person's appreciation or consciousness of its existence and there is only one true social reality experienced by all social actors (Saunders, Lewis and Thornhill, 2019). This worldview therefore likens social entities to "technical, asocial occurrence of the natural world" (Chua, 1986b, p. 528) which can be studied without considering its social or institutional context (Hopper *et al.,* 1995).

From an epistemological perspective, positivism adopts assumptions of natural science and based on positivist epistemology. It assumes acceptable knowledge to be "facts" which are measurable and observable through establishing consistencies and causal relationship between or among accounting events (Hopper *et al.,* 1995, p. 527). These facts are assembled into generalisable empirical patterns that can be used to explain and predict future practices (Tomkins and Groves, 1983; Chua, 1986a; Mouck, 1992; Hopper *et al.,* 1995; Laughlin, 1995; Agger, 1998).

Axiologically, positivist accounting researchers perceive their research as value-free and that they play a neutral role of discovering an objective reality out there. The positivists see themselves as "independent" (Chua, 1986b, p. 528) of what is being researched (Saunders, Lewis and Thornhill, 2019). Under positivism, the processing of discovering the "truth" about social events is deemed to be objective and follows a methodology which is based on systematic protocol and technique which Burrell and Morgan (1979) described as "nomothetic" approach (p. 6). This methodology is

governed by strict adherence to scientific model of "hypothetico-deductivism" (Chua, 1986b, p. 584) and requires systematic and quantitative techniques (Tomkins and Groves, 1983; Dillard, 1991). The method of "hypothetico-deductivism" starts with a theory about how things work, and then testable hypotheses are formulated (Watts and Zimmerman, 1983). Empirical data is gathered and analysed to test the hypotheses which either support (verify) or refute (falsify) the initial theory based on the results (Betz, 2013).

6.2.2 Interpretivism

Researchers who subscribe to this philosophical stance emphasise that humans are distinct and different from physical phenomena because they create meanings and for that matter human beings and their social world cannot be studied the same way physical phenomena are studies as done in positivist approach. They therefore adopt a subjective approach to analyse and understand social phenomena with the aim of understanding the fundamental meaning attached to social life from the level of subjective experiences of actors (Ahrens, 2008). In addition to providing subjective understanding of social phenomena, they also explain and characterise by a certain degree of ''thickness" (Lukka and Modell, 2010, p. 462).

Interpretive research is based on social constructionist ontology which views social reality as emergent, subjectively created and objectified through human interactions (Chua, 1986a). It follows an epistemology which view acceptable knowledge as consisting of narratives, stories, perceptions, and interpretations of individual actors within a setting and for that reason sees new understanding, interpretations, and worldviews as contribution to knowledge (Saunders, Lewis and Thornhill, 2019). Chua (1986a) maintained that to the interpretivists, there are multiple realities which are socially constructed. The human actions are explained using theory and the adequacy of the theory is tested through the criteria of logical consistency, subjective interpretations, and agreement with actors' common-sense interpretation (Chua, 1986a; Baag and Kavitha, 2017).

An axiological implication of this philosophy is that the researchers recognise their interpretations of the research materials and data and thus their values and beliefs play an important role in the research process. In terms of methodology, interpretivist research are typically inductive with smaller sample size aimed at in-depth

investigations by using qualitative methods of analysis, but a wide range of data are normally interpreted.

6.2.3 Research Philosophy for This Research

The aim of this research is to examine the extent of diversity of accounting treatments for pre-development costs among extractive industries and explore pathways for standardisation. Specifically, the research seeks to examine the level of harmony in accounting treatments of pre-development costs, assess the extent of intra-method and inter-method comparability in the accounting treatments and finally, to explore the need and pathways for standardisation.

In order to achieve the research objectives, the annual reports of extractive companies listed on the LSE are reviewed to identify the accounting treatments for components of pre-development costs, the accounting treatments are codified, and the codes are then used to construct indices to measure the level of harmony, intra-method and inter-method comparability. The inferences are made from the statistical analysis (magnitude of the index values) to determine the levels of harmony and intra-method or inter-method comparability as well as if there is the need and pathways to standardise the accounting practices.

Though this research lends itself more to the positivist philosophy because its assumptions are more suitable in achieving the research objectives, interpretivism features at certain instances especially where the researcher has to make meaning of the accounting policy of companies where they are not stated explicitly. The researcher believes there is a "truth" out there about the diversity of accounting practices that can be understood in an objective way. The research approaches this goal by generating explanatory associations in the way extractive companies treat components of pre-development costs to ultimately predict the level of harmony, intra-method and inter-method comparability. Ontologically, the researcher believes a single external reality exists, one that can be understood, identified, and measured. The epistemological stance of the researcher is that knowledge about the diversity of accounting practices in the extractive industries can be established through a rigorous scientific method involving quantifiable observations that lead to statistical analyses. By this, accounting treatments are quantified and subjected to statistical analyses to established numeric measures (called indices) which can be interpreted to understand the extent of diversity.

Axiologically, the researcher agrees with Saunders, Lewis and Thornhill (2019) when they argued that "excluding our own values as researchers is impossible. Even a researcher adopting a positivist stance exercises choice in the issue to study" (p. 146). That notwithstanding, positivists try as far as possible, to undertake their research in a value-free manner. Similarly, in this research, much as the researcher tries to be value -free, there are some instances where choices are made but where such choices are required the researcher tries to do them in an objective manner and reduce the impact of personal biases. The researcher therefore sees himself as an independent investigator who is detached and neutral of the phenomenon being studies.

This research adopts method, which is deductive, high structured, and uses large sample as well as quantitative data as prescribed by positivism (see Tomkins and Groves, 1983; Dillard, 1991). Motivated by the definition of comparability as stated in the IASB Conceptual Framework which describe information as comparable when "like things look alike and different things look different" (IASB, 2010), the research initially postulates that if extractive companies treat components of pre-development costs the same way then the index values should be one (1) implying there is a complete level of harmony and complete intra-method and inter-method comparability but if the index values are less than one (1) then there exists some level of disharmony and incomparability. In so doing, the research starts with a claim that each component of pre-development costs is treated the same by extractive companies, collect empirical data, analyse data statistically and the findings which is the index values are used to either confirm or reject the claim (Betz, 2013).

6.3 Research Approach

Saunders, Lewis and Thornhill (2019) described research approach as how research involves the use of theory, either it involves theory testing (deductive approach), theory building (inductive approach) or theory modification (abductive approach). Each of these approaches is explained and the choice of approach for this research is then discussed.

Under deductive approach, the researcher put forward a tentative idea, premise or hypothesis based on existing theory, specifies the conditions under which those premises should hold, gathers data to test hypothesis through series of steps to arrive at a conclusion which either verifies or falsifies the theory. This approach is more

associated with quantitative research and grounded by positivist philosophy. In contrast, inductive reasoning is associated with qualitative research and develops general conclusions based on the exploration of how individuals experience and perceive the world around them, and this normally results in theory generation and building (Creswell and Plano Clark, 2007). Abductive inference accommodates the values of both deductive and inductive approaches but ultimately relies on the expertise, experience, and intuition of researchers (Wheeldon, 2010). With abductive approach, known premises are used to generate testable conclusions. It incorporates existing theory and can lead to theory modification as well as generation of new theory (Saunders, Lewis and Thornhill, 2019). This approach is more associated with mixed methods research design.

This study adopts the deductive approach in addressing its objectives because it initially starts with a premise based on existing literature that diversity of accounting methods in the extractive industries lowers the level of harmony in accounting treatment and eventually impede intra-method and inter-method comparability. Data on accounting treatments for pre-development costs are gathered from their annual reports to evaluate the propositions and the finding either confirm or rejects the proposition. The choice of positivist philosophy and quantitative research design confirms the appropriateness of deductive approach for this research.

6.4 Research Design

Research design refers to the overall plan of the research in addressing the research questions or objectives. Saunders, Lewis and Thornhill (2019) note that the methodological choice, research strategy and time horizon layers of the research onion make up the research design.

6.4.1 Methodological Choice

Methodological choice is categorised into three main types which are qualitative, quantitative, and mixed methods research design (Bryman, 2012). And the choice of a particular approach is based on the nature of research problem, the researchers' experience, and the audiences for the study.

Quantitative research design involves testing objective theories by examining relationship among variables (Creswell, 2014). It focuses on objective measurement

and the statistical, mathematical, or numerical analysis of data collected (Babbie, 2010). In addition to quantification in the data collection and analysis, quantitative research adopts a deductive approach where relationship between theory and research is placed on testing theories (Bryman, 2012). Saunders, Lewis and Thornhill (2019) in describing quantitative research underscore that it is often seen as a synonym for any data collection technique or analysis which generates or uses numerical data (p. 175). Quantitative research designs are mostly underpinned by positivist philosophy (Bryman, 2012).

Conversely, qualitative design seeks to explore and understand the meaning individuals or groups ascribe to a social or human problem (Creswell, 2014). Qualitative research develops a "complex, holistic picture, analyse words, report detailed views of informants and conduct the study in natural setting (Creswell, 1998, p. 15). For this reason, qualitative research is sometimes referred to as "naturalistic" (Saunders, Lewis and Thornhill, 2019, p. 179). With qualitative research, the researcher makes sense of (interprets) the subjective and socially constructed meaning expressed about the issue under study. It is therefore often associated with interpretive philosophy (Denzin and Lincoln, 2018).

In qualitative research, data is collected from those immersed in everyday life of the setting in which the study is framed. Data analysis is based on the values that these participants perceive for their world. Ultimately, it produces an understanding of the problem based on multiple contextual factors (Creswell and Miller, 2000). Qualitative research is usually associated with interpretive research philosophy (Denzil and Lincoln, 2008).

At the middle of the spectrum is the mixed method design which is sometimes referred to as Multi-strategy (Bryman, 2004) or multi-method or multiple methods (O'Cathain, Murphy and Nicholl, 2007). Mixed methods research involves collecting, analysing, and "mixing" both quantitative and qualitative data at some stage of the research process within a single study, to understand a research problem better (Creswell, 2002). The rationale for combining quantitative and qualitative methods is that it provides a more complete understanding of a research problem than what can be derived from using only one of the methods. It is believed that none of the two methods is sufficient by itself to capture the nature and details of the situation under study than when the two

are combined (Creswell, 2014). Mixed methods research design is generally associated with two research philosophies which are pragmatism and critical realism (Saunders, Lewis and Thornhill, 2019).

Reflecting on the definitions of the different research designs, this research lends itself to the quantitative research design. This is because this research seeks to achieve its objectives by codifying the accounting treatments for pre-development costs and using the numerical codes to undertake the statistical analyses which results in index values (numbers). These numbers are interpreted to determine the level of harmony and the extent of intra-method and inter-method comparability. Specifically, this study adopts mono-method quantitative research design since only one data collection technique and corresponding quantitative analytical procedure are employed. Consistent with Bryman (2012), quantitative research design is in line with the positivist research philosophy selected for this research.

6.4.2 Research Strategies

Research strategies outlines how a researcher is going to answer the research questions. It serves a link between the philosophy and the choice of methods to collect and analyse research data (Denzin and Lincoln, 2018). The choice of research strategy used in this study is in line with what Saunders, Lewis and Thornhill (2019) termed "archival and documentary research" (p. 195). Archival and documentary research strategy entails a wide range of materials including organisational documents such as administrative records, agendas, minutes of meetings, agreements, annual reports, strategy statements etc.

Specifically, this research obtains and analyses the 2018 Annual reports of extractive companies listed on the LSE to identify how components of pre-development costs are treated. As noted by Prior (2007) analysing annual reports enable the researcher to gather useful data on the type of accounting methods used in accounting for pre-development costs, how different cost components are treated and identify what has been disclosed and what has not. With the advent of digitalisation and online archives, all annual reports used in the research were downloaded from the sampled companies' websites. Detailed procedures on how annual reports are accessed are outlined in later sections of this chapter.

6.4.3 Time Horizon

The choice of 2018 annual reports makes the time horizon of the study cross-sectional in nature because it studies the accounting treatments for pre-development costs among extractive companies at a point in time, in this case as at the year 2018 (see Bryman and Bell, 2015). The decision to use 2018 annual reports was influenced by some reasons. First, the underlying goal of the research is to examine the level of harmony, intra-method and inter-method comparability in accounting treatment and not the harmonisation process. As distinguished by Tay and Parker (1990), research that measure level of harmony studies practices at a point in time as in the case of this research whilst those that study harmonisation looks at practices over a given period of time or different points in time (p. 73).

Secondly, the researcher is interested in the accounting method extractive companies adopt in treating these costs and these choices are accounting policy issues regulated by IAS 8 — *Accounting Policies, Changes in Accounting Estimates and Errors*. The standard prohibits frequent change of accounting policy unless it is required by a standard or interpretation or it improves the reliability and relevance of financial statements (IAS 8.14). This implies the researcher does not expect accounting policy (method) of sample companies to change yearly hence there is no need to study the accounting treatments over time (longitudinal) rather a study at a point in time is sufficient to achieve its objectives. Thirdly, the researcher needed to select a year when there has not been an issue of new accounting standard that is likely to change the existing accounting practices in the extractive industries and as far as the researcher is concerned 2018 seemed far from when the last accounting standard (IFRS 6) which directly affects the extractive industries was issued. It was issued in December 2004 and applied to annual periods beginning on or after 1 January 2006, which means even late adopters of this standard should have been using it for many years now. With this, findings cannot be attributed to the introduction of new standard but rather reflect the current accounting practices in the extractive industries. Lastly, the researcher chose 2018 because that the time the IASB place the extractive project back on its active agenda and also it was the most recent annual report available at the time the research started.

6.5 Techniques and Procedures

6.5.1 Sampling and Sample Selection

This study comprises of upstream extractive firms listed on the London Stock Exchange (LSE), both the Main market and the Alternative Investment Market (AIM). The LSE is selected for several reasons. Firstly, it is one of the two largest stock exchanges in Europe and seventh globally (Power, Cleary and Donnelly, 2017; Cherowbrier, 2019;). Secondly, LSE has been described as the most important foreign source of equity for extractive firms (Luther, 1996); thirdly, any firms listed on LSE is required to apply IFRS under the European Union Regulation[20] (EC) No 1606/2002 which allows firms being governed by the same conceptual framework to be included in our sample (Armstrong et al., 2010; De George, Li and Shivakumar, 2016). Therefore all companies included in the study sample adopt IFRS in the preparation of their accounts. And finally, the listed extractive firms on the LSE originate from all the five continents. This may not necessarily mean fair representation of all extractive firms worldwide, but it gives a decent coverage of that (Power, Cleary and Donnelly, 2017).

The two main sectors (oil & gas and mining) in the extractive industries are included in this research to ensure that the accounting issues facing the extractive industry can be investigated and addressed in a more holistic manner. Including the mining sector in this study offers a good opportunity to fill the gap in the accounting literature regarding the parsimony of research in the mining sector as reiterated by (Power, Cleary and Donnelly, 2017).

In order to identify the list of sample firms, the researcher visited the website of LSE on 30th April 2019 and first of all filtered the oil and gas companies and mining companies on both the Main and AIM markets. The initial search returned a list of 341 extractive companies consisting of 157 oil & gas companies and 184 mining companies. 117 of them are listed on the main market with the remaining 224 on the AIM. After obtaining the initial list of extractive companies, the list was sorted, and the companies were categories according to their sectors and market where there are listed. A criterion for inclusion into the study sample was set which include the following:

- First, the annual report for the company for 2018 should be available for download; and

[20] Even after Brexit, LSE is still following EC Regulations.

- Secondly, the accounting policies section of the financial report should contain information about accounting method used in recording pre-development costs and it should be possible to extract how the various cost components are treated.

Any company that failed to meet any of the criteria was excluded from the sample. The 341 annual reports were manually examined and subsequently, 25% (85) out of the 341 extractive companies were excluded for not meeting the criteria for inclusion into the study sample. This resulted in a final sample of 256 extractive companies, 47% (121) of which are oil & gas companies and the remaining 53% (135) are mining companies. 68% (173) of the sample companies are listed on the AIM whilst the remaining 32% (83) trade on the main market. Table 6.1 presents a breakdown of the sample size by market and by sector.

Table 6. 1: Number of Companies in Population, Excluded and Final Sample by Market

Panel A: Population			
SECTOR	**Main Market**	**AIM**	**TOTAL**
Oil &Gas	53	104	157
Mining	64	120	184
Total	**117**	**224**	**341**
Panel B: Excluded			
Oil &Gas	10	26	36
Mining	24	25	49
Total	**34**	**51**	**85**
Panel C: Final Sample			
Oil &Gas	43	78	121
Mining	40	95	135
Total	**83**	**173**	**256**

6.5.2 Data Collection

As noted earlier, this study employs secondary data for its analysis. The data is primarily extracted from the annual reports of extractive companies. To achieve the objectives of the research, the accounting method used by each company in the sample

had to be identified. And this was done by manually examining each of the annual reports specifically the accounting policies section of the notes. Some of the companies clearly stated the accounting method they adopt in treating pre-development costs whilst others did not state it explicitly but could be derived from the description of the method. Where the researcher was not sure about what the description meant, two options were used to arrive at a conclusion. First, the researcher sent an email to the supervisors for their opinion without disclosing what he thinks and allow the supervisors to state which of the accounting methods they think the description is referring to. The second option was that the researcher was in contact with a qualified accountant that works in BDO[21] and specifically worked on extractive clients. This person had appreciable knowledge on the different accounting methods. This expert was also consulted in situations like this. And it happens that for the instances when this situation happened, the responses of all the parties were in agreement.

After identifying the accounting methods used by all the sample companies, the researcher further reviewed the notes to the annual reports to identify different components of pre-development costs mentioned in these annual reports and how they are treated by each of the companies. After reviewing a number of these annual reports, the researcher identified the following pre-development cost components. Table 6.2 displays the different pre-development cost components identified and pre-development cost category as discussed in chapter 2.

Table 6. 2: Pre-Development Cost Components Identified in Annual Report

Pre-development cost component identified	Broad pre-development costs category
Pre-licence costs	Prospecting costs
Licence and other acquisition costs	Acquisition costs
Geological and Geophysical costs	Exploration costs
Exploratory Drilling and Well	Exploration costs
Other exploratory costs	Exploration costs
Appraisal Well and Work	Evaluation costs
Other evaluation costs	Evaluation costs
General Administration costs	Exploration costs or Evaluation costs

[21] Name withheld for confidentiality's sake.

Reviewing the annual reports, three different accounting treatments were identified for each of the cost components, and they are, either the cost component is *fully capitalised, fully expensed, or initially capitalised pending decision.* These are consistent with the accounting treatment mentioned in the existing literature (Brock, 1956; Field, 1969; Lourens and Henderson, 1972). Some of the companies did not disclose how the treat some of the cost components so the researcher added a fourth option which is *not disclosed*. For each cost component, the accounting treatment is coded as "1" if a particular treatment applies, or "0" if otherwise. This coding has been widely used in the accounting literature (van der Tas, 1988; Beattie, McInnes and Feanley, 2004). These codes are used in constructing harmony and comparability indices. Table 6.3 outlines the sample selection and data collection steps.

Table 6. 3: Sample Selection and Data Collection Steps

1	Initial searched for list of extractive companies listed on LSE
2	Categorised into sectors (oil & gas and mining) and markets (Main market and AIM)
3	Set criteria for inclusion and exclusion into sample
4	Downloaded annual reports of each of the companies
5	Excluded some companies from sample from not meeting criteria
6	Reviewed annual reports to identify accounting method and classify sample companies by accounting method
7	Cross-checked those accounting method description which were not clear with supervisors and expert
8	Reviewed sample of annual report to identify pre-development cost components recurring the report
9	Made list of the nine pre-development costs
10	Examined the annual reports for accounting treatments and code the accounting treatments
11	Used codes to construct harmony and comparability indices.

6.6 Analytical Techniques

The overall aim of this research is to examine the extent of (dis) harmony of accounting treatments for pre-development costs among extractive companies and explore the pathways for standardisation. In order to achieve this aim, the research specifically seeks assess the extent of intra-method and inter-method comparability of accounting

treatments for pre-development costs among extractive companies, and finally explore the need and pathways for standardisation.

To measure the level of harmony in accounting treatments for pre-development costs, this research employs the *van der Tas' (1988) H-index* and Archer, Delvaille and McLeay (1995) *disclosure-adjusted C-index*. For each of the cost components the H and Archer, Delvaille and McLeay C-index values are computed for users of each of the accounting methods and across all the accounting methods. This helps us to gauge whether there are harmony or disharmony in accounting treatment among users of the same accounting method and also identify when costs component has the highest and lowest level of harmony.

The application of each of these indices is discussed in subsequent sections of this chapter but detail discussion of the indices is presented in chapter 4 of this thesis.

6.6.1 H-Index

In order to examine the level of harmony in the accounting treatment among disclosing companies for each of the cost components, this study employs the H- index proposed by van der Tas (1988).

By this the level of concentration of accounting policy choice among sample companies determines the extent of harmony among them. Which implies that as alternative policy choice centres around one or two methods, then harmony level will be high and vice versa. The H-index is computed as follows:

$$\boldsymbol{H = \sum_{i=1}^{n} p_i^2}$$

$$\boldsymbol{H = Herfindahl\ index}$$

$$\boldsymbol{p_i = the\ relative\ frequency\ of\ accounting\ method\ i}$$

$$\boldsymbol{n = number\ of\ alternative\ accounting\ treatments}$$

The H index ranges between "**0"** for no harmony to a maximum of "**1"** where there is complete harmony in accounting treatments. For each cost component for example, prospecting cost, this study will investigate how it is treated among firms using the same accounting method and measure the extent of harmony among them.

6.6.2 Archer, Delvaille and McLeay (1995) Disclosure-Adjusted C-Index

To measure the level of harmony in accounting treatment adjusting for non-disclosing companies , this employs the Archer, Delvaille and McLeay (1995) disclosure-adjusted C index. The C index was proposed by van der Tas but was modified by Archer, Delvaille and McLeay to incorporate non-disclosing companies. It measures the direct comparability of reported accounting numbers which are treated as comparable only in those cases where the same accounting method is used by any two companies. The C index ranges from **1** representing total harmony (same treatment) to **0** where different treatments are used hence making them not comparable. Mathematically, the Archer, Delvaille and McLeay disclosure-adjusted C-index is computed as:

$$C = \frac{\sum_{j=1}^{j} x_{+j}(x_{+j}-1)}{x_{++}(x_{++}-1)}$$

Where:

x_{+j}= the number of firms adopting accounting treatment j in accounting method i

J= total number of alternative accounting treatments

x_{++}= total number of firms including non-disclosers

6.6.3 Archer, Delvaille and McLeay (1995) Decomposed C-Index

Apart from including non-disclosers Archer, Delvaille and McLeay (1995) argued that the C index can be decomposed to allow distinction between comparability within-countries and between-country. By doing that the resulting formulae are:

$$\text{Within} - \text{country C index} = \frac{\sum_i \sum_j (x_{ij}(x_{ij}-1))}{\sum_i (x_{i+}(x_{i+}-1))}$$

$$\text{Between} - \text{country C index} = \frac{\sum_i \sum_j (x_{ij}(x_{+j}-x_{ij}))}{\sum_i (x_{i+}(x_{++}-x_{i+}))}$$

Where:

x_{ij} = the number of firms adopting accounting method j in country i

x_{i+} = the total number of firms in the country i

x_{+j}= the total number of firms adopting method j

x_{++}= the total number of firms

Archer, Delvaille and McLeay (1995) contend that the between-country C index is more robust than the I-index in measuring international harmony. Following Archer, Delvaille and McLeay (1995), this study adopts the within and between-country C index and modifies them to measure within- method (intra-method) and between- method (inter-method) comparability of accounting treatments for pre-development costs.

van der Tas (1988) asserts that international harmonisation can be viewed from two ways- international harmony is the degrees of comparability of financial statements of companies regardless of their countries of origin, or by viewing international harmonisation as when there is convergence among countries on how a specific item is treated. He posited the former is the way international investors view harmonisation (van der Tas ,1988, p.165). Reflecting on this and the objective of this current study, this research adopts the former view and assess harmonisation regardless of the country of origin. This view is further confirmed by Taplin (2004) who stated that in assessing harmony in European community, one can view all companies as belonging to the same "nation" disregarding their country of origin (p. 58). Against this backdrop, this study does not focus on the countries of origin of selected companies rather emphasis is placed on the choice of accounting method and see companies adopting the same accounting method as belonging to the same community.

The modified C index is computed as:

$$\text{Within} - \text{method (Intramethod) C index} = \frac{\sum_i \sum_j (x_{ij}(x_{ij} - 1))}{\sum_i (x_{i+}(x_{i+} - 1))}$$

$$\text{Between} - \text{method (intermethod) C index} = \frac{\sum_i \sum_j (x_{ij}(x_{+j} - x_{ij}))}{\sum_i (x_{i+}(x_{++} - x_{i+}))}$$

Where:

x_{ij}

$=$ the number of firms adopting accounting treatment j in accounting method i

x_{i+} $=$ the total number of firms using accounting method i

x_{+j}= the total number of firms adopting accounting treatment j

x_{++}= the total number of firms

This formula is the same as Archer, Delvaille and McLeay (1995), but the notations have different meaning. Consistent with all other comparability indices, C range between 0 (not comparable) to 1 (complete comparability). The within-method C index is the ratio of the number of pairwise comparisons that may be made in the *ith* accounting method amongst companies selecting the *jth* accounting treatment to the total number of inter-firm comparisons that can be made between companies using that same accounting method. Whilst the between-method C index is the ratio of the number of pairwise comparisons that may be made between firms selecting the *jth* accounting treatment but using different accounting methods, to the maximum number of such comparisons that may be made.

6.6.4 van der Tas (1988) I-Index

Consistent with the second viewpoint put across by van der Tas (1988) which has been explained earlier, he introduced the I-index. It is used to measure the degree of comparability of accounting policy choice across different countries. It is seen as the international version of H-index. The I-index is computed by multiplying the relative application frequency of each particular accounting method in one country by the corresponding relative frequency of the same method in the other countries, and subsequently adding together the results of all alternative methods. Mathematically, I-index can be computed as:

$$\textbf{van der Tas (1988)}\ \boldsymbol{I-index} = \sum_{\boldsymbol{i=1}}^{\boldsymbol{n}} (\boldsymbol{f_{i1}}\ \mathbf{x}\ \boldsymbol{f_{i2}}\ \mathbf{x}\ \ldots.\ \boldsymbol{f_{im}})$$

$f_{i1} =$
$the\ relative\ \ frequency\ of\ accounting\ treatment\ i\ of\ accounting\ method\ 1$

$n = the\ total\ number\ of\ alternative\ accounting\ treatments$

$m = the\ number\ of\ accounting\ methods$

One limitation with the I-index is that the index value tends to be zero as the number of countries increase since the additional relative frequencies will almost always be fractions, leading to a skewed distribution over the range 0-1. In dealing with the skewness problem, van der Tas (1988) suggested a correcting factor of *(m-1)th* root to be applied which results in a corrected I-index formulated as:

$$\textbf{van der Tas (1988)}\ \boldsymbol{corrected\ I^{*} - index} = \sum_{i=1}^{n} (\boldsymbol{f_{i1}}\ \mathbf{x}\ \boldsymbol{f_{i2}}\ \mathbf{x}\ \ldots.\ \boldsymbol{f_{im}})^{\mathbf{1/(m-1)}}$$

In order to make the I-index analogue of the H-index as stated by van der Tas, Archer and McLeay (1995) propose a different correcting factor which "2*/m"* and hence an adjusted I"-index which is formulated as:

$$\textbf{Archer and McLeay (1995)}\ \boldsymbol{I - index} = \sum_{i=1}^{n} (\boldsymbol{f_{i1}}\ \mathbf{x}\ \boldsymbol{f_{i2}}\ \mathbf{x}\ \ldots.\ \boldsymbol{f_{im}})^{\mathbf{2/m}}$$

This research therefore employs both van der Tas I index with correction factor and Archer and McLeay I-index in measure inter-method comparability, thus, comparability between companies using different accounting methods.

6.7 Interpretation of Index values

There is no universally accepted benchmark for interpreting index values, however, some prior studies have suggested benchmarks for doing so (Taplin, 2011). For instance, Parker and Morris (2001) interpreted H index values of less than 0.75 as "little" harmony, values between 0.75 to 0.89 as evidence of "some" harmony and between 0.90 to 0.99 as "considerable harmony" and 1 as "complete harmony". Ali et al. (2006), on the other hand, interpreted index values of 0.8 and above as "high", between 0.6 and 0.79 as "moderate" and any values less than 0.6 as "low". In a slightly similar fashion, Taplin (2006) interpreted the index values between 0.75 and 1 as "high", between 0.55 and 0.74 as "moderate" and less than 0.54 as "low". Merging these different classifications, we propose and adopt the classifications on Table 4 in interpreting the values of our indices.

Table 6.4: Interpretation of Index values

Index range/ values	Interpretation
1	Complete/absolute harmony/comparability
0.75 ≤ index value <1	High level of harmony/comparability
0.5 ≤ index value <0.75	Moderate level of harmony/comparability
0.25 ≤ index value <0.5	Low level of harmony/comparability
0 < index value <0.25	Very low level of harmony/comparability
0	No harmony or disharmony/comparability

6.8 Chapter Summary

This chapter has discussed the methodology and method employed in this research. It explains the research philosophy that underpins the study, the approach and research design with discussions on methodological choice, strategies and data and data collection procedures as well as the statistical indices used. Next three chapters presents the analysis and discussion of the results.

CHAPTER SEVEN
ACCOUNTING METHOD CHOICE

7.1 Introduction

To inform the main analysis, some initial descriptive analyses are carried out and this chapter presents the results. It starts by presenting the accounting method choice by market and sector and proceeds to examine the accounting method choice by country. This is followed by descriptive analysis of size and age and choice of accounting methods.

7.2 Accounting Methods Choice

Table 7.1 shows the number and percentage of companies listed on each market and their accounting method choice. From the table, it is evident that extractive companies in the sample adopt four different accounting methods which are SE, FC, AOI and EA. Following the classification of Deloitte Touche Tohmatsu (2001) and Stadler and Nobes (2020), the four accounting methods can be ranked in the order of conservatism from most conservative to the least, with the most conservative one being EA, followed by SE, then by AOI and least conservative (or more aggressive) is the FC. The conservative methods have a higher tendency to write off costs whilst the less conservative (aggressive) methods prefer to capitalise costs.

In the oil & gas sector as shown on Panel A, out of the 43 sampled companies on the main market, 36 (83.7%) follow SE method, 5 (11.6%) follow FC method, and 1 (2.3%) each following AOI and EA method. Whilst on the AIM, out of the 78 companies in the sample, 47 (60.3%) use SE method, 18 (19%) use FC method, 11 (14.1%) use AOI with only 2 (2.6%) using EA method. This shows that the most common accounting method used by oil & gas companies on both the main and alternative markets is the SE method and the least common method on both markets is the EA. This finding is in line with the finding of Power, Cleary and Donnelly (2017). From the analysis, it is evident that among oil & gas companies listed on the main market, SE method and FC method remain the two main accounting practices followed whilst among those listed on AIM, the choice is among SE, FC and AOI.

In the mining sector, as shown on Panel B, AOI is the most common accounting method. Out of 40 mining companies on the main market, 18 (45.0%) use AOI, 13

(32.5%) use SE, 7 (17.5%) use EA and only 2 (9.5%) use FC. Among those listed on AIM, 39 (41.1%) out of 95 mining companies follow SE method, 35 (36.8%) follow AOI, 12 (12.6%) follow EA method and only 9 (9.5%) follow FC method. On the pooled sample, the SE is observed to be the most common method adopted by companies listed on both main and alternative markets whilst FC is the least common among those companies listed on the main market, EA is the least common among those on the AIM. This finding is in line with that of Abdo (2016) who also reported SE as the most common method among AIM listed companies. It can also be observed that EA is relatively more popular among mining companies (14.1%) than oil & gas companies (2.5%). This is in line with the IASB staff survey (IASB, 2020b), which notes that mining companies (24%) are more likely to adopt EA than their oil and gas counterparts (5%).

There are differences in the accounting method choice between oil& gas companies and their mining counterparts. Whilst the dispersion of accounting choice among oil & gas companies is clustered around SE and FC, there is a wider diversity among mining companies in the choice of methods with choice scattered around AOI, SE and EA. This finding supports what one would intuitively expect given that oil & gas companies tended to be bigger than mining companies. Bigger companies may be more established and certain on their choice of method than relatively smaller ones who tend to show more variety in their choice of methods.

Table 7. 1 Number and Percentage of Companies by Method, Sector and Market

Panel A: Oil & Gas sector

Accounting method	Number			Percentage		
	MM	AIM	CM	MM	AIM	CM
Successful Efforts (SE)	36	47	83	83.70%	60.30%	68.60%
Full Cost (FC)	5	18	23	11.60%	23.10%	19.00%
Area of Interest (AOI)	1	11	12	2.30%	14.10%	9.90%
Expense All (EA)	1	2	3	2.30%	2.60%	2.50%
Total	**43**	**78**	**121**	**100.00%**	**100.00%**	**100.00%**

Panel B: Mining sector

Accounting method	Number			Percentage		
	MM	AIM	CM	MM	AIM	CM
Successful Efforts (SE)	13	39	52	32.50%	41.10%	38.50%
Full Cost (FC)	2	9	11	5.00%	9.50%	8.10%
Area of Interest (AOI)	18	35	53	45.00%	36.80%	39.30%
Expense All (EA)	7	12	19	17.50%	12.60%	14.10%
Total	**40**	**95**	**135**	**100.00%**	**100.00%**	**100.00%**

Panel C: Pooled Sample

Accounting method	Number			Percentage		
	MM	AIM	CM	MM	AIM	CM
Successful Efforts (SE)	49	86	135	59.00%	49.70%	52.70%
Full Cost (FC)	7	27	34	8.40%	15.60%	13.30%
Area of Interest (AOI)	19	46	65	22.90%	26.60%	25.40%
Expense All (EA)	8	14	22	9.60%	8.10%	8.60%
Total	**83**	**173**	**256**	**100.00%**	**100.00%**	**100.00%**

Source: Author's estimates from research data, 2018 *MM- Main Market, AIM -Alternative Investment Market, CM- Combined Market*

7.3 Country of Origin and Accounting Method Choice

Existing literature reports that the country of origin influences the choice of accounting method (Tarca, 2002; Cortese, 2011; Gray, Hellman and Ivanova, 2019; Nobes and Stadler, 2021). This is because countries have accounting requirements which companies domiciled in must follow in preparing their financial statement and these influence the choice of accounting methods (IASB, 2003). The European Commission issued a regulation in 2002 that required all listed companies to prepare financial statements using IFRS by 2005 (Amstrong *et al.,* 2010), the absence of specific IFRSs in addressing certain transactions may allow companies to resort to their local law or rules for guidance. This section examines the association between country and accounting choice to see if what has been documented in literature is true of companies

in this samples.

Panel A of Table 7.2 presents the country of origin and accounting methods followed by the listed oil & gas companies. As evident on Table 7.2, the commonly used accounting method among oil & gas companies is the SE (83 companies, 68.6%). This is line with the finding of Abdo (2016) who using companies listed on six stock exchanges found SE as the most predominate method. Similarly, Power, Cleary and Donnelly (2017) found the SE as the commonly used method using sample of companies listed on the LSE. The SE method is most exclusively used method by oil & gas companies in the sample from countries like China, Falkland Islands, France, Ireland, Jersey, Pakistan, and Romania (100% usage in each of these countries). It is also the most popular method among other methods among oil and gas companies from Canada (9 companies, 90%), Cayman Islands (2 companies, 67%), India (2 companies, 67%), Isle of Man (2 companies, 40%), Russia (5 companies, 83%) and UK (46 companies, 72%).

The second most popular method used by oil and gas companies in the sample is FC. Other studies like Power, Cleary and Donnelly (2017) and Abdo (2016) have also found FC to be the second most common method among oil & gas companies, but Constantatos *et al.* (2021) using sample companies from eight countries (Australia, Canada, India, South Korea, Norway, Russia, South Africa and the UK) found AOI to be the second common method among oil & gas companies. The FC method is exclusively used by companies from Guernsey (2, 100%) and used, but not very popular, among companies from Canada (1 company, 10%), Cayman Islands (1 company, 33%), India (1 company, 33%), Isle of Man (1 company, 20%), Russia (1 company, 17%) and UK (16 company, 24%). Among the 3 US oil & gas companies, majority (2 companies, 67%) of them used the FC method which reflects the influence of US GAAP. This is consistent with Al-Jabr and Spear (2004) who observed that among sample of 94 US oil & gas companies 51% (48 companies) of them followed the FC method between the period 1995 to 2005.

The third most prominent method among oil & gas companies is observed to be AOI used by 12 companies representing 10% of the oil & gas companies in the sample. This is the method used by the only African company (from Nigeria) in the sample and one of the two methods used by companies from Bermuda. This method is the widely used

by Australian oil & gas companies with 75% (6) of them adopting it. This is not surprising given that AOI is the method mandated under Australian Accounting Standard Board (AASB) under AASB 6. AOI is also used by, but not too popular among companies from countries such as Isle of Man (1 company, 20%) and UK (3 company, 4%). Notwithstanding that AOI is required under AASB 6, it can be observed that 25% of Australian oil & gas companies adopt SE and 17% of Australian mining companies adopt EA instead of the mandated AOI. This confirms the findings of Stadler and Nobes (2020) who reported that other accounting methods are used by Australian companies beside the AOI.

The least popular method adopted by oil & gas companies is the EA. This finding is in line with the findings of Power, Cleary and Donnelly (2017) and Constantatos *et al.* (2021). This method is used by only 3 companies representing 2% of the sampled oil & gas companies. This is the method exclusively used by the only Greek company in the sample. It is also used by one company each from Isle of Man (1 company, 20%) and UK (1 company, 1.5%).

Panel B of Table 8.2 presents the accounting methods used by mining companies originating from different countries listed on LSE. Among the sampled mining companies, the most prominent accounting method is the AOI which is used by 39.3% (53 companies) of them. The popularity of AOI among mining companies was underscored by PwC (2012, p. 21) when they noted that "… the most common approach among mining companies is to allocate cost between areas of interest". Similarly, Epstein and Jermakowicz (2010) noted that AOI is "fairly commonly employed in the mining industry" (p. 1093). It is the method exclusively used by the each of the mining companies from Finland and Gibraltar. Expectedly, it is most prominent method among Australian mining companies (10 companies, 83%). It is also common among mining companies from Bermuda (3 companies, 75%), Cayman Islands (1 company, 50%) and Jersey (3 companies, 50%). Among UK mining companies, AOI is popular (25 companies, 35%) but second to the SE method.

The SE is almost as predominant as the AOI (53 companies, 39.3%) among mining companies in the sample since it is used by 52 companies representing 38.5% of the mining sample. By ranking it is second common method used by mining companies in the sample. Majority of mining companies from countries such as British virgin (7

companies, 58%), Guernsey (4 companies, 67%), Ireland (4 companies, 57%), Russia (4 companies, 67%) and UK (28 companies, 39%) use SE. Among mining companies, the third most popular method is EA which is used by 19 of the companies representing 14.1% of the sampled mining companies. Among Australian mining companies who do not use AOI, the EA is the method they adopt. 2 of the 4 Canadian mining companies used EA, the only Cyprus mining company in the sample adopts EA method and 15.5% (11) of the UK mining companies also use EA. Power, Cleary and Donnelly (2017) combining the SE and AOI, found that EA method was the next common method used by the mining companies in their sample. FC method is found to be the least popular method among mining companies in the sample with the method adopted by 8.1% (11) of the mining companies. This means mining companies tend to be less aggressive in choice of accounting method hence their least preference for FC which is deemed to be a more aggressive method compared to the other methods (Deloitte Touche Tohmatsu, 2001; Stadler and Nobes, 2020). This finding is in line with that of Constantatos *et al.* (2021) who found that EA is the least followed method by general mining and gold mining companies. Similar result was found by Power, Cleary and Donnelly (2017) among LSE listed mining companies.

The pooled sample on Panel C shows the dominance of SE among extractive companies in the sample (135 companies, 53%). At least one company from each of the countries adopts the SE method except for Cyprus, Finland, Gibraltar, Greece, and Nigeria where this method is not applied by any company. This can be explained by the sheer low number of companies (1 company from each country) from these countries in our sample. The dominance of SE is influenced by the high adoption by companies that originate from UK (74 UK companies, representing 54.8% of the SE companies). The second most common method across the two sectors is AOI with 34 companies (13%) using this method. Whilst 80% of 20 Australian companies use this method, across the different countries, Australian companies form 25% (16 companies out of 65 AOI companies) of the users of the AOI. This shows that though AOI is mandated by AASB it has really gained international recognition and companies outside Australia are equally following it. It is therefore not surprising that 21% (28 companies) of UK companies also follow this method in accounting for pre-development costs. It is the method used by the only company in our sample from countries like Nigeria, Gibraltar, and Finland as well as most common among companies from Bermuda.

The third most common method across the two sectors is the aggressive FC method with 34 companies representing 13% of our sampled companies adopting it. It is the most common method among the US companies in our sample. It is also used by Canadian companies (2 companies, 14%) but less popular than the SE method (9 companies, 64%). FC is used by companies from countries such as Cayman Islands, Guernsey, India, Isle of Man, Jersey, and Russia. Quite a substantial number of UK companies follow the FC with them representing 62% (21) of the 34 FC companies in the sample.

The least common method followed by the extractive companies in our sample is the EA. It is used by 22 companies representing 9% of our sample. Majority of the users of this method are mining companies (19 mining companies out of the 22 FC companies) who tend to prefer more conservative method. This method is followed by only 3 oil & gas companies from Greece, Isle of Man and UK. The 19 mining companies adopting EA originate from Australia (2 companies), Bermuda (1 company), British Virgin (1 company), Canada (2 companies), Cyprus (1 company), Guernsey (1 company) and UK (11 companies).

From Panel C of Table 8.2, the sample is dominated by large proportion of companies that originate from the UK (135 companies, 52.7%) and this followed by those from Australia (20 companies, 7.8 %) and then by those from Canada (14 companies, 5.5%) and the remaining 66% coming from the other countries. These countries have been the focus of most previous studies on extractive industries accounting (Luther, 1996; Abdo, 2016; IASB, 2020).

Table 7. 2 Accounting Method Choice by Country of Origin

Panel A: Oil and Gas sector					
Country of origin	**SE**	**FC**	**AOI**	**EA**	**TOTAL**
Australia	2	0	6	0	8
Bermuda	1	0	1	0	2
Canada	9	1	0	0	10
Cayman Islands	2	1	0	0	3
China	1	0	0	0	1
Falkland Islands	1	0	0	0	1
France	1	0	0	0	1
Greece	0	0	0	1	1
Guernsey	0	2	0	0	2
India	2	1	0	0	3
Ireland	4	0	0	0	4
Isle of	2	1	1	1	5
Jersey	4	0	0	0	4
Nigeria	0	0	1	0	1
Pakistan	1	0	0	0	1
Romania	1	0	0	0	1
Russian	5	1	0	0	6
UK	46	14	3	1	64
US	1	2	0	0	3
Total	**83**	**23**	**12**	**3**	**121**

Panel B: Mining sector					
Country of origin	**SE**	**FC**	**AOI**	**EA**	**TOTAL**
Australia	0	0	10	2	12
Bermuda	0	0	3	1	4
British Virgin	7	0	4	1	12
Canada	0	1	1	2	4
Cayman Islands	1	0	1	0	2
Cyprus	0	0	0	1	1
Finland	0	0	1	0	1
Gibraltar	0	0	1	0	1
Guernsey	4	0	1	1	6
India	1	0	0	0	1
Ireland	4	0	3	0	7
Israel	1	0	0	0	1
Jersey	2	1	3	0	6
Russian	4	2	0	0	6
UK	28	7	25	11	71
Total	**52**	**11**	**53**	**19**	**135**

Panel C: Pooled Sample (both sectors)					
Country of origin	**SE**	**FC**	**AOI**	**EA**	**TOTAL**
Australia	2	0	16	2	20
Bermuda	1	0	4	1	6
British Virgin	7	0	4	1	12
Canada	9	2	1	2	14
Cayman Islands	3	1	1	0	5
China	1	0	0	0	1
Cyprus	0	0	0	1	1
Falkland Islands	1	0	0	0	1
Finland	0	0	1	0	1
France	1	0	0	0	1
Gibraltar	0	0	1	0	1
Greece	0	0	0	1	1
Guernsey	4	2	1	1	8
India	3	1	0	0	4
Ireland	8	0	3	0	11
Isle of Man	2	1	1	1	5
Israel	1	0	0	0	1
Jersey	6	1	3	0	10
Nigeria	0	0	1	0	1
Pakistan	1	0	0	0	1
Romania	1	0	0	0	1
Russian	9	3	0	0	12
UK	74	21	28	12	135
US	1	2	0	0	3
Total	**135**	**34**	**65**	**22**	**256**

7.4 Accounting Method and Company Characteristics

Prior studies have argued that extractive companies are fundamentally different in many respects including their size, and these differences influence their choice of accounting method (Malmquist, 1990; Bandyopadhyay, 1994). It has often been argued that FC companies are more aggressive in exploration, newer, and smaller in size than their SE counterparts (Deakin, 1979; Misund, Osmundsen and Sikveland, 2015; Misund, 2017). To examine if companies in this sample exhibit these tendencies, we follow Power, Cleary and Donnelly (2017) and Bryant (2003) to analyse the mean and median values of age and market capitalisation to determine the age and size of companies relative to their counterparts. Table 7.3 reports descriptive statistics for market capitalisation (size) and age albeit across the markets and sectors. The table shows that the mean and median values of market capitalisation and age.

7.4.1 Accounting Method and Size Analysis

It is evident from Table 7.3 that among the oil & gas companies, the mean market capitalisation values suggest SE companies (based on the combined market) are much larger than the other methods users as shown by the mean (£6,103m) and median (£61m) values. The EA companies are the second largest by mean market capitalisation with the FC and AOI companies being relatively smaller. On the other hand, among the mining companies, it is evident that EA companies are much larger than the others with mean market capitalisation of £4,946m.

The pooled sample on Panel C of Table 7.3 offers a more harmonised insight. As evident on the combined market, EA companies are observed to be the largest in size, followed by SE companies and the third largest by market capitalisation is AOI with FC companies being the smallest as indicated by mean market value of £479m and median value of £16m. This confirms the findings reported in the existing literature (Amernic, 1979: Frazier and Ingersoll, 1986; Johnson and Ramanan, 1988; Bryant 2003; Misund, 2017) that larger extractive companies adopt more conservative accounting methods like EA and SE since by virtue of their size they have the financial capacity to write off pre-development costs and remain profitable. On the contrary, smaller extractive companies are mostly highly indebted and consequently have higher preference for capitalisation to maximise their profit (Deakin, 1979; Dhaliwal, 1980) and to avoid breaking their debt covenant as suggested by the debt/equity hypothesis of

positive accounting theory (Hagerman and Zmijewski, 1979; Ullman, 1985; Watts and Zimmerman, 1986; 1990).

Comparing the two sectors based on the across methods mean values on the combined market, it is observed that oil & gas companies are much larger in size than mining counterparts on both the main and alternative markets. With oil & gas companies being larger than mining companies, it would have been expected that a larger proportion of oil & gas companies will adopt the most conservative EA method. Conversely, it is observed that the proportion of mining companies (14%, 19 companies)[22] adopting EA is higher than their oil & gas (2.5%, 3 companies) counterparts. But when the proportion of the two most conservative methods (EA and SE) are put together, it is observed that a larger proportion of oil & gas companies (71 %, 86 companies) adopt the more conservative EA and SE methods than their mining counterparts (53%, 71 companies).

Between the two markets, the mean and median values provide evidence to show that main market listed companies are much larger than their AIM counterparts in both sectors. Likewise, it can be observed from the pooled sample that the proportion of main market listed companies (69%) adopting the more conservative EA and SE methods are higher than those adopting the AIM (58%).

Overall, the results reveal that among the sampled companies EA users are, on the average, the largest and FC users are the smallest. This confirms the preference of smaller extractive companies for less conservative methods (more aggressive) like FC whilst larger companies prefer more conservative methods like EA and SE methods.

7.4.2 Accounting Method and Age Analysis

Similarly, from the age analysis, it can be observed that, among oil & gas companies on the combined market, EA companies are the oldest with mean age of 31 years. This is followed by SE users with mean age of 28 years. FC and AOI users are 20 and 15 years respectively. Among mining companies, it can be observed that EA companies are the oldest with mean age of 33 years. This is followed by FC and AOI with mean age of 27 and 26 years respectively. SE mining companies are seen to be the youngest with mean age of 23 years. On the pooled sample shown on Panel C, it is obvious that on the combined market, EA companies are the oldest with mean age of 33 years,

[22] Refer to Table 7.1

followed by SE companies with average age of 26 years and the youngest companies are FC companies with average of 22 years. The results on the pooled sample on the combined market confirms the argument that users of more conservative methods like EA and SE are older and more established companies whilst the FC users are mostly newer and younger companies. This finding is consistent with that of Deakin (1979) who found similar result using data on extractive companies in the United States.

Comparing across sectors, it is observed that mining companies (26 years) are slightly older than oil & gas companies (25 years) based on the mean age across methods on the combined market. This explains why the proportion of companies that employ EA method is higher among mining companies (14.1%, 19 companies) than oil & gas counterparts (2.5%, 3 companies). By they are older, they may be more established and can afford to write off significant pre-development costs. Between the two markets, it is evidently clear from the pooled sample that main market listed companies (42 years) are older than their AIM counterparts (17 years). This is expected since the AIM is only 25 years old and hosts newer and younger companies (LSE, 2021). This further confirms AIM-listed companies least preference for the conservative EA method (8.6%) because as younger and newer companies they may not have the financial capacity to fully expense pre-development costs instead they will prefer to capitalise them. Similarly, as most of these AIM listed companies are smaller and tend to use more debt, they ensure they do not break debt/equity ratio covenants and hence prefer to capitalise pre-development costs instead of expensing or treating them in a conservative manner which will result in reduction of their reported earnings and subsequently increase their debt/equity ratio.

Table 7. 3 Descriptive Statistics of Users of Different Accounting Methods

SIZE (MARKET CAPITALISATION -£million)							AGE (years)					
Panel A: Oil and Gas sector												
Accounting method	**Mean**			**Median**			**Mean**			**Median**		
	MM	**AIM**	**CM**	**MM**	**AIM**	**CM**	**MM**	**AIM**	**CM**	**MM**	**AIM**	**CM**
SE	16343	93	6103	372	39	61	38	20	28	24	16	19
FC	188	57	82	34	14	14	19	20	20	17	17	17
AOI	671	20	74	671	16	16	11	15	15	11	15	14
EA	30	325	227	30	325	30	62	16	31	62	16	19
Across methods	13416	80	4118	252	23	41	36	19	25	23	16	17
Panel B: Mining sector												
Accounting method	**Mean**			**Median**			**Mean**			**Median**		
	MM	**AIM**	**CM**	**MM**	**AIM**	**CM**	**MM**	**AIM**	**CM**	**MM**	**AIM**	**CM**
SE	531	33	131	8	15	13	44	16	23	25	15	16
FC	6462	74	1236	6462	17	47	73	16	27	73	16	16
AOI	5760	39	1834	511	12	25	44	16	26	28	15	17
EA	13322	61	4946	6935	14	48	64	15	33	28	16	19
Across methods	5974	43	1631	474	13	18	49	16	26	29	15	16
Panel C: Pooled Sample												
Accounting method	**Mean**			**Median**			**Mean**			**Median**		
	MM	**AIM**	**CM**	**MM**	**AIM**	**CM**	**MM**	**AIM**	**CM**	**MM**	**AIM**	**CM**
SE	12390	66	3795	217	23	33	40	18	26	25	16	16
FC	2280	63	479	373	15	16	34	19	22	20	16	16
AOI	5460	34	1498	671	13	23	42	16	24	26	15	16
EA	11660	99	4303	6636	16	43	64	15	33	45	16	19
Across methods	9639	60	2779	270	18	26	42	17	25	25	16	16

Source: Author's estimates from research data, 2018 *MM- Main Market, AIM -Alternative Investment Market, CM- Combined Market*

7.5 Chapter Summary

This chapter has presented the results and discussions on the choice of accounting method used by extractive companies listed on the LSE. It started by looking at the choice of accounting methods used by companies across markets, sectors and across countries. This was followed by some descriptive analysis, to establish whether the size and age of companies that adopt the different accounting method differ and consistent with what has been reported in literature.

In terms of accounting method choice, this study confirms the findings of prior research that diverse accounting methods are used in accounting for pre-development costs by extractive companies listed on the LSE. Overall, four different accounting methods are used by extractive companies in the study sample, which are SE, AOI, FC and EA with majority of them using the SE method.

Much as these findings are consistent with prior studies, there are some refresh insights. First, the study finds evidence based on combined market that the dispersion of accounting method choice is not the same for both sectors. Whilst the dispersion of accounting choice among oil & gas companies is clustered around SE and FC, there is greater heterogeneity among mining companies with choice scattered around AOI, SE and EA. This means majority of oil & gas companies tend to adopt either SE or FC, but mining companies tend to show greater diversity adopt choose among AOI, SE and EA. Secondly, the finding suggests that accounting method choice tend to be clustered around SE and AOI among main market listed companies whilst there is a wider variety among AIM-listed companies with choice around SE, FC and AOI. These findings support what one would intuitively expect given that oil & gas companies tended to be bigger than mining companies. Bigger companies may be more established and certain on their choice of method than relatively smaller ones who tend to show more variety in their choice of methods. Similarly, since main market host bigger and more established companies, it is not surprising that companies listed there do not exist much diversity as their AIM counterparts who tend to be relatively smaller. These findings suggest that future regulation attempt should pay more attention to mining and AIM listed companies and offer more guidelines to them reduce the extent of diversity that exists there.

CHAPTER EIGHT
ACCOUNTING FOR PRE - LICENCING, LICENCING AND OTHER ACQUISITION COSTS

8.1 Introduction

This chapter and the next two chapters present the empirical results and discussions of the research findings. This chapter focuses on the accounting for pre-licencing, and licencing and other acquisition costs. For each of these cost components, the discussions are made in line with the objectives of the study. Thus, it is essential to reiterate that the specific objectives of this research are to:

- identify the current practice in accounting treatment for eight pre-development cost components;
- examine the level of (dis)harmony in accounting treatments for each pre-development cost components;
- assess the extent of intra-method and inter-method comparability in the accounting treatments;
- investigate if there is a need for standardising accounting practices by EI;
- explore and suggest possible pathways for standardisation.

For each cost component, the results and discussions are broadly divided into three parts. The first part looks at the accounting treatment for the cost component among users of the same and different accounting methods to identify the extent of diversity in treatment both within and across methods as well as the most common accounting treatment for that cost component. In this part, the study employs positive accounting theory and institutional theory to explain the possible reasons why some of the companies treat cost components differently from their method counterparts and how harmonisation and standardisation can be achieved. The extent of diversity both within and across methods offers insight on whether there is the need for standardisation whilst the most common practice (treatment) allows the study to offer suggestions as to how standardisation can be achieved. By this, the first part addresses the first, fourth and fifth objectives.

The second part shows the level of harmony in treatment of cost components by users of the same method and across all the methods as reported by the *van der Tas (VDT) (1988) H-index* and *Archer, Delvaille and McLeay (ADM) (1995) disclosure-adjusted C-index*.

The third and final part presents the results and discussions of the extent of comparability in how cost components are treated both within and across methods. The intra-method comparability is measured by the Within-method (WM) C-index and inter-method comparability by Between-method (BM) C-index, *van der Tas (VDT)* (1988) *I-index* and *Archer and McLeay (*A&M) *(1995) I-index*. The third part addresses objectives three, four and five.

Under each part, the results and discussions are done at both sector and market levels. At sector levels, the results and discussions of oil & gas sector, mining sector and the pooled sample (extractive companies) are presented. And under each market, the results and discussions of main, alternative, and combined markets are presented. These provide an opportunity to identify any obvious differences that might exist between sectors and markets.

Furthermore, in view of the number of companies included in the sample and those treating cost components differently, it is not possible to undertake an in-depth review and explanation of why each of the companies that treat costs component differently from their method counterparts do so without being overly lengthy. Hence, the interpretation is in most cases limited to few of them and focus is placed on their size as measured by market capitalisation (MarketCap) and how old or young they are in terms of ages (in years) compared to their mean values for their method users on the same market.

It is also worthy of note that, regardless of the level of harmony or comparability, an index value of less than 1 among users of the same the method is an issue of concern because it denotes some diversity within method. The interpretations for the index values are provided as foot note to each of the tables showing the level of harmony and comparability index values. Consistent with prior studies such as Parker and Morris (2001), the same interpretations are used in explaining the values of H, C and I indices.

The remaining sections of this chapter examine how two of the pre-development cost components, thus, Pre-licencing costs, and Licencing and other acquisition (LOA) costs, are accounted for by users of the same and different accounting methods. For each pre-development cost component, the results and discussions are presented in three parts as delineated above.

8.2 Pre-Licencing Costs

Pre-licencing costs refer to costs incurred before legal rights to explore a specific area is obtained by the extractive firm (Oil Industry Accounting Committee (OIAC), 2001). Such costs may include cost of scouting over a wide area, cost of acquisition of exploration data, costs of speculative seismic data, the associated costs of analysing that data, and cost of preparatory work of exploration team (Williamson, 2005). Pre-licencing costs are incurred during the prospecting phase of extractive activities. The magnitude of pre-licencing costs varies considerably depending on the age, size of company and the areas being explored (Lourens and Henderson, 1972). For a newer company, pre-licencing costs may form significant portion of pre-development costs since a lot of money needs to be spent to gather relevant data unlike an already established company. Similarly, what may be seen as an immaterial amount for a large company may be highly significant for a smaller company. If a company is entering a new area, its pre-licencing costs may be higher than when they continue operating in an area, they are familiar with. This gives a clear perspective of how relevant pre-licencing costs can be for extractive companies and hence the way they are treated is important. Unfortunately, the scope of IFRS 6 *Exploration for and Evaluation of Mineral Resources* does not cover pre-licencing costs because the standard is only limited to exploration and evaluation (E&E) costs. The scope of the standard is defined to exclude expenditures incurred before an entity obtains the legal rights to explore a specific area or after the technical feasibility of extracting the mineral has been established. The exclusion of pre-licencing costs from this standard leaves companies with several options to choose from which includes either following pre-IFRS national standards/ guidance, applying definition under the US GAAP[23], following other relevant standards (IFRSs) such as the principles of asset recognition in IAS 16

[23] Stadler and Nobes (2020) argue that since the different accounting methods are not named and defined under IFRS, companies adopting them might be applying their US definitions, however, their findings show that the use of these policies were not consistent with the US definitions.

Property, Plant and Equipment and IAS 38 *Intangible assets* (KPMG, 2005).

Pre-IFRS in the UK, pre-licencing costs were allowed to be fully capitalised by FC companies (OIAC, 2001: para 41) whilst SE companies initially capitalises them pending determination (OIAC, 2001: para 50). Conversely, under the US GAAP defined by the FASB, though FC companies could fully capitalise these costs (SEC Regulation S-X4-10), SE companies had to fully expense them (FASB 19, 1977, para 16-19). This implies that whilst there seem to be uniformity for FC companies to fully capitalise these pre-licencing costs, SE companies could either initially capitalise or fully expense them which creates a potential for diverse treatment even among users of the same method. Under IFRS, pre-licencing costs can be treated in a manner consistent with the requirement of IAS 38 *Intangible assets* where costs such as start-up, pre-opening, and pre-operating costs are required to be charged to expense when incurred (see IAS 38.69). The lack of clear guidance on how pre-licencing costs should be treated by the current IFRS gives room for choice in treatment which may be conflicting. This following section discusses the accounting for pre-licencing costs by extractive companies.

The accounting for pre-licencing cost is presented in three parts. The first part presents the results and discusses the accounting treatment for the cost among extractive companies to identify diversity within and across method and the most common treatment for pre-licencing costs. The second part reports and discusses the level of harmony in the accounting treatment for these costs and shed more light on the level of diversity both within and across methods and the method which exhibit the highest level of diversity. The final part discusses the level of intra-method and inter-method comparability in the accounting treatment.

8.2.1 Accounting Treatment for Pre-Licencing Costs

8.2.1.1 Oil and Gas companies

Panel A of Table 8.1A presents the accounting treatment for pre-licencing costs by the sampled oil & gas companies. The accounting treatments for these costs have been categorised as either being fully capitalised (A), fully expensed (B), initially capitalised pending determination (C) or not disclosed (D) for each of the accounting methods.

As can be observed from the table, among main market oil & gas companies adopting different methods, there is consistency in the way pre-licencing costs are treated. All disclosing companies regardless of their accounting method, fully expense pre-licencing costs except one FC company[24] that fully capitalises them. This company seems to have complied strictly with principle of its accounting method and fully capitalises these costs. Similarly, among disclosing oil & gas companies listed on the AIM, all of them, notwithstanding their accounting methods, write off pre-licencing costs except one SE company[25] that initially capitalises pending decision. Though the treatment by this SE company is different from those of its method users, it is not unexpected given that past guidance has permitted SE users to initially capitalise such costs (see OIAC, 2001: para 50). Therefore, the absence of standard stating clearly how such costs should be treated allows companies the liberty to treat these costs anyhow.

When oil & gas companies on both markets are combined (henceforth combined market), the results suggest that there is uniformity in fully expensing pre-licencing costs among oil & gas companies in the sample apart from two companies that treat these costs differently. It is evident from the table that there is high level of non-disclosure. Among the main market-listed oil & gas companies, 44% (16 companies) of SE users and 20% (1 company) of FC did not disclose how they treat pre-licencing costs. Similarly, among the AIM-listed oil & gas companies, 34% (16) of SE users, 22% (4) of FC users and as high as 64% of AOI users failed to disclose how they treat pre-licencing costs. On the combined market, 39% (32) of SE users, 22% (5) of FC users and 58% of AOI users failed to disclose how they treat pre-licencing costs leaving the overall non-disclosure rate for pre-licencing costs among oil & gas companies at

[24] Endeavour International Corporation
[25] Clontarf Energy Plc

36% (44) which is quite high.

8.2.1.2 Mining Companies

As evident on Panel B of Table 8.1A, in the mining sector there is complete uniformity in fully expensing pre-licencing costs among disclosing mining companies listed on each of the markets among users of each of the accounting methods. Like their oil & gas counterparts, what is alarming among mining companies is the high rate of non-disclosure to the extent none of the FC companies [26] on the main market disclosed how they treat pre-licencing costs. Apart from EA users, for all the other method users, more than half of their members failed to disclose how they treat these costs. The non-disclosure rates are 64% (61) for AIM-listed companies, 60% (24) for the main market counterpart and 63% (85) on the combined market.

Though the extent of consensus among mining companies in fully expensing pre-licencing costs may not suggest the need for standardisation, the overwhelming non-disclosure rate suggests otherwise. There is the need for regulation to mandate full disclosure of information regarding these costs among companies in mining sector. Additionally, mandating the treatment and disclosures will reduce the possibilities for diversity of practice in future and sustain the current unified practice around expensing pre-licencing costs. With fully expensing being the most common treatment among mining companies, it is therefore reasonable to conclude that future standard may require all extractive companies to fully expense pre-licencing costs and mandate them to fully disclose information on pre-licencing costs in their accounts since non-

[26] Novolipetsk Steel and PJSC Acron

disclosure allows companies the freedom to treat costs differently from their method counterparts.

8.2.1.3 Pooled Sample

Consistent with the accounting treatments observed under each sector, on the pooled sample as shown on Panel C of Table 8.1A, consistent with Field (1969) and Lourens and Henderson (1972), the evidence suggests that pre-licencing costs is fully expensed by all disclosing extractive companies in the sample regardless of the choice of accounting method except for two[27] oil & gas companies that treated these costs differently. Of these two, Endeavour International Corporation (EIC) is a US-based FC company whilst Clontarf Energy Plc is a UK-based SE company. Though they treat pre-licencing costs in line with the principles of their accounting methods, their treatments vary with the common practice among their method users. Detailed analysis revealed that both companies are relatively smaller in size (measured by market capitalisation) compared to their method counterparts. This may explain why they do not prefer a more conservative treatment of fully expensing these costs. As noted by Deakin (1979), smaller companies are, on the average, highly geared and therefore prefer to capitalise costs to build their balance sheet and to attract investors. Similarly, the debt/equity hypothesis of PAT could be used to explain their treatment. The debt/equity hypothesis of PAT contends that companies may choose accounting method and treatment deliberately which result in higher assets and earning values to avoid breaking debt covenants they have with their lenders (Watts and Zimmerman, 1986; 1990). Therefore, the least preference of EIC and Clontarf Energy Plc for conservative

[27] Endeavour International Corporation is the only FC company that fully capitalised pre-licencing costs. Its MarketCap (size) as 31 December 2018 was £0.95m (Mean MarketCap for its method is £ 188m). And Clontarf Energy Plc, UK-based company with MarketCap of £1.65m (Mean MarketCap for its method is £93 m).

treatment may be an attempt by them to build their balance sheets to attract investment and avoid breaking debt covenants, if any.

Additionally, in terms of choice of accounting method, one would understand why EIC adopts FC given that it is a smaller company as FC is mostly used by smaller companies (Bryant, 2003; Abdo, 2016; Misund, 2017). But for Clontarf Energy Plc, it is quite surprising to find a smaller and newer company of its kind adopting SE since SE is notable among bigger and more established companies (Cortese, Irvine and Kaidonis, 2009; Misund, 2017, Abdo, 2018). But Clontarf Energy Plc choice of method could be explained using the mimetic isomorphism of institutional theory which argues that in industries with high risk and uncertainty, newer companies tend to "copy" accounting method of already established companies to gain legitimacy into the industry (DiMaggio and Powell, 1991). But by virtue of its size and age, it may not have the financial capacity to write off pre-licencing costs, which is mostly very significant for newer companies (Lourens and Henderson, 1972), like a well-established company will, hence its decision to initially capitalise pre-licencing costs though they are generally expensed by its SE method users. By initially capitalising the costs pending decision, it can allow management the flexibility to manage the adverse impact of such costs on current earnings by deferring a potential write off as a means of managing current earnings especially if bonuses depend on them as stipulated by bonus plan hypothesis (Watts and Zimmerman, 1986; 1990). Additionally, the discretion as to when an initially capitalised cost is either written off or fully capitalised rests with management, which means they can choose the "appropriate time" to write off initially capitalised costs to reduce reported earnings to avoid political pressure in line with the political cost hypothesis (Zimmerman, 1983; Milne, 2002).

From the findings, it is reasonable to conclude that there is high level of uniformity in fully expensing pre-licencing costs among extractive companies adopting the different accounting methods. This confirms that of Field (1969) who concluded that majority of costs before acquisitions are charged as expense. The common practice of writing off pre-licencing costs among users of different methods treatment is broadly in line with guidance under IAS 38 paragraphs 54 and 69 which allow companies to charge costs such as research, pre-opening and pre-operating costs incurred before obtaining legal rights to expense when incurred. It is also consistent with the recommendation under the 2010 Discussion Paper, which explicitly proposed that "The costs of these prospecting activities should therefore be recognised as expenses as incurred..." (IASB, 2010, p. 55). Additionally, this treatment is consistent with the prudence concept, because at the time pre-licencing costs are incurred, there is a very low probability that companies can establish whether future economic benefits will arise from them. And with such high uncertainty, it is just reasonable for such costs to be written off and not capitalised to reduce the chance of overstating companies' assets with non-value adding costs.

Much as there is high uniformity among extractive companies to fully expense pre-licencing costs, what is worrying is the high number of non-disclosing companies and this suggests that there is a need for harmonising the diverse practice in order for standardisation to take place and to mandate the current practice of expensing pre-licencing costs and encourage full disclosure of information related to these costs. Non-disclosure has several implications. The extant finance and accounting literature is clear on the fact that non-disclosure among companies especially listed ones increases information asymmetry and agency problem (Donnelly and Mulcahy 2008; Mallin and Ow-Yong, 2012). By not disclosing, the extractive companies first and foremost,

renege on their responsibilities to investors as stewards of the companies and deny them fully information about their own company. Secondly, by not disclosing, management of these extractive companies can choose to treat these costs in a manner which fulfils their self-interest instead of that of the owners' (Jensen and Meckling, 1976; Watts and Zimmerman, 1990).

Table 8.1A Pre-licencing Costs Cross – Classification

Panel A: Oil and Gas sector

Accounting Method	Main Market					AIM					Combined Market				
	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D	Total
SE	0	20	0	16	36	0	30	1	16	47	0	50	1	32	83
FC	1	3	0	1	5	0	14	0	4	18	1	17	0	5	23
AOI	0	1	0	0	1	0	4	0	7	11	0	5	0	7	12
EA	0	1	0	0	1	0	2	0	0	2	0	3	0	0	3
Total	1	25	0	17	43	0	50	1	27	78	1	75	1	44	121
Panel B: Mining Sector															
SE	0	6	0	7	13	0	18	0	21	39	0	24	0	28	52
FC	0	0	0	2	2	0	3	0	6	9	0	3	0	8	11
AOI	0	4	0	14	18	0	8	0	27	35	0	12	0	41	53
EA	0	6	0	1	7	0	5	0	7	12	0	11	0	8	19
Total	0	16	0	24	40	0	34	0	61	95	0	50	0	85	135
Panel C: Pooled Sample															
SE	0	26	0	23	49	0	48	1	37	86	0	74	1	60	135
FC	1	3	0	3	7	0	17	0	10	27	1	20	0	13	34
AOI	0	5	0	14	19	0	12	0	34	46	0	17	0	48	65
EA	0	7	0	1	8	0	7	0	7	14	0	14	0	8	22
Total	1	41	0	41	83	0	84	1	88	173	1	125	1	129	256

Source: Author's estimates from research data, 2018 **A** - *fully capitalised;* **B** – *fully expensed;* **C** – *initially capitalised;* **D** – *not disclosed*

8.2.2 Level of Harmony in Accounting Treatment for Pre-Licencing Costs

8.2.2.1 Oil and Gas sector

Panel A of Table 8.1B presents the harmony index values for the accounting treatment for pre-licencing costs by oil & gas companies. It is evident from Panel A that there is complete harmony in fully expensing pre-licencing costs among SE, AOI and EA users with H-index values of 1. However, the level of harmony is rather moderate (0.63)

among FC users where one of them fully capitalise instead of fully expensing pre-licencing costs. With 44% and 20% non-disclosure rates, the ADM C-index values indicate low level of harmony for SE (0.30) and FC (0.30) whilst treatment among AOI and EA remain in complete harmony. The complete harmony among AOI and EA users is because only one company adopts each of these accounting methods on the main market.

Among all the oil & gas companies listed on the main market, disregarding their choice of accounting methods (across all the methods), the level of harmony in the accounting treatment for pre-licencing costs is high with H-index value of 0.93, however, when 40% non-disclosing companies are taken into consideration, the level of harmony drops to low as indicated by the ADM C-index value of 0.33. This implies that among disclosing oil & gas companies on the main market, there is high uniformity in them fully expensing pre-licencing cost, however with about 40% of these companies not disclosing clearly how they treat these costs gives room for different treatment to be used which leads to the low level of harmony when non-disclosing companies are taken into consideration. Across the different method users, the level of harmony in accounting treatment for pre-licencing costs is observed to be high with H-index value of 0.96 but unfortunately the 35% non-disclosure rate leaves the ADM C-index at 0.41 suggesting low level of harmony among oil & gas companies listed on the AIM.

Among oil & gas companies on the AIM, the H-index values ranging between 0.94 and 1 show high level to complete harmony in treatment of pre-licencing costs among disclosing companies adopting different accounting methods with the complete harmony observed among users of FC, AOI and EA. Conversely, given high non-disclosure rates among SE, AOI and FC users, the levels of harmony fall to low (0.4), moderate (0.59) and very low (0.11) respectively as indicated by ADM C-index values.

There is still complete harmony in the treatment of pre-licencing costs by the EA companies as depicted by the ADM C-index value of 1 because both the two companies which follow this accounting method fully expense pre-licencing costs with no non-disclosures.

On the pooled sample, there is complete harmony among AOI (1) and EA (1) users in fully expensing pre-licencing costs, but high harmony among SE (0.96) and FC (0.90) users as indicated by H-index values. With 58% of AOI oil & gas companies not disclosing, a very low level of harmony is observed in their treatment with ADM C-index value of 0.15. With 39% and 22% non-disclosure rates observed among SE and FC companies, the levels of harmony are low (0.36) and moderate (0.54) respectively. Across the different method users, the H-index value of 0.95 suggests high level of harmony but taking into consideration the 36% non-disclosure rate among oil & gas companies the ADM C-index value is 0.38 which gauges the level of harmony is low.

The findings strongly suggest that there is between high to complete harmony in accounting treatment for pre-licencing costs among oil & gas companies listed on each of the markets and this confirms the earlier observation where majority of the oil & gas companies fully expense pre-licencing costs. It is notable that though all the users of the various methods exhibit either high or complete harmony, FC users on the main market show moderate harmony because one of them rather fully capitalises these costs instead of fully expensing them. It is also evident from the ADM C-index values that the level of harmony decreases drastically for most of the method users given the high number of non-disclosing companies.

Overall, there is between high to complete level of harmony in accounting treatment for pre-licencing costs among oil & gas companies using different accounting methods, however, given the high non-disclosure rate among all but EA users, the level of

harmony is much lower. Overall, AOI users having the lowest level of harmony in accounting treatment for pre-licencing costs as measured by ADM C-index because more than half its users did not disclose information on pre-licencing costs.

Based on these findings, it may be reasonable to conclude that the high level of harmony in the treatment for pre-licencing costs among oil & gas companies do not require standardisation but the high level of non-disclosure which adversely affects the harmony levels suggest otherwise. Against this backdrop, it is recommended that future standard for EI should require companies to fully expense pre-licencing costs and the standard include mandatory requirement for full disclosure of information on how pre-licencing costs are treated.

8.2.2.2 Mining Sector

From Panel B of Table 8.1B among main market-listed mining companies, it is observed that apart from the 2 FC companies who did not disclose how they treat pre-licencing costs and hence their H-index could not be computed, the levels of harmony among the users of the other methods are observed to be complete as indicated by the H-index values of 1. Conversely, the harmony levels as shown by ADM C-index values are observed to be either complete disharmony (0) for FC with 100% non-disclosure rate or very low among SE (0.19) and AOI (0.04) users with 54% and 78% non-disclosure rates respectively. EA companies recorded the lowest level of non-disclosure (14%) and therefore show moderate level of harmony indicated by ADM index value of 0.71.

Among the AIM-listed mining companies, the H-index values show complete harmony among disclosing companies using the various methods as well as across all. On the contrary, the ADM C-index values indicate very low level of harmony for users of all

the methods (SE:0.21; FC:0.08; AOI:0.05; EA :0.15) because of the high level of non-disclosure.

On the combined market, similar results are reports as seen on both the main and alternative markets among mining companies. Across all the methods, it can be observed that there is complete level of harmony among mining companies listed on the main market, AIM and on the combined market as indicated by the H-index values of 1 but the ADM C-index values are very low (0.15, 0.13 and 0.14 respectively) for the main market, AIM and the combined markets suggesting rather very low level of harmony because of high non-disclosure cases. Overall, among disclosing companies, there is evidence of complete harmony in accounting treatment for pre-licencing costs among mining companies, however, considering the high number of non- disclosing companies, the harmony levels are rather low for each of the methods with FC and AOI users exhibiting the lowest level of harmony.

8.2.2.3 Pooled Sample

Panel C of Table 8.1B presents the harmony index values for the accounting treatment of pre-licencing costs across the two sectors (entire extractive industries). It is evident from Table 8.1B that among the pooled sample listed on the main, alternative, and combined markets, the level of harmony in accounting treatment for pre-licencing costs as measured by the H-index is either complete or high for all the different method users except for FC companies listed on main market which exhibit moderate level of harmony with H-index value of 0.63. Similarly, across all the sample companies on both the main market, AIM and combined market, the level of harmony is equally high as indicated by the H-index values.

The results reveal that the level of harmony in treatment for pre-licencing costs among

extractive companies that disclose information about pre-licencing costs (as measured by H-index), ranges between high and complete with some few companies exhibiting rather moderate harmony. The level of harmony is found to be relatively lower among FC users. The findings suggest that there is a high level of harmony in the accounting treatment for pre-licencing costs among extractive companies listed on the LSE. This is not surprising given the fact that IAS 38 offer some guidance on how companies should treat such pre-opening or operating costs by recommending that they are written off. Since the pre-licencing phase is excluded from the scope of IFRS 6, companies cannot enjoy the flexibility the standard offers.

Nonetheless, there is a problem because several companies failed to disclose information on how they treat pre-licencing costs which leaves the levels of harmony as measured by ADM C-index very low. The high non-disclosure places users of financial reports at a disadvantage because it increases information asymmetry and signals agency problem (Mallin and Ow-Yong, 2012). Existing evidence suggests that managers that manage earnings are less likely to disclose information in their annual report (Kasnik, 1999). Non-disclosure also offers an opportunity for managers to treat pre-licencing costs (manage earnings) in a manner that may satisfy their self-interest not the interest of owners (Jensen and Meckling, 1976; Watts and Zimmerman, 1990).

With such high non-disclosure rates, there is the urgent need for extractive companies to be coerced to disclose information on how they treat pre-licencing costs either through legislation or by adherence to investors' demand. As suggested by coercive isomorphism of the institutional theory, these extractive companies can be forced to change, as to disclose information on pre-licencing costs, if such change is required by a powerful constituent such as financiers (investors) or government legislation (Hassan,

2005; Touron, 2005). When required by legislation, failure to comply may be met with a penalty and when demanded by financiers (investors) failure may imply that company will not get the needed financial resources for operation (Tuttle and Dillard, 2007; Collin *et al.*, 2009).

These findings give rise to following policy implications. Given that there is high level of harmony in the accounting treatment for pre-licencing costs, there is the need for clear guidance in future standard for such costs to be fully expensed when incurred in order to maintain and even improve the level of harmony among extractive companies. Secondly, there should be a mandatory disclosure compelling companies to disclose clearly how pre-licencing costs are treated in their books to reduce the level of non-disclosures.

Table 8.1B Harmony Indices for Pre-Licencing Costs

Panel A: Oil and Gas Sector									
Accounting method	Main Market			AIM			Combined Market		
	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)
SE	1.00	0.30	44%	0.94	0.40	34%	0.96	0.36	39%
FC	0.63	0.30	20%	1.00	0.59	22%	0.90	0.54	22%
AOI	1.00	1.00	0%	1.00	0.11	64%	1.00	0.15	58%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.93	0.33	40%	0.96	0.41	35%	0.95	0.38	36%
Panel B: Mining Sector									
SE	1.00	0.19	54%	1.00	0.21	54%	1.00	0.21	54%
FC	n/p	0.00	100%	1.00	0.08	67%	1.00	0.05	73%
AOI	1.00	0.04	78%	1.00	0.05	77%	1.00	0.05	77%
EA	1.00	0.71	14%	1.00	0.15	58%	1.00	0.32	42%
Across all	1.00	0.15	60%	1.00	0.13	64%	1.00	0.14	63%
Panel C: Pooled Sample									
SE	1.00	0.28	47%	0.96	0.31	43%	0.97	0.30	44%
FC	0.63	0.14	43%	1.00	0.39	37%	0.91	0.34	38%
AOI	1.00	0.06	74%	1.00	0.06	74%	1.00	0.07	74%
EA	1.00	0.75	13%	1.00	0.23	50%	1.00	0.39	36%
Across all	0.95	0.24	49%	0.98	0.23	51%	0.97	0.24	50%

Source: Author's estimates from research data, 2018 *ADM DA -Archer, Delvaille & McLeay (1995) disclosure adjusted C-index*
Benchmarks for index values: **1.00** *– complete harmony/comparability;* **0.75 ≤x<1** *-High;* **0.50 ≤x<0.75** *-Moderate;* **0.25 ≤x<0.50** *-Low;* **0.00 <x<0.25** *-Very low;* **0.00** *– no harmony/comparability;* **n/p** *– computation not possible because of non-disclosure*

8.2.3 Intra-Method and Inter-Method Comparability for Pre-Licencing Costs

8.2.3.1 Oil and Gas Sector

Panel A of Table 8.1C presents the intra-method and inter-method comparability index values for the accounting treatment for pre-licencing costs among oil & gas companies. As evident on Panel A, the WM C-index values suggest that there is high intra-method comparability among oil & gas companies listed on all the markets with index values of 0.98, 0.95 and 0.95 for the main, AIM and combined markets respectively. The WM C index value of 0.98 suggests that among main market-listed oil & gas companies adopting the same accounting method, there is high probability of randomly selecting (without replacement) two companies who treat pre-licencing costs in the same way. The high intra-method comparability results reflect the high harmony in fully expensing pre-licencing costs among oil & gas companies adopting the same accounting method.

In terms of comparability between users of different methods (inter-method comparability), it is evident from the BM C, VDT *I* and A & M *I* index values (are 0.75 or greater) displayed on Panel A that among oil & gas company on each of the markets, there is high and some cases complete inter-method comparability in the way users of pairs of different accounting method (SE & FC, SE & AOI, SE & EA, FC & AOI, FC & EA and AOI & EA) treat pre-licencing costs as well as across all the four methods (SE & FC & AOI & EA). And as discussed earlier, majority of oil & gas companies notwithstanding their accounting methods fully expense pre-licencing costs. The findings broadly suggest that there is high comparability in accounting treatment for pre-licencing costs among users of different accounting methods and for that matter this should not be a major course of concern but attempt to make it completely comparable across different method will not be out of place since it is common practice

for these costs to be fully expensed when incurred.

The findings therefore suggest that there is a good opportunity for new IFRS for extractive industries to mandate the full expensing of pre-licencing costs, owing to the small number of companies that do not fully expense pre-licencing costs, such regulation is likely to face very minimal or no lobbying from oil & gas companies.

8.2.3.2 Mining Sector

Panel B of Table 8.1C displays the intra and inter-method comparability index values for mining companies. The WM C-index values suggest that there is complete level of intra-method comparability in the accounting treatment for pre-licencing costs among mining companies listed on each of the markets as shown by the index values of 1. These suggest all the mining companies adopting the same accounting method treat pre-licencing costs the same way.

Similarly, BM C-index and I index values of 1 also suggest complete inter-method comparability among mining companies adopting the different pairs of accounting methods[28] as well as across all the four methods. This also emphasises the great harmony and comparability among users of different accounting methods in treating pre-licencing costs. Which implies regulating accounting for pre-licencing costs should not be a big challenge for the IASB since the common practice of fully expensing pre-licencing costs is being used largely by all disclosing mining companies.

8.2.3.3 Pooled Sample

Consistent with the reported findings on Panel A and B, it is evident from Panel C that

[28] The inter-method comparability index between FC users and other method users could not be computed because none of the FC mining companies disclosed how they accounted for pre-licencing costs.

on the pooled sample, the WM C-index values suggest high intra-method comparability in the treatment of pre-licencing costs on each of the markets. Similarly, BM C and the I -index values also indicate high inter-method comparability and, in some cases, complete inter-method comparability between users of different pairs of accounting methods as well as across the four accounting methods. The high intra-method comparability results reflect the high uniformity and harmony in fully expensing pre-licencing costs among extractive companies adopting the same accounting method. As noted by Parker and Morris (2001), all other things being equal, the high level of harmony in accounting treatment, the greater the level of comparability. Notwithstanding, the high intra-method comparability levels, one would have expected a rather complete comparability among users of the same method, nonetheless, there is lack of complete intra-method comparability indicating the presence of intra-method diversities. The existence of intra-method diversities, little as it may be, suggests the need to harmonise to standardise within methods even before focusing on across methods.

The results suggest that accounting for pre-licencing costs should not be a big hurdle for future regulation of the extractive industries since the common practice of fully expensing pre-licencing costs can be made mandatory for all extractive firms and this should face little or no opposition at all.

Table 8.1C Intra and Inter-Method Comparability Indices for Pre-Licencing Costs

Panel A: Oil and Gas Sector	Main Market			AIM			Combined Market		
	C-index	VDT I-index	A&M I-index	C-index	VDT I-index	A&M I-index	C-index	VDT I-index	A&M I-index
Intra-method comparability (WM C-index)	0.98			0.95			0.95		
Inter-method comparability:									
SE &FC	0.75	0.75	0.75	0.97	0.97	0.97	0.93	0.93	0.93
SE & AOI	1.00	1.00	1.00	0.97	0.97	0.97	0.98	0.98	0.98
SE & EA	1.00	1.00	1.00	0.97	0.97	0.97	0.98	0.98	0.98
FC & AOI	0.75	0.75	0.75	1.00	1.00	1.00	0.94	0.94	0.94
FC &EA	0.75	0.75	0.75	1.00	1.00	1.00	0.94	0.94	0.94
AOI & EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SE & FC & AOI & EA	0.83	0.91	0.87	0.97	0.99	0.98	0.94	0.97	0.96
Panel B: Mining Sector									
Intra-method comparability (WM C-index)	1.00			1.00			1.00		
Inter-method comparability:									
SE &FC	n/p	n/p	n/p	1.00	1.00	1.00	1.00	1.00	1.00
SE & AOI	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SE & EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FC & AOI	n/p	n/p	n/p	1.00	1.00	1.00	1.00	1.00	1.00
FC &EA	n/p	n/p	n/p	1.00	1.00	1.00	1.00	1.00	1.00
AOI & EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SE & FC & AOI & EA	1.00	n/p	n/p	1.00	1.00	1.00	1.00	1.00	1.00
Panel C: Pooled Sample									
Intra-method comparability (WM C-index)	0.99			0.97			0.97		
Inter-method comparability:									
SE &FC	0.75	0.75	0.75	0.98	0.98	0.98	0.94	0.94	0.94
SE & AOI	1.00	1.00	1.00	0.98	0.98	0.98	0.99	0.99	0.99
SE & EA	1.00	1.00	1.00	0.98	0.98	0.98	0.99	0.99	0.99
FC & AOI	0.75	0.75	0.75	1.00	1.00	1.00	0.95	0.95	0.95
FC &EA	0.75	0.75	0.75	1.00	1.00	1.00	0.95	0.95	0.95
AOI & EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SE & FC & AOI & EA	0.92	0.91	0.87	0.98	0.99	0.99	0.97	0.98	0.97

Source: Author's estimates from research data ,2018 *VDT -Van der Tas; A &M - Archer & McLeay*

Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

8.2.4 Concluding Remarks on Accounting for Pre-Licencing Costs

The preceding sections have examined the accounting treatment for pre-licencing costs among oil & gas and mining companies listed on the main and alternative markets of the LSE to identify the common accounting treatment for the cost component, assess

the level of harmony in treatment, measure the extent of comparability among users of the same and different accounting methods and explore the need and pathways for standardisation.

The findings of this study indicate that the most prominent accounting treatment for pre-licencing costs is for them to be fully expensed as incurred. This treatment is found to be consistent among companies operating both sectors and markets. Regardless of their accounting method, a vast majority of extractive companies fully expense pre-licencing costs. This finding confirms that it is common practice for pre-licencing costs to be fully expensed among extractive companies in line with IAS 38.

Given that vast majority of extractive companies fully expense pre-licencing costs, the level of harmony among users of the different methods are observed to be either complete or high and, on few occasions, moderate among disclosing companies. However, the high levels of non-disclosing companies consequently reduced the harmony levels to either low or very low levels, which is worrying. The high level of non-disclosure can be subjected to several interpretations.

This study also finds intra-method and inter-method comparability to be high among companies adopting same and different accounting methods. For accounting regulation purposes, pre-licencing costs should not be an issue of worry for regulators since there is already high level of harmony as well as high intra and inter-method comparability. But the lack of complete harmony and intra-method comparability among users of the same method suggest the need for efforts to eliminate within method diversities. It is therefore recommended that future regulation requires pre-licencing costs to be expensed and mandate companies to fully disclose information regarding accounting treatment and nature of pre-licencing costs in annual reports.

8.3 Licencing and Other Acquisition (L&OA) Costs

To obtain an exclusive right to explore minerals within a specified area, extractive companies need to acquire licence for that area. These licences are the "work authority" because they give the companies the authority to start extractive works (Extractive industries regulation, 2019). Aside the licencing costs, the companies incur other acquisition costs such as option to acquire, lease properties, brokers' fees, recording and legal fees, cost of title acquisition and title search costs. As noted by Lourens and Henderson (1972), L&OA costs form a significant proportion of extractive costs, and they are costs that give companies rights to explore an area. Because of how material they are, their treatments can have significant impact on the overall financial reports of extractive companies.

Pre-IFRS, L&OA costs were allowed to be fully capitalised by FC users whilst SE initially capitalised these costs (OIAC, 2001: para 41 and 50). Though IFRS 6 allows L&OA costs to be included in the initial measurement of exploration and evaluation (E&E) assets (Deloitte, 2005), it was not clear on the specific treatment under each of the methods as none of the methods is mentioned in the standard. The 2010 Discussion Paper by IASB proposed that legal rights should form the basis for extractive companies to recognise assets (IASB, 2010). Similarly, Jennings, Feiten and Brock (2000) argue that L&OA costs should be capitalised. It may seem obvious that L&OA costs should be capitalised among extractive companies, but this may not necessarily be the case given the multiplicity of accounting methods and the vagueness of the prescription offered by the IFRS 6.

This section examines how L&OA costs are accounted for by extractive companies with the aim to identify diversity in treatment both within and across methods, the most common accounting treatment and examine the level of harmony/diversity in treatment.

It further assesses the extent of intra -method and inter-method comparability in the treatments to explore if there is the need for standardisation and pathway for standardisation.

8.3.1 Accounting Treatment for Licencing and Other Acquisition Costs

8.3.1.1 Oil and Gas Companies

Panel A of Table 8.2A shows the accounting treatment for oil & gas companies of licencing and other acquisition costs (L&OA). It can be noted that among the main market -listed oil & gas companies, there is at least one company from each of the methods that fully capitalises L&OA costs. Specifically, whilst each of the companies that adopt AOI and EA fully capitalise these costs, 80% (4) of FC and 17% (6) of SE companies treat these costs in a similar manner. Despite the popularity of L&OA costs to be fully capitalised, vast majority of SE companies (29, 81%) choose to initially capitalise in line with the principle of their accounting method. Surprisingly, one[29] (20%) FC user also initially capitalises L&OA costs.

Among AIM-listed oil & gas companies, it is observed that majority of companies treat L&OA costs in line with the principles of their accounting methods. As such, most SE (42, 89%) and all AOI (11, 100%) companies initially capitalise these costs whilst a larger proportion of FC (15, 88%) companies fully capitalise them with all EA companies fully expensing these costs. It is striking to see that 3 (12%) FC companies[30] initially capitalise and 4 (9%) SE fully capitalise L&OA costs. Overall, out of 121 oil & gas companies on the combined market, 71% (86) initially capitalise, 26% (31) fully

[29] Cadogan Petroleum Plc is a UK-based oil & gas company with MarketCap (size) of £7.03m and was 16 years as 2020. The mean MarketCap and age of main market-listed FC oil & gas companies is £188m and 19 years respectively

[30] There are Block Energy Plc, Falcon Oil & Gas Ltd and United Oil & Gas Plc.

capitalise and only 2% (2) fully expense L&OA costs. In a related study, Field (1969), reports that out of 18 US petroleum companies, 83% fully capitalised all acquisition costs, 11% partially capitalised them and only 5% fully expensed them. Similarly, Lourens and Henderson (1972) report that 86% of Australian companies capitalises L&OA costs. This evidence suggests that among oil & gas companies, L&OA costs are less likely to be treated in a conservative way (expensed).

The results indicate that there are diversities in accounting treatment for L&OA costs among oil & gas companies listed on the LSE even among users of the same method, specifically SE and FC users. The most common treatment for L&OA costs among the oil& gas companies is initially capitalising but this is partly due to the large number of SE and AOI companies in the sample. It is evident from the combined market that at least one member of each of the methods fully capitalises L&OA costs suggesting the greater preference for L&OA costs to be fully capitalised regardless of companies' accounting method.

8.3.1.2 Mining

Panel B of Table 8.2A presents the accounting treatments for L&OA costs among mining companies. Among main market-listed mining companies, it is evident that at least one company from each of the methods fully capitalises L&OA costs. Apart from the FC companies who unanimously fully capitalised these costs in line with the principle of their accounting method, some diversities are observed among the other method users. For instance, 2 (15%) SE users[31] and 3 (17%) AOI users[32] fully

[31] Altyn Plc is a UK based company with MarketCap of £14.76m and it is 23 years and Public Joint Stock Company (PJSC) Polyus - is the largest gold producer in Russia and the fourth largest gold producer globally with MarketCap of £17.10bn (as at 21st September 2021) and 99 years of age https://www.londonstockexchange.com/stock/PLZL/public-joint-stock-company-polyus/our-story)

[32] EN+ Group plc is a Jersey-based company and is 18 years old, Gem Diamonds Plc is a North American-based company (British Virgin Islands) and is 15 years old, and Kaz Minerals Plc is a UK-

capitalise these costs whilst their method counterparts initially capitalised them. Unexpectedly, the proportion of EA users that fully capitalised (4, 57%) L&OA costs exceed those that fully expensed (3, 43%) them in line with the principle of their accounting method.

Overall, among the mining companies listed on the main market, the accounting treatment for licencing and other acquisition costs ranges between initially capitalising, fully capitalising, and fully expensing with initially capitalising being the most common practice but this is influenced by the dominance of SE and AOI companies in the sample. Evidence among the main market-listed mining companies suggest the existence of diversity in accounting treatment for L&OA costs among users of each of the methods except FC users who unanimously fully capitalised these costs.

Similar diversities in accounting treatments are observed among the AIM-listed companies. Though majority of SE and AOI users initially capitalised L&OA costs, there were still 5 (13%) and 4 (11%) respectively, who fully capitalised them. Notably, one[33] AOI (3%) fully expensed L&OA costs. Amongst FC users, not all of them fully capitalised, there were 2 companies[34] (22%) that initially capitalised them instead. There was equal split in the number of EA users that fully capitalised (5, 42%) and fully expensed L&OA costs. The remaining 16% (2) initially capitalise these costs pending determination.

Overall, among the mining companies as evident on the combined market, there are

based company which is 6 years and £ 2,384.60m. The mean age of AOI mining companies on the main market is 44 years. Which makes them relatively younger than the average.

[33] Kefi Minerals Plc is a UK-based company with MarketCap of £8.85m and is 14 years. The mean MarketCap and age for AOI listed on the AIM is £39m and 16 years.

[34] Hummingbird Resources Plc (MarketCap - £75.82m, age – 15 years) and Vast Resources Plc (MarketCap - £16.80m, age – 16 years) are both UK-based companies. Mean of FC mining on AIM is (MarketCap - £74m, age – 16 years).

diversities in the treatment of L&OA costs with majority of them initially capitalising these costs. The dominance of initially capitalising is partly due to large number of SE and AOI companies in the sample as earlier alluded to, however, it is evident that at least one member of each of the methods fully capitalises or initially capitalises these costs.

Just like in the oil & gas sector, the results indicate widespread diversities in accounting treatment for L&OA costs among mining companies even though majority seem to initially capitalise these costs. Across the different method there are range of treatments used by companies in accounting for the same costs. These underscore the need for effort to harmonise accounting practices for L&OA costs among mining companies to eliminate diversities and promote comparability accounts.

8.3.1.3 Pooled Sample

As shown on Panel C of Table 8.2A, on the pooled sample, diversities in accounting treatment are observed among extractive companies even among those adopting the same accounting methods. For SE and FC users, choice of treatments for L&OA costs is spread between two alternatives, thus, initially capitalise and fully capitalise whilst for AOI and EA choice is exercised across all three alternatives which are initially capitalise, fully capitalise and fully expensed. In all, EA users exhibit the greatest heterogeneity (treatment scattered across the three treatment options) on each market.

To offer possible explanations for why some companies treat L&OA costs differently, analysis of size and age of the companies are carried out. As mentioned earlier, Cadogan Petroleum plc, Block Energy Plc, Falcon Oil & Gas Ltd and United Oil & Gas

Plc are FC companies that initially capitalise[35] L&OA costs instead of fully capitalising like their method counterparts. The analysis revealed that all these companies are relatively smaller and younger compared to their method counterparts apart from Falcon Oil & Gas Ltd. For the smaller and younger companies, one would have expected that they would prefer to fully capitalise expenditure in order to build their asset base and attract investors. On the contrary, they rather initially capitalise them. The possible interpretation for their accounting treatments could be, even though they are small, young and adopt FC, they copy how "big" companies (SE companies) in the industry treat such costs to appear legitimate (DiMaggio and Powell, 1991; Granlund *et al.,* 1998). It could also be an attempt by management to manage earnings in a way that favours them because by initially capitalising (may help to shift future earnings to current period), decision needs to be made on them in the future as to whether to fully capitalise or expense them and the discretion rests with management who can make a choice to satisfy their self-interest depending on the desired results needed at that time (Watts and Zimmerman, 1986; Milne, 2002).

It was observed that Falcon oil & gas Ltd, on the other hand, which is older and bigger than its method counterparts initially capitalises instead of fully capitalising in accordance with its method common practice. It was noticed that the company had changed its accounting method from SE to FC but had not practically changed its way of treating L&OA costs. This, in a way, confirms the assertion of Stadler and Nobes (2020) that accounting method description in annual reports may be mere labels which may differ from actual treatments. It is evident that the change of "accounting method

[35] Cadogan Petroleum Plc is a UK-based oil & gas company with MarketCap (size) of £7.03m and was 16 years as 2020. The mean MarketCap and age of main market-listed FC oil & gas companies is £188m and 19 years respectively. Falcon Oil & Gas Ltd had MarketCap of £125.73m whilst the mean MarketCap for FC AIM-listed was £ 57m; and it was 40 years whilst FC AIM-listed was 20 years.

label" has not yet been reflected in the treatment of this particular company.

Among the AIM-listed SE oil & gas companies, 4 (9%) fully capitalise L&OA costs instead of initially capitalising and these are Amerisur Resources Plc, Angus Energy Plc, Oilex Ltd and Wentworth Resources Plc. Out of the four, it was only Amerisur Resources Plc who is bigger than its method counterparts, all the others are smaller and younger than average method counterparts. And for that matter, their decision to adopt the SE could have arisen from mimetic pressure (Watts and Zimmerman, 1986) and not based on suitability. That could also explain why regardless of choosing SE, they still fully capitalise L&OA costs, probably because they do not have the financial strength to write off these costs should they not directly relate to successful discoveries (Johnson and Ramanan, 1988). For Amerisur, its decision to fully capitalise may be to build its assets base and make its balance sheet look better probably to attract investors. Though compared to average SE company on the AIM, it is bigger and older but compared to average main market-listed SE company with an average of 38 years and mean market capitalisation of £16,343m, it is relatively smaller and younger and want to build its asset base further in other to better compete with main market listed counterparts.

Similarly, among two SE mining companies that fully capitalise L&OA costs was Altyn Plc when compared with its method counterparts on the main market, is smaller and younger. As a younger and a smaller company, decision to fully capitalise could arise from management attempt to improve their balance sheet and avoid breaking any debt covenant as suggested by the debt-to-equity hypothesis of the positive accounting theory (Watts and Zimmerman, 1986). By fully capitalising these costs, they avoid expensing them which would have reduced their earnings and eventually lowered equity, thereby increasing debt-to-equity ratio which may breach the target ratio

specified by debt covenant. The other company is PJSC Polyus; its decision to fully capitalise is quite suspicious given that it ranked as one of the biggest gold companies globally (Fortune, 2020). As a big and old company adopting SE, one would have expected it to treat L&OA costs in manner consistent with its method counterparts. This further underscore the variety of choice exercised between methods even among established companies.

With regard to AOI users, there was one AIM-listed mining company called Kefi Minerals Plc that contrarily to expectation, fully expensed L&OA costs. This company is noted to be smaller and younger than its method counterparts. Though fully expensing is not consistent with the treatment of its method counterparts, being an AOI company, there may be justification for this. As noted by Gerhardy (1999), the regulations that preceded current regulation (see paragraph 9 of DS 12/308) that led to the enactment of AOI in Australia allowed companies to expense pre-production costs and reinstate them when an area later becomes economically viable. This could be a potential reason why Kefi Minerals Plc treat LA&O costs this way, but whatever the reason is, this creates disharmony in treatment which can impede comparability of accounts.

These findings suggest that the choice of the same accounting method does not necessarily mean L&OA costs will be treated in the same way and this confirms the claim of Lilien and Pastena (1981). The findings provide insight for future standard setting for the EI because given this evidence future attempt to standardise accounting practice should not adopt any of the existing accounting method and recommend it to be used by all companies without first harmonising practices within that method. The extent of diversity in the treatment of L&OA costs both within and across methods is worrying and should be of concern to accounting standard setting board especially if

comparability remains an important qualitative characteristic of accounting information.

Generally, it is expected that L&OA costs are capitalised under IAS 38 Intangible Assets (IAS 38, para 25 and 33). However, the diversity in treatment of L&OA costs in EI is not surprising since IFRS 6 is not explicit on how these costs should be treated. By just stating that acquisition of rights to explore might be included in the initial measurement of E&E assets is not definitive and explicit enough to tell companies how to treat these costs. No wonder, there is no uniformity in treatments even among users of the same methods. The lack of clarity under IFRS 6 and its resulting impact on diversity of treatment clearly highlights the need to harmonise to achieve standardisation. To determine the appropriate treatment for L&OA costs to harmonise practice, it may be reasonable to argue in favour of fully capitalisation of these costs when incurred because they meet most of the asset recognition criteria and definition as prescribed in the 2018 Conceptual Framework for financial reporting. Chapter 4 of the Framework defines an asset as a "present economic resource controlled by the entity as a result of past events" (IASB, 2018, p. 8). It further explains an economic resource as "a right that has the potential to produce economic benefits" (ibid.). This definition unlike the previous ones[36] does not make reference to 'expected flow' which implies economic benefits from an economic resource does not need to be certain, or even likely, however, a low probability of economic benefits might affect recognition decisions and the measurement of the assets. This is where the problem arises, for extractive companies because they operate in an industry with high uncertainty and risks as noted by Field (1964), Luther (1996), Wise and Spear (2000), the decision to

[36] An asset is a resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity (IASB, 2011).

fully capitalise L&OA costs when incurred may be overambitious and not prudent. For this reason, it may be more reasonable and in line with prudence concept to initially capitalise L&OA costs to a point when outcome can be determined with higher level of certainty before final treatment can be effected. Our analysis shows that the practice is concentrated around 'capitalising pending decision'; therefore, in order to harmonise accounting practices of L&OA expenditure we recommend that this practice be mandated in an accounting standard.

Against this drop, though fully capitalising is common among each of the methods, it is recommended that to harmonise accounting practices for L&OA costs companies should be required to initially capitalise them pending decision on commerciality of reserves. And given that majority of companies treat these costs this way, if there will be opposition, it would not be as massive as choosing a less preferred treatment.

Table 8.2A Licencing and Other Acquisition Costs Cross-Classifications

Panel A: Oil and Gas sector															
Accounting method	Main Market					AIM					Combined Market				
	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D	Total
SE	6	0	29	1	36	4	0	42	1	47	10	0	71	2	83
FC	4	0	1	0	5	15	0	3	0	18	19	0	4	0	23
AOI	1	0	0	0	1	0	0	11	0	11	1	0	11	0	12
EA	1	0	0	0	1	0	2	0	0	2	1	2	0	0	3
Total	12	0	30	1	43	19	2	56	1	78	31	2	86	2	121
Panel B: Mining sector															
SE	2	0	11	0	13	5	0	34	0	39	7	0	45	0	52
FC	2	0	0	0	2	7	0	2	0	9	9	0	2	0	11
AOI	3	0	15	0	18	4	1	30	0	35	7	1	45	0	53
EA	4	3	0	0	7	5	5	2	0	12	9	8	2	0	19
Total	11	3	26	0	40	21	6	68	0	95	32	9	94	0	135
Panel C: Pooled Sample															
SE	8	0	40	1	49	9	0	76	1	86	17	0	116	2	135
FC	6	0	1	0	7	22	0	5	0	27	28	0	6	0	34
AOI	4	0	15	0	19	4	1	41	0	46	8	1	56	0	65
EA	5	3	0	0	8	5	7	2	0	14	10	10	2	0	22
Total	23	3	56	1	83	40	8	124	1	173	63	11	180	2	256

Source: Author's estimates from research data, 2018 **A** - *fully capitalised;* **B** – *fully expensed;* **C** – *initially capitalised;* **D** – *not disclosed*

8.3.2 Level of Harmony in Accounting Treatment for Licencing and Other Acquisition Costs

8.3.2.1 Oil & Gas Sector

Panel A of Table 8.2B displays the harmony index values for the accounting treatment of L&OA costs among oil & gas companies listed on the main and AIM markets. On the main market, among disclosing companies, it is apparent that there is complete level of harmony with H-index values of 1 among AOI and EA companies with each of the companies fully capitalise L&OA costs. Conversely, among SE and FC users the level of harmony is moderate with H-index values of 0.72 and 0.68 respectively. The moderate level of harmony reflects the diversity that exists among users of each of the two methods: SE and FC. As noted earlier, 17% (6) of SE companies fully capitalise L&OA costs when their method counterparts initially capitalised the same costs. Similarly, 20% (1) of FC users instead of fully capitalising rather initially capitalise pending determination. The level of harmony in accounting treatment among the main market-listed oil & gas companies across the different method is observed to be moderate with H-index value of 0.59. This reflects the diversity in terms of the choice of treatment between initially capitalising (30, 70%) and fully capitalising (12, 30%) L&OA costs. Because of the low non-disclosure levels, the ADM C-index values suggest the same level of harmony as the H-index for each of the methods and across all the methods.

Among AIM-listed oil & gas companies, there is complete level of harmony among AOI (1) and EA (1) users, high level of harmony among SE but moderate level of harmony among the FC (0.72) users. These results suggest that all AIM-listed AOI oil & gas companies in the sample initially capitalise licencing and other acquisition costs and EA users fully expensed these costs in harmony. However, among the SE user there

were 9% (4) that fully capitalised them whilst their method counterparts initially capitalised L&OA costs. Among the FC, the proportion that treat these costs differently from their method counterpart is higher at 17% (3) that is why the resulting H-index value is relatively low at 0.72. Across all the AIM-listed oil & gas companies, the resulting level of harmony in accounting treatment is also moderate with H-index value of 0.59. This is because of the diversity in treatment with 72% (86) of them initially capitalising, 24% fully capitalising and 3% (2) fully expensing. Like the main market, because of the low non-disclosure rate, the ADM C-index values suggest the same level of harmony as the H-index.

When oil & gas companies on both markets are pooled together on the combined market, there is no complete level of harmony in accounting treatment for licencing and other acquisition costs among any of the users of four methods. AOI and SE users exhibit high level of harmony whilst users of FC (0.71), EA (0.56) and across all the methods (0.59) show moderate level of harmony in treatments. ADM C-index values suggest the same level of harmony for each of the methods except EA where there is low level of harmony with ADM C-index value of 0.33.

For instance, though there is complete harmony among user of AOI on the main market in fully capitalising these costs, among their AIM counterparts, they initially capitalise these costs. These imply for the combined market, the accounting treatments for L&OA costs consist of either fully capitalising or initially capitalising resulting in no complete harmony.

These findings reveal that the accounting treatment for L&OA costs is not in complete harmony among oil & gas companies listed on both markets on the LSE and even among those adopting the same accounting method there are still some diversities in

treatment. These results underscore the need to harmonise to eliminate diversities and ensure standardisation of practices to improve comparability of accounts.

8.3.2.2 Mining Sector

As evident on Panel B of Table 8.2B, among mining companies on the main market, there is complete harmony in accounting treatment for L&OA costs among only FC companies as indicated by the H-index value of 1. This is because all the 2 FC companies fully capitalise these costs in line with the principle of their accounting method. None of them deviated from the common practice among their method users. Conversely, there is a moderate level of harmony among SE, AOI and EA users with H-index value of 0.74, 0.72 and 0.51 respectively. The moderate level of harmony among SE users is because 2 companies fully capitalised instead of initially capitalising them like their method counterparts. Similarly, the lack of complete harmony among AOI companies is because out of the 18 AOI companies, 3 of them fully capitalised these costs which is a deviation from their normal practice among their method users to initially capitalise pending determination. Similarly, out of the 7 EA companies, 4 instead of fully expensing like their other counterparts rather fully capitalised licensing and other acquisition costs. All the mining companies listed on the main market in the sample disclosed how they account for L&OA costs. Since there were no non-disclosing companies, the ADM C-index indicates the same levels of harmony for each of the accounting methods as indicated by the H-index values though the C-index values are slightly lower. Across the different methods, the level of harmony in accounting treatment is observed to be moderate with H-index value of 0.50 whilst the ADM C-index of 0.49 suggests low level of harmony in accounting treatment for licensing and other acquisition costs.

Among AIM-listed mining companies, there were no complete harmony in treatment

among any of the accounting methods which implies there are diversities in the treatment among users of the same method. As shown on the Panel B of Table 10B, the highest level of harmony is observed among SE mining companies with H-index and ADM C-index values of 0.78 and 0.77 respectively. Though as many as 34 out of 39 SE companies initially capitalised licensing and other acquisition costs, there were at least 5 of them that fully capitalised these costs. AOI companies also demonstrate high level of harmony with H-index of 0.75 but moderate when measured with the ADM C-index of 0.74. Similarly, whilst majority (30) of the 35 AOI companies initially capitalised licensing and other acquisition costs, there were 4 companies which chose to fully capitalise and 1 company that fully expensed instead. While moderate level of harmony is observed among users of FC (H-index =0.65, ADM C-index = 0.61), there is low level of harmony among EA companies (H-index =0.38, ADM C-index = 0.32). The low level of harmony among EA companies is because of the fairly even spread of treatment across fully expensing (5 out of 12), fully capitalising (5 out of 12), and initially capitalising (2 out of 12). Across the different methods, the level of harmony in accounting treatment is observed to be moderate with H-index value of 0.57 and ADM C-index of 0.56 suggesting some level of disharmony in accounting treatment for licensing and other acquisition costs.

Consistently, across the two markets on the combined market, SE mining companies (H-index =0.77, ADM C-index = 0.76) demonstrate highest level of harmony in accounting treatment for licensing and other acquisition costs, this followed by AOI companies with also moderate level of harmony (H-index =0.74, ADM C-index = 0.73) and then by FC companies with moderate level of harmony (H-index =0.70, ADM C-index = 0.67) and the lowest level of harmony is seen among EA companies (H-index =0.41, ADM C-index = 0.38). Across the different methods, the level of harmony in

accounting treatment is observed to be moderate with H-index value of 0.55 and ADM C-index of 0.54 suggesting some level of disharmony in accounting treatment for licensing and other acquisition costs.

These results suggest that among sampled mining companies, the accounting treatment for licencing and other acquisition costs is not in complete harmony not even among companies that adopt the same accounting method. This provides evidence to support the claim that the choice of accounting method are mere labels which may differ from actual treatment or practices (Stadler and Nobes, 2020). This further highlights the needs for accounting bodies to harmonise and standardise the different accounting methods and treatments. And as stated earlier, to harmonise the accounting treatment for licencing and other acquisition costs, mining companies can be required to initially capitalise these costs pending determination.

8.3.2.3 Pooled Sample

As displayed on Panel C of Table 8.2B, on the pooled sample, on both markets there is no complete harmony in accounting treatment among users of each of the methods. On the main market, apart from FC companies that exhibit high level of harmony with H-index value of 0.76, the level of harmony for users of the other methods and across the different methods is moderate with index values of less than 0.75. The ADM C-index values suggest the same level of harmony as the H-index except for users of EA where the ADM C-index values are lower than 0.5 suggesting low level of harmony in accounting treatment.

On both the AIM and combined market, SE and AOI show high level of harmony in treatment, FC users exhibit moderate level of harmony and EA users exhibit low level of harmony. Across all methods, there is a moderate level of harmony as suggested by both indices. As observed on both markets, the level of harmony as indicated by H-

index is the same as those of ADM C-index because of low non-disclosure.

These findings suggest that there are diversity in accounting treatment for L&OA costs even among extractive companies that adopt the same accounting method. This emphasises the need for harmonisation and standardisation. To achieve this harmony as suggested earlier, this study, and based on our analytical results, recommends that L&OA costs are initially capitalised pending decision. This recommendation is more in line with the UK SORP for SE users during the pre-IFRS periods (OIAC SORP 2001: para 50). This recommendation, just like previous attempts to standardise, is likely to face lobbying and opposition, but with the right coercive power from Standard setters, stock market regulations and investors, the desired results of standardisation can be achieved. Evidence from extant literature shows that where recommendations and guidance are backed by law and other coercive pressures as described by DiMaggio and Powell (1991), companies will comply by them. For instance, Australia is noted for its relative success in regulating the EI partly because most of their recommendations and guidelines are back by law to ensure compliance (Zhou, Birth and Rankin, 2015). This is confirmed by Luther (1996) when he noted that, "In other respects DS 12 has followed through, largely unchanged, into AAS 7 and AASB 1022... (p. 77)" and "…AAS 7 became AASB 1022 and obtained legal backing (ibid.). It is therefore not surprising that AOI is widely used by Australian companies in compliance with the requirement of their standard AASB 6. The IASB can learn lessons from Australian experience by ensuring future efforts are backed by adequate coercive pressure to ensure compliance and curtail any potential lobbying or opposition.

Table 8.2B Harmony Indices for Licencing and Other Acquisition Costs

Panel A: Oil and Gas Sector									
Accounting method	Main Market			AIM			Combined Market		
	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)
SE	0.72	0.67	3%	0.84	0.80	2%	0.78	0.74	2%
FC	0.68	0.60	0%	0.72	0.71	0%	0.71	0.70	0%
AOI	1.00	1.00	0%	1.00	1.00	0%	0.85	0.83	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.59	0.55	2%	0.59	0.57	1%	0.59	0.57	2%
Panel B: Mining Sector									
SE	0.74	0.72	0%	0.78	0.77	0%	0.77	0.76	0%
FC	1.00	1.00	0%	0.65	0.61	0%	0.70	0.67	0%
AOI	0.72	0.71	0%	0.75	0.74	0%	0.74	0.73	0%
EA	0.51	0.43	0%	0.38	0.32	0%	0.41	0.38	0%
Across all	0.50	0.49	0%	0.57	0.56	0%	0.55	0.54	0%
Panel C: Pooled Sample									
SE	0.72	0.69	2%	0.81	0.79	1%	0.78	0.75	1%
FC	0.76	0.71	0%	0.70	0.69	0%	0.71	0.70	0%
AOI	0.67	0.65	0%	0.80	0.80	0%	0.76	0.75	0%
EA	0.53	0.46	0%	0.40	0.35	0%	0.42	0.39	0%
Across all	0.55	0.53	1%	0.58	0.57	1%	0.57	0.56	1%

Source: Author's estimates from research data, 2018 ADM DA -Archer, Delvaille & McLeay (1995) disclosure adjusted C-index
Benchmarks for index values: **1.00** *– complete harmony/comparability;* **0.75 ≤X<1** *-High;* **0.50 ≤X<0.75** *-Moderate;* **0.25 ≤X<0.50** *-Low;* **0.00 <X<0.25** *-Very low;* **0.00** *– no harmony/comparability;* **n/p** *– computation not possible because of non-disclosure*

8.3.3 Intra-Method and Inter-Method Comparability of Licencing and Other Acquisition Costs

8.3.3.1 Oil & Gas Sector

Results in Panel A of Table 8.2C reveals that among oil & gas companies in the study sample, there is moderate intra-method comparability in the treatment of L&OA costs among those listed on the main market but high among those on the AIM and on the combined market with corresponding Within-Method (WM) C-index values of 0.71, 0.83 and 0.78 respectively. This shows that, on the main market, there is a 71% chance of randomly selecting two oil & gas companies that adopt the same accounting method and treat L&OA costs in the same way. The lack of complete intra-method comparability highlights the diversities that exist among users of the same methods. One would have expected that oil & gas companies listed on the same market and

adopting the same accounting method to treat L&OA costs in completely comparable manner, but the evidence does not support that assumption. Given that past attempts to standardisation have sought to recommend a single accounting method on the basis that the use of a single accounting method may solve the problem of incomparability that exist both within and across the different methods (Van riper, 1994; Cortese, Irvine and Kaidonis, 2009), this study provide evidence to suggest that the use of same accounting method does not and will not lead to complete comparability even among users of the same methods until choices within methods are completely eliminated through harmonisation. This emphasises the need to rethink the whole process of standardisation. Against this backdrop, this study recommends that standardisation efforts should start by first harmonising diversities within methods before focusing on across methods.

As evident on Panel A of Table 8.2C, the level of inter-method comparability in accounting treatment for L&OA costs among oil & gas companies on the main market are observed to be complete between users of AOI and EA with BM C and I[37] index values of 1. This is because each of these methods (AOI and EA) was adopted by one company each on the main market and they both fully capitalise L&OA costs. The inter-method comparability between FC & AOI and FC& EA users are also observed to be high with index values of 0.80. Apart from these, the inter-method comparability is observed to be rather low between SE & FC companies as indicated by index values of 0.30 and even far lower between SE & AOI and SE & EA companies with BM C-index of 0.17. This is because whilst majority of the SE oil & gas companies on the main market initially capitalised L&OA costs, the AOI and EA companies fully capitalised

[37] The Between-method C and I index produce same values when comparing between two items but when the number exceed two then they differ (Morris and Parker, 1998).

them. This is consistent with the assertion of Deloitte Touche Tohmatsu (2001) and Stadler and Nobes (2020) that AOI is more aggressive than SE and hence AOI users are more likely to fully capitalise than SE users. Likewise, the inter-method comparability across the four accounting methods (SE & FC & AOI & EA) is low as reported by BM C-index value of 0.29 and A & M I index of 0.37 but moderate as indicated by VDT I index values of 0.52. These results indicate that regarding the accounting treatment for L&OA costs, though there is high level of inter-method comparability between some of the pairs, across all the accounting methods the inter-method comparability is low. Therefore, this is an area that accounting bodies need to consider seriously should they wish to harmonise accounting treatment for L&OA costs among oil & gas companies.

Among AIM-listed oil & gas companies, apart from SE and AOI companies whose treatments are highly comparable with index values of 0.91, the inter-method comparability levels between SE & FC and FC & AOI are low with BM C- index values of 0.22 and 0.17 respectively. The inter-method comparability between the other pairs of methods (SE & EA, FC & EA, AOI & EA) are completely incomparability with index values of 0. Across all the methods, the inter-method comparability as suggested by BM C-index is low but the I-index[38] values suggest no inter-method comparability at all. Similar low inter-method comparability is observed on the combined market between pairs and across all the methods except between SE & AOI, which is high.

These findings suggest that among oil & gas companies, the intra-method comparability for the accounting treatment for L&OA costs ranges between moderate to high,

[38] I-index tends to be zero as more countries/ methods are added to the analysis (Jaafar, 2004) and sensitive to zero proportions because of the multiplication involved (Emenyonu and Gray, 1996). So, where BM C-index return a significant number, but the I-index does not, both are reported but the BM C-index value is accepted because of the superiority of the BM C-index over the I-index (Morris and Parker, 1998).

however, the inter-method comparability is very low between pairs and across the four accounting methods except for the high comparability between SE and AOI users. Therefore, it can be stated that accounting for L&OA costs requires serious consideration by accounting bodies should comparability of accounts be a top priority for these bodies.

8.3.3.2 Mining Sector

Among mining companies, it is evident from Panel B of Table 8.2C that the intra-method comparability among those companies listed on the main market, AIM and combined market are moderate with WM C-index values of 0.69, 0.73 and 0.72 respectively. This shows that among mining companies adopting the same accounting method is a moderate chance of randomly selecting two companies who treat L&OA costs in a comparable way. The level of intra-method comparability is observed to be higher on AIM than on the main market.

Similar to the observation among oil & gas companies, the inter-method comparability among mining companies adopting the different pairs of accounting methods (SE & FC, SE & EA, FC & AOI, AOI & EA) are observed to be either very low or low with some few exceptions on each of the markets. For instance, the moderate inter-method comparability observed between SE & AOI on the main market but high on both AIM and combined market. Inter-method comparability across the different methods on the main, alternative markets are also observed to be low as indicated by the BM C-index values and much lower when measured by the *I* -index.

The results among mining companies further emphasise that among companies using the same accounting methods, the treatment of L&OA costs is not completely comparable because of intra-method diversity in treatments. When the treatment of

L&OA costs is compared across users of different methods, this study finds evidence of very low or low inter-method comparability with just some few exceptions such as the comparability between SE and AOI which is observed to be moderate or highly occasionally. But this is not surprising because AOI has been argued to be a variant of SE (FASB, 1977; Gerhardy, 1999). The results reveal the need for regulation by accounting bodies if comparability and consistency of accounts of extractive companies remains important.

8.3.3.3 Pooled Sample

The results displayed on Panel C of Table 8.2C affirm the earlier findings on both the oil & gas and mining sectors. The intra-method comparability in the accounting treatment for licencing and other acquisition costs is moderate among extractive companies on the main market but high among those on the AIM and on the combined markets.

On the contrary, the level of inter-method comparability between the other pairs of accounting methods is generally low or very low, apart from the moderate and high comparability observed between SE and AOI users. Across the four methods, the inter-method comparability as shown by the index values are either low or very low suggesting there is low or very low probability of selecting two companies adopting different accounting methods that treat L&OA costs in a comparable way. The findings provide evidence in support of the assertion that diversity of accounting methods impedes comparability. This should be of great concern to anyone that uses financial reports of extractive companies in their investment decision and for that matter should be priority to standard setters.

Table 8.2C Intra and Inter-Method Comparability Indices for Licencing and Other Acquisition Costs

Panel A: Oil and Gas Sector	Main Market			AIM			Combined Market		
	C-index	VDT I-index	A & M I-index	C-index	VDT I-index	A & M I-index	C-index	VDT I-index	A & M I-index
Intra-method comparability (WM C-index)	0.71			0.83			0.78		
Inter-method comparability:									
SE &FC	0.30	0.30	0.30	0.22	0.22	0.22	0.25	0.25	0.25
SE & AOI	0.17	0.17	0.17	0.91	0.91	0.91	0.81	0.81	0.81
SE & EA	0.17	0.17	0.17	0.00	0.00	0.00	0.04	0.04	0.04
FC & AOI	0.80	0.80	0.80	0.17	0.17	0.17	0.23	0.23	0.23
FC &EA	0.80	0.80	0.80	0.00	0.00	0.00	0.28	0.28	0.28
AOI & EA	1.00	1.00	1.00	0.00	0.00	0.00	0.03	0.03	0.03
SE & FC & AOI & EA	0.29	0.52	0.37	0.40	0.00	0.00	0.39	0.14	0.05
Panel B: Mining Sector									
Intra-method comparability (WM C-index)	0.69			0.73			0.72		
Inter-method comparability:									
SE &FC	0.15	0.15	0.15	0.29	0.29	0.29	0.27	0.27	0.27
SE & AOI	0.73	0.73	0.73	0.76	0.76	0.76	0.75	0.75	0.75
SE & EA	0.09	0.09	0.09	0.20	0.20	0.20	0.15	0.15	0.15
FC & AOI	0.17	0.17	0.17	0.28	0.28	0.28	0.26	0.26	0.26
FC &EA	0.57	0.57	0.57	0.36	0.36	0.36	0.41	0.41	0.41
AOI & EA	0.10	0.10	0.10	0.20	0.20	0.20	0.16	0.16	0.16
SE & FC & AOI & EA	0.40	0.24	0.12	0.48	0.32	0.18	0.45	0.28	0.14
Panel C: Pooled Sample									
Intra-method comparability (WM C-index)	0.70			0.79			0.76		
Inter-method comparability:									
SE &FC	0.26	0.26	0.26	0.25	0.25	0.25	0.26	0.26	0.26
SE & AOI	0.69	0.69	0.69	0.81	0.81	0.81	0.77	0.77	0.77
SE & EA	0.10	0.10	0.10	0.17	0.17	0.17	0.14	0.14	0.14
FC & AOI	0.29	0.29	0.29	0.24	0.24	0.24	0.25	0.25	0.25
FC &EA	0.54	0.54	0.54	0.32	0.32	0.32	0.39	0.39	0.39
AOI & EA	0.13	0.13	0.13	0.17	0.17	0.17	0.14	0.14	0.14
SE & FC & AOI & EA	0.43	0.27	0.14	0.46	0.29	0.15	0.45	0.26	0.13

Source: Author's estimates from research data ,2018 *VDT -Van der Tas; A &M - Archer & McLeay*

Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

8.3.4 Concluding Remarks on Accounting for Licencing and Other Acquisition Costs

The previous sections have discussed the accounting treatment for L&OA costs incurred by extractive companies to identify the diversity in treatment and the most common treatment, assess the level of harmony in treatment, and examine the extent of intra-method and inter-method comparability and explore the need and pathways for standardisations.

The results suggest that the extractive companies regardless of the accounting method tend to treat L&OA costs in three different ways - either fully capitalise them, initially capitalise them pending decision or fully expense them. Across the different accounting methods, though treatments cluster around a particular practice type based on the choice of accounting method. For instance, whilst the accounting treatments among SE and AOI cluster around initially capitalising, and among FC companies treatments cluster around fully capitalising. Among EA there is a fair split between fully capitalising or fully expensing L&OA costs. However, for each of the methods, there are some users who treat these costs differently from their method counterparts. Among the sampled companies, the most common accounting treatment for L&OA costs is initially capitalising these costs pending determination.

On average, the level of harmony is observed to be either moderate or high and, on few occasions, complete. Lack of complete harmony among users of the same method highlights disharmony or diversity in accounting treatment. On the pooled sample there is no complete harmony in accounting treatment for licencing and other acquisition costs among each of the methods which indicate that there are some method users who treat these costs in a manner which is inconsistent with their method counterparts. Overall, EA users exhibit the lowest level of harmony in treatment for licencing and

other acquisition costs with SE and AOI users on top with high levels of harmony.

The intra-method comparability in accounting treatment for L&OA costs was found to be either moderate or high. There was no evidence of complete intra-method comparability which indicates intra-method diversities in treatments. Whilst the intra-method comparability were mostly moderate with some few high levels, the inter-method comparability between pairs of different methods and across all the different accounting methods were observed to either be low or very low with only exception being between SE and AOI which is not surprising at all.

These findings suggest that though there seems to be some harmony in accounting treatment for L&OA costs, the flexibility offered by IFRS 6 gives room for diversity in accounting treatment which affect the overall comparability both within and across methods. These highlight the need to harmonise practices within and between methods in order to alleviate the level of diversity in accounting treatment of L&OA costs among extractive companies.

8.4 Chapter Summary

This chapter has examined the accounting treatment for two pre-development cost components, thus, pre-licencing costs and L&OA costs to identify the common accounting treatment and the diversities that exist in their treatments. It further assessed the level of harmony in treatment and extent of intra-method and inter-method comparability in treatment to determine, first, if there is the need for standardisation; and second, to explore the possible pathways for standardisation.

The results suggest high uniformity in fully expensing pre-licencing costs among users of various accounting methods which underpin high harmony levels both within and across methods. Similarly, intra-method and inter-method comparability levels are observed to be high. But the lack of complete intra-method comparability indicates

some intra-method diversities that require standardisation to fully eliminate the diversities. The most worrying issue with the accounting for pre-licencing costs is the high level of non-disclosure which deteriorate the level of harmony when measured with the ADM C-index which further highlights the need for future standard to include mandatory requirement for full disclosure of information regarding pre-licencing costs. This study therefore recommends that future standard to require extractive companies to fully expense pre-licencing costs.

The results on the accounting for L&OA costs indicate diversity in treatment for these costs among even users of the same accounting method. It was notable that fully capitalising licencing and other acquisition costs was common among various users of the different methods with at least one member of each of the methods treating licencing and other acquisition costs this way. But the high proportion of SE and AOI companies in the sample, makes the initially capitalising approach the most predominate accounting treatment. It is evident that EA users exhibited the highest level of diversity in the accounting treatment for licencing and other acquisition costs with SE and AOI showing greater harmony in treatment. The level of intra-method comparability in treatment for these costs are observed to be either moderate or high with no complete intra-method comparability suggesting existence of intra-method diversities which require standardisation to eliminate such diversities. The extent of inter-method comparability is broadly found to be low between pairs of different methods and across all the methods. This further underscores the need for standardisation. This study recommends that to harmonise the different accounting treatments and method future accounting standard should require all companies to initially capitalise L&OA costs till the point when the technical feasibility and commercial viability of an area can be determined before deciding on the final treatment for these costs either to fully capitalise or write them.

CHAPTER NINE
ACCOUNTING FOR
GEOLOGICAL AND GEOPHYSICAL (G&G) COSTS, EXPLORATORY DRILLING AND WELL (ED&W) COSTS, AND OTHER EXPLORATORY (OE) COSTS

9.1 Introduction

This chapter presents the results and discussions of three of the pre-development cost components, thus, Geological and Geophysical (G&G) costs, Exploratory Drilling and Well (ED&W) costs, and Other Exploratory (OE) costs. For each of the cost components, the results of the accounting treatments, the level of harmony in treatment and the extent of intra-method and inter method comparability are presented and discussed. The chapter commences by looking at G&G costs, then this is followed by ED&W costs and then with the OE costs.

9.2 Geological and Geophysical (G&G) Costs

Before extractive companies discover mineral resource for extraction, there is the need for G&G studies or activities. These studies and activities allow the companies to locate and identify areas with the potential to produce commercial quantities of mineral, oil and natural gas deposits as well as identify the best location for exploratory and development wells (Independent Petroleum association of America, 2017). On the average, the cost of a single well is estimated at $5-8 million onshore and $100-200 million or more in deep water (U.S Energy Information Administration, 2016).[39] Because of the high costs of drilling, extractive companies invest much time and resources into G&G activities to enhance their chances of drilling a productive well. G&G costs include, but not limited to, costs incurred on geologists, geophysical crews, seismic surveys, gravimeter surveys, magnetometer surveys and the drilling of core

[39] U.S Energy Information Administration, 2016) Trends in U.S oil and Natural Gas upstream costs

holes. The associated costs of G&G are so significant they run into hundreds of millions of dollars (Jennings, Feiten and Brock, 2000; Cortese, 2011).

Because of the sheer size of G&G costs, the way they are treated has significant impact on the financial results extractive companies report and how they are accounted has been a subject of contention among researchers for several years now (Brock, 1956; Ford, 1957; Field, 1969, Lourens and Henderson, 1972; Gray, Hellman and Ivanova, 2019). Earlier recommendation under the Federal Income tax laws in the U.S allowed extractive companies to expense G&G costs[40] but later the issuance of Field Procedure Memorandum Number 241 outlined some general principles for either expensing or capitalising G&G costs (Ford, 1957). Under the US GAAP/FASB, G&G costs were allowed to be fully capitalised by FC users (SEC Regulation S-X-10), but SE users had to charge G&G costs to expense when incurred (FASB 19,1977: para 16-19). During pre-IFRS periods in the UK, guidance provided by OIAC under Statement of Recommended Practice allowed FC users to fully capitalised G&G costs whilst SE users could capitalise pending determination (see OIAC, 2001, para 41 and 50). Pre-IFRS under Australian regulation, G&G costs could either be carried forward or expensed under AOI (AASB 1989: para 10 and 11). The IFRS 6, on the other hand, allows companies to choose their own treatment for G&G costs (IASB, 2004: para 5b). These imply that the accounting treatment for G&G costs can range between a more conservative approach where they are fully written off when incurred or aggressively capitalised or somewhere in between thus initially capitalised pending outcome of evaluation. These give a clear perspective of the lack of clarity extractive companies are faced with in dealing with G&G costs which are so material that the way they are treated in accounts can significant impact the overall reported performance and position of the reporting entity.

There are several schools of thought backing each of the stances – fully expensing, initially capitalising or fully capitalising. On one hand, arguments have been made that, costs incurred on G&G are high risk expenditure because they generally have low chances of success and for that matter are unlikely to lead to commercial deposits. If this view is held then writing these costs off may be justifiable and this is the view taken

[40] From 1913 to 1941 the US Treasury Department accepted the position that G&G costs are necessary business expenses and should be tax deductible (Ford, 1957, p.57)

by Field (1969). On the other hand, it has also been argued that since G&G costs have uncertain chances of success, they should be carried forward as deferred expenditure until outcome is ascertained before they can either be written off or capitalised. This is the view of Coutts (1963) and several other authors. And those who favour fully capitalisation of G&G costs also argue that the costs involved in such activities are significantly high such that if companies decide to write off these costs, it will adversely affect the financial performance and position and discourage exploration activities (Myer, 1974; Deakin, 1979; 1989). Additionally, IFRS 6 allows the companies the flexibility to develop their own accounting policy on how G&G costs are treated and this latitude gives room for variety of treatments. There is valid argument in support of fully expensing, capitalising pending decision and fully capitalising G&G costs. However, these diversity in treatments result in conflicting financial figures even among seemingly equal companies impeding the comparability of their accounts. And this is what IFRS seeks to avoid given its mandate to eliminate diversity and promote comparability.

The following sections examines the current accounting treatment for G&G costs among extractive companies to identify the most common treatment and the diversity in treatment, assess the level of harmony in the treatment among users of the same and different accounting methods and examine the extent of intra-method and inter-method comparability in treatment to explore the need and pathways for standardisation.

9.2.1 Accounting Treatment for Geological and Geophysical Costs

9.2.1.1 Oil and Gas

Panel A of Table 9.1A presents the cross-classifications of accounting treatment for G&G costs among oil & gas companies. As evident on the Table, each of the AOI and EA oil & gas companies on the main market fully expenses G&G costs but among SE users there is a split in treatment between initially capitalising (19, 53%) and fully expensing (14, 39%) with remaining 8% (2) failing to disclose. It is not surprising to find several companies fully expense G&G costs even among AOI and SE companies because as opined by Field (1969) G&G costs are high risk expenditure and generally

less likely to link them to successful or unsuccessful projects. The other SE companies that initially capitalise treated G&G costs in line with the principle of their accounting method share the view of Coutts (1963) that G&G costs have uncertain chances of success and for that matter should be carried forward as deferred expenditure until outcome is ascertained before they can either be written off or capitalised. Conversely, among the FC users, none of them fully expensed these costs, as it has been common among the other accounting methods. Instead, all the FC fully capitalise these costs except one[41] that initially capitalised them. Among oil & gas companies listed on the main market, the choice of accounting treatment for G&G costs is mainly between either initially capitalising or fully expensing them. But for the FC companies that fully capitalised them, none of the users of the other accounting methods fully capitalised G&G costs.

Among the AIM-listed oil & gas companies, companies seem to treat G&G costs in line with the principles of their accounting methods with some few exceptions. All AOI users initially capitalise G&G costs and all the EA companies fully expense them. Whilst majority (14, 78%) of FC users fully capitalise G&G costs, there are still 4 (22%) that initially capitalise these costs. The greatest diversity in treatment is observed among SE users where though majority initially capitalise (41, 87%), there are still 4 (9%) who fully expense and one company[42] that fully capitalises these costs instead. Overall, among oil & gas companies on the combined market, similar diversity in treatment is observed among all the users of all the methods except EA users who unanimously fully expensed G&G costs. The greatest heterogeneity is observed among

[41] Cadogan Petroleum Plc is a UK-based oil & gas company with MarketCap (size) of £7.03m and was 16 years as 2020. Cadogan indicated it uses Modified Full Cost Methods (MFCM). The mean MarketCap and age of main market-listed FC oil & gas companies is £188m and 19 years respectively.

[42] Wentworth Resources Plc is 19 years and Market cap of £6.81m. The average age and Market Cap for AIM-listed SE oil & gas companies is 20 years and £93m.

SE users where though majority initially capitalise (60, 72%), there are still a few that fully expense (18, 22%) and one that fully capitalise instead. Among FC companies, though majority fully capitalise (18, 78%) these costs, there are still a few that initially capitalise (18, 22%) instead. All AOI consistently initially capitalise except one that fully expenses.

The results reveal that there is diversity in accounting treatment for G&G costs among oil & gas companies listed on the LSE even among companies adopting the same accounting method and emphasise the need for regulation to harmonise accounting practices in the oil & gas sector. The most common treatment for G&G costs among oil & gas companies is for them to initially capitalise these costs. But this can partly be attributable to the large number of SE and AOI companies in the sample. It is striking to note that among main market-listed companies, fully expensing G&G costs is the second preferred alternative treatment for G&G costs whilst among AIM-listed companies, the alternative treatment is for G&G costs to be fully capitalised. The possible explanation for these practices could be that since main market companies are generally bigger and more established, they may have the financial capacity to write off significant G&G costs hence the popularity of fully expensing among main market companies unlike their AIM counterparts who tend to be smaller and newer and may lack such capacity and hence prefer to fully capitalise instead (see LSE, 2010; Mallin and Ow-Yong, 2012). The results further confirm the fact that smaller and newer companies prefer capitalising to more aggressive treatment of fully expensing these costs (Deakin, 1979; Misund, Osmundsen and Sikveland, 2015).

9.2.1.2 Mining

Panel B of Table 9.1A displays the accounting treatment for G&G costs among mining companies listed on the LSE. It evident that majority of mining companies listed on both main market and AIM treat G&G costs in manner consistent with the principles of their accounting methods with some few exceptions. For instance, on the main market-listed companies, there is one SE company[43] that fully capitalises G&G costs instead of initially capitalising them like its method users and one AOI company[44] that fully expenses on the contrary. Similarly, among the AIM-listed companies, there is diversity in treatment among FC and AOI users. Whilst majority (5, 56%) of the FC users fully capitalise G&G costs, there are still 3 (33%) that initially capitalise and 1(11%) company that fully expenses these costs. Among the AOI users, all of them initially capitalise G&G costs except for two[45] that fully expense these costs. Overall, on the combined market, it is observed that there is diversity in treatment among users of each of the methods apart from EA users who uniformity write off G&G costs. Whilst treatment choice among SE and AOI is between two alternatives, there is much wider range among FC users who adopt each of the three treatment alternatives suggesting great diversity in the treatment of G&G costs among FC users.

The results suggest that the most popular treatment for G&G costs among mining companies is for them to be initially capitalised. It is also evident that aside initially capitalising, fully expensing seems also popular among users of other methods. It is

[43] Public Joint Stock Company (PJSC) Polyus - is the largest gold producer in Russia and the fourth largest gold producer globally with MarketCap of £17.10bn (as at 21st September 2021) and 99 years of age.

[44] Prairie Mining Limited is an Australian company with MarketCap of £49.88m and 63 years. It is smaller but older than its method counterparts (mean MarketCap of £5,760m; mean age: 44 years).

[45] Kefi Minerals Plc (MarketCap: £8.85m; age: 14 years), Patagonia Gold Plc (MarketCap: £13.24m; age: 17 years), The method counterparts (mean MarketCap of £39m; mean age: 16 years). They are both smaller than their method counterparts, but Kefi is slightly younger than its counterparts whilst Patagonia is slightly older.

again noticeable that apart from EA users who unanimously fully expense these costs, among the other methods, there are few of the method users who treat these costs differently from their method users highlighting diversity in accounting treatment for G&G costs both within and across methods. This emphasises the need for standardisation if consistency and comparability remains important features of accounting information. The nature of the diversity is so severe that it goes beyond the diversity of accounting methods shown in the literature but also diversity in treatment even within users of the same method.

9.2.1.3 Pooled Sample

From Panel C of Table 9.1A, consistent with observations on each sector, the accounting treatment for G&G costs is highly diverse with each of the treatment alternatives being used by at least one company. Overall, the results indicate that there is diversity in accounting treatment for G&G costs with choices ranging between initially capitalising, fully expensing and fully capitalising. The most common accounting treatment is for them to be initially capitalised as indicated by 180 companies (70%) in the sample treating these costs this way. Though, this is influenced by the large number of SE and AOI companies, it can be observed that there are a few FC companies who instead of fully capitalising G&G costs, like the other FC users, have initially capitalised them instead. The second most common treatment for G&G costs is for them to be fully expensed with 18% (45) of the sample treating these costs this way. There are SE and AOI companies that fully expensed G&G costs just like EA users. Fully capitalising G&G costs seemed to be the least common accounting

treatment. Aside the FC companies, there are 2 SE companies[46] that fully capitalise G&G costs. Of the two, Wentworth Resources Plc is an AIM-listed oil & gas company whilst Public Joint Stock Company (PJSC) Polyus is a mining company listed on the main market. Wentworth Resources Plc is found to be small and newer company that probably adopts SE as way of copying the accounting method of bigger and more established companies (mimetic pressure) (see Meyer and Rowen, 1977; Watts and Zimmerman, 1978) but may not have the financial capacity to fully expense G&G costs. This argument stands, particularly since for newer companies, G&G costs are mostly very significant because of lack of adequate historical data from previous exploratory works (Lourens and Henderson, 1972). By fully capitalising G&G costs, these smaller companies build their balance sheets by reporting higher assets values as well as report higher earnings to attract investors (Myers, 1974; Deakin, 1979). Similarly, as newer, and smaller company, its reliance on external funding especially debt financing may be high as noted by Deakin (1979) and for that matter be concerned about breaking any debt covenant in place hence prefers aggressive treatment to build increase asset values and decrease debt ratio in line with debt-to-equity hypothesis of Watts and Zimmerman (1986). Conversely, PJSC Polyus is found to be an older and larger than its counterparts and as a big and well-established company, one would have expected PJSC Polyus to initially capitalise G&G costs like it method counterparts or even fully expense them but its decision to fully capitalise these costs is quite suspicious and may potentially be attributable to management quest to satisfy their own self-interest. It could be that the company chooses to fully capitalise to build the company's asset base and report high

[46] Wentworth Resources Plc is 19 years and Market cap of £6.81m. The average age and Market Cap for AIM-listed SE oil & gas companies is 20 years and £93m.
And Public Joint Stock Company (PJSC) Polyus - is the largest gold producer in Russia and the fourth largest gold producer globally with MarketCap of £17.10bn (as at 21st September 2021) and 99 years of age.

earnings (Baker, 1976) which may be to the benefit of management especially if bonuses are based on earnings. Watts and Zimmerman (1978) argue that managers are likely to choose accounting method or treatment which will increase the reported earnings of their companies if they bonuses are based on these earnings. This is because fully capitalising G&G costs eliminates any future tendency for fully writing off these costs at once to reduce earnings. Even among FC users, it is also shocking to note that 8 (24%) of them initially capitalise G&G costs.[47] Cadogan Petroleum Plc, the only FC oil & gas company listed on the main market that initially capitalises G&G costs is comparably smaller and younger than its FC counterparts on the main market. A further probe into the company showed that it describes its accounting method as "Modified Full Cost Method" (Cadogan, 2018, p. 64). Could that be a reason by it treats G&G costs differently from its method counterparts?

There has been argument among practitioners and academics as to whether the US FC method is consistent with IFRS and BDO contends that the US FC method is "not consistent with the requirements of IFRS" (BDO, 2013, p. 9). Nobes and Stadler (2021) support this view as they note that the modification to the US FC may be to ensure Cadogan plc "complies with IFRS 6" (p. 6). Whatever the justification for the different treatment is, it creates a problem for users of financial reports by making comparability of accounts difficult. This should be of interest to accounting bodies that even aside the notable accounting methods in literature and practice, there may be several other variations which makes the issue of diversity more concerning. It is therefore not surprising that Nobes and Stadler (2021) review of annual reports of IFRS firms

[47] Cadogan Petroleum Plc, PJSC Gazprom Neft, Block Energy, Falcon oil& gas ltd and United oil & gas (oil & gas companies) and Cadence mineral plc, Hummingbird resources plc and Vast resources plc (mining companies)

conclude that there are about eleven different accounting methods being used under IFRS. For the other FC companies that initially capitalise G&G costs, there is no consistency in their characteristics in terms of size and ages. For instance, whilst Cadence Plc and Vast Resources Plc are smaller in size and same age compared to their method counterparts, Hummingbird Plc is slightly larger but younger than its method counterparts. This may suggest that the choice of treatment may not necessarily be informed by the size and ages of a company alone but as explained earlier there could be motivations by management self-interest to manage their earnings.

Among AOI users, 7% (4) of them fully expense G&G costs instead of initially capitalising. For AOI users, fully expensing G&G costs may not be too surprising given that it has been argued that earlier guidelines (see Statements of Accounting Concepts (SAC) 4) that led to the AOI method permitted 'expense and reinstate' method. One of these companies is Prairie Mining Limited. This company is found to be a smaller than average AOI on the main market, it is relatively older than its method counterparts. As an old Australian company, it could be that its treatment is consistent with the expense and reinstate method which is in line with the guidance under the Statements of Accounting Concepts (SAC) 4 which allowed Australian companies to expense pre-production costs and reinstate when an area proves commercially viable and technically feasible. Gerhardy (1999) contends that aspects of the expense and reinstate method have been combined with the AOI. This further underscores the diversity that exist or can exist even among users of the AOI method and impede comparability. The treatment by Prairie Mining Limited could be explained by political cost hypothesis which states that companies tend to adopt conservative treatment to reduce earnings to avoid political costs or political visibility (Zimmerman, 1983; Milne, 2002). By fully

expensing G&G costs, the company reduces its earnings and divert attention of political powers or institutions from it.

The explanations in the treatment pattern among companies offer insight into the level of diversity that exists and how haphazard it is, with both smaller and newer and larger and older companies all contributing to it.

The diversity in treatment for G&G costs reported in this study is consistent with that of earlier study. Brock (1956) found that majority (65%) of the US sampled companies capitalised all G&G exploration costs that were directly attributed to discovery and development (termed initially capitalised in this study), and the remaining 35% fully expensed them. None of his sample companies fully capitalised G&G costs. Similarly, a survey of API found that treatment for G&G costs is split between fully expensing and initially capitalising pending determination (API, 1965). The diversity in treatment is not surprising given the widespread absence of clear and unified guidance on how these costs should be treated. Even past regulations and guidance have been inconsistent in their prescriptions, and this further underscores the need for regulation to harmonise accounting treatment of G&G costs to enhance comparability of accounts of extractive companies.

It is evident that apart from EA users where there is complete harmony in writing off G&G costs, for the other methods there are some diversities with SE and FC users exhibiting greatest diversity. Whilst initially capitalising remains the most prominent treatment for G&G costs among the sampled companies, it is evident that there is a greater preference for these costs to be fully expensed as an alternative among companies listed on each of the markets. Though the preference for G&G costs is higher among main market-listed companies, among AIM-listed companies, there is almost

equal preference between fully expensing and fully capitalising G&G costs as an alternative to initially capitalising them. As noted earlier, the greater preference for main market to fully expense G&G costs demonstrate their financial strength they have to write off such huge costs and remain profitable unlike their AIM counterparts.

Based on the distribution of treatment on the pooled sample on the combined market, it is notable that fully expensing G&G costs seems common among users of the various methods, but for the huge number of SE and AOI companies in the sample, it may have been the most predominate treatment among the sampled companies and hence reasonable, for standardisation purpose, to recommend it as the most possible treatment to harmonise accounting for G&G costs among extractive companies. Though advocates for fully expensing of G&G costs argue that it is difficult to make a link between G&G costs and a successful discovery, it is prudent to write them off when incurred. Also, if one thinks of G&G costs as research costs then expensing them is justified in line with IAS 38.

However, given that extractive activities are generally risky and uncertain (see Luther, 1996, Wise and Spear, 2000; Gray, Hellman and Ivanova, 2019) such a conservative treatment can be a disincentive for exploratory activities which without them natural resources cannot be discovered (Myers, 1974; Deakin, 1979, 1981). Additionally, fully expensing such G&G costs when incurred would be a violation of the matching concept. This is because G&G costs are incurred with the hope of discovering natural resources which the company can benefit from in future so writing of these costs when incurred will not be "fair matching" of costs to revenue for that particular year. And for that matter based on the level of uncertainty and the matching concept, it is appropriate for G&G costs to be initially capitalised until the point when the outcome of the

exploration activities can be determined with some degree of certainty then final treatment of the costs can be applied.

Against, this backdrop, it is recommended that the most suitable treatment to harmonise G&G costs is to require companies to initially capitalise them pending determination. This recommendation is consistent to that of Field (1964). Aside that this treatment is more consistent with matching concept, it will not discourage exploratory activities since it avoids the immediate writing off of huge G&G costs against profit in the current year especially if a company undertakes more exploratory works. Furthermore, since this treatment is adopted by majority companies, if there is even opposition or lobbying will come from a smaller number of companies. The lobbying and opposition from the small number of companies can be curtailed using the right coercive pressure from accounting standard setting bodies and this must be complemented by normative pressure from professional accounting bodies (DiMaggio and Powell, 1983; Irvine, 2008). Thus, IASB mandate extractive companies to initially capitalise G&G costs and offer clear guidance on how this should be done limiting the extent of discretionary that management regarding how these costs should be treated. Additionally, accounting professional bodies, in training their members should encourage the adherence to standards issues by the IASB and limiting the exercise of discretionary.

Table 9.1A Geological and Geophysical Costs Cross-Classifications

Panel A: Oil and Gas sector															
Accounting method	Main Market					AIM					Combined Market				
	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D	Total
SE	0	14	19	3	36	1	4	41	1	47	1	18	60	4	83
FC	4	0	1	0	5	14	0	4	0	18	18	0	5	0	23
AOI	0	1	0	0	1	0	0	11	0	11	0	1	11	0	12
EA	0	1	0	0	1	0	2	0	0	2	0	3	0	0	3
Total	4	16	20	3	43	15	6	56	1	78	19	22	76	4	121
Panel B: Mining sector															
SE	1	0	12	0	13	0	0	39	0	39	1	0	51	0	52
FC	2	0	0	0	2	5	1	3	0	9	7	1	3	0	11
AOI	0	1	17	0	18	0	2	33	0	35	0	3	50	0	53
EA	0	7	0	0	7	0	12	0	0	12	0	19	0	0	19
Total	3	8	29	0	40	5	15	75	0	95	8	23	104	0	135
Panel C: Pooled Sample															
SE	1	14	31	3	49	1	4	80	1	86	2	18	111	4	135
FC	6	0	1	0	7	19	1	7	0	27	25	1	8	0	34
AOI	0	2	17	0	19	0	2	44	0	46	0	4	61	0	65
EA	0	8	0	0	8	0	14	0	0	14	0	22	0	0	22
Total	7	24	49	3	83	20	21	131	1	173	27	45	180	4	256

Source: Author's estimates from research data, 2018 *A - fully capitalised; B – fully expensed; C – initially capitalised; D – not disclosed*

9.2.2 Level of Harmony in Accounting Treatment for Geological and Geophysical Costs

9.2.2.1 Oil & Gas Sector

Panel A of Table 9.1B displays the level of harmony in accounting treatment for G&G cost among oil & gas companies. Consistent with the cross classification of the accounting treatment, the H-index values show the level of harmony to be moderate for SE (0.51) and FC (0.68) companies but there is a complete harmony among AOI (1) and EA (1) companies. Given that among SE companies on the main market, there is a nearly even split between those who initially capitalise and fully expense, this leaves the level of harmony at a moderate level. Similarly, by 25% of FC companies initially

capitalising instead of fully capitalising as they follow FC, the level of harmony among them is estimated as moderate, based on the H-index. The complete harmony observed among AOI, and EA companies listed on the main market is because only one company employed each of these methods in our sample. When the level of harmony is measured using ADM C-index which adjusts for non-disclosing companies, it is observed that level of harmony among SE oil & gas companies on the main market is rather low with ADM C-index value of 0.42, this low result is because 8% of the SE companies did not disclose how they treat G&G costs. However, the harmony level as measured by ADM C-index value for FC remains moderate, and complete for both AOI and EA companies because there were no non-disclosures. The level of harmony across all the methods is low as shown by H-index and ADM C-index values of 0.42 and 0.35 respectively which suggest high level of diversity in accounting for G&G costs among oil & gas companies on the main market.

Among oil & gas companies listed on the AIM, the H-index values indicate moderate level of harmony among FC (0.65) users, high level of harmony among SE (0.80) and complete harmony among AOI (1) and EA (1) users. Among the SE oil & gas companies on the AIM, though treatment for is distributed among fully expense (1), fully capitalise (4) and initially capitalise (47), a higher proportion of the SE (87%) companies initially capitalise these costs and this explains the high harmony observed in their accounting treatment. With 22% of FC initially capitalising G&G costs instead of fully capitalising them like their fellow FC users, the level of harmony is observed to be moderate. The complete harmony among the AOI and EA users is a result of all AOI companies initially capitalising G&G costs and all EA companies consistently fully expensing G&G costs. Given the higher proportion initially capitalising G&G costs among SE users, when adjusted for the 2% non-disclosing company the ADM C-

index value (0.76) is slightly lower than the H-index value (0.80) but still leaves harmony at high level. The ADM C-index values for FC (0.63), AOI (1) and EA (1) users indicate the same level of harmony like the H-index because all the companies disclosed how they treat G&G costs. Across AIM-listed oil & gas companies the level of harmony in accounting for G&G costs is observed to be moderate with H-index and ADM C-index values of 0.57 and 0.55 respectively which also highlights diversity in treatment for these costs.

Similar level of diversity in treatment is suggested by the H-index and ADM index values reported on the combined market with low level of harmony across all the methods, moderate harmony among users of SE and FC and high harmony among AOI. It is only EA users who exhibit complete harmony in treatment. The highest level of harmony in accounting treatment is observed among EA companies who conservatively write off G&G costs. This is followed by AOI users who exhibit higher level of consistency in initially capitalising these costs. The third on the list is among FC users where some level of diversity with some of its users initially capitalising instead of fully capitalising their method counterparts. The lowest level of harmony is observed among users of SE. All the non-disclosure on G&G costs are observed among SE companies which means they record lower ADM C-index values once index was adjusted for non-disclosures.

The results suggest that among oil & gas companies on the LSE, there is diversity in accounting treatment for G&G costs and even among users of the same method there are still some companies who treat these costs differently from their method counterparts. Based on this, the study concludes that among users of the various accounting methods (except EA) G&G costs are treated in a harmonious way indicating

diversities within methods which highlight the need for standardisation to eliminate these diversities. This is an area the extant literature has not paid much attention to. Against this backdrop, this study recommends that future standardisation effort should, first, aim at harmonising diversity within methods before possible harmonising across the methods.

9.2.2.2 Mining Sector

Panel B of Table 9.1B presents the harmony index values of the accounting treatment for G&G costs among mining companies. Among those listed on the main market, the index values indicate complete harmony in the treatment of G&G costs among FC and EA users as indicated by the H and ADM C-index values of 1. This is because users of each method uniformly treated G&G costs in line with the principles of their accounting method. There is high level of harmony among SE and AOI users but across the different methods there is moderate level of harmony with H-index value of 0.57. The ADM C-index values on the main market suggest the same level of harmony as indicated by the H-index because all companies disclosed information related to G&G costs.

However, on the AIM, whilst the H-index values show complete harmony among SE (1) and EA users (1), high harmony among AOI users (0.89), there is low level of harmony among FC users (0.43) with accounting treatment. The low level of harmony among FC companies is because not all of them fully capitalised G&G costs in line with the principle of their accounting method. Out of the 9 FC companies, 3 representing 33% initially capitalised and 1 (11%) fully expensed instead of fully capitalising like the other FC users. The level of harmony among AOI companies as indicated by the H-index value of 0.89 is high because two of the AOI companies rather fully expensed instead of initially capitalising like their counterparts. Because there is

no non-disclosers, the ADM C-index values indicate the same level of harmony as shown by the H-index values. Across the different methods, there is moderate level of harmony with H and ADM C-index values of 0.65.

Consistently, level of harmony on the combined market is low among FC users, high among SE and AOI but rather complete among EA users as suggested by both H and ADM C-index values. Across the methods, there is moderate level of harmony with H and ADM C index values of 0.63 and 0.62 respectively. Among mining companies, the highest level of harmony in accounting treatment for G&G costs is observed among EA companies and this followed SE user and then AOI users, and the least level of harmony seen among FC mining companies. It is evident from the analysis that, just like among oil & gas companies, among mining companies there are diversity in accounting treatment for G&G costs both within and across method which further underscore the need for harmonisation efforts to focus on both within and across method to achieve the desired consistency and comparability needed in the EI.

Just as was observed in the case of oil & gas companies, it is evident that there is lack of complete harmony in accounting treatment for G&G costs among mining companies that adopt the different methods except for EA users who uniformly expensed these costs as shown by the combined market. These suggest diversity both within and across methods which indicate the need for standardisation to harmonise the different treatments and methods to achieve netter harmony and promote comparability of accounts.

9.2.2.3 Pooled Sample

When the two sectors are pooled together, on Panel C of Table 9.1B, it is evident from the index values that on both the main and alternative markets as well as the combined market, it is only among EA users that exhibit complete harmony in treatment of G&G

costs. However, among the other method users, the index values suggest some level of disharmony (diversity) in the treatment. On the main market, whilst FC and AOI exhibit high harmony in treatment of G&G costs, SE users show moderate level of harmony. But across the methods on the main market, there is rather low level of harmony with H and ADM C index values of 0.47 and 0.43 respectively. Among AIM listed companies, SE and AOI users exhibit high level of harmony but among FC and across the method there is moderate level of harmony. There is no change in the level of harmony indicated by ADM C-index because there are no non-disclosers.

Overall, on the combined market among the extractive companies in the sample, it can be observed that there is a complete level of harmony among users of EA method, high level of harmony among AOI users and moderate level of harmony among SE, FC users and across the methods in the treatment of G&G costs. The highest level of harmony in accounting treatment for G&G costs are observed among EA users (1) and this is followed by AOI companies (0.88) and then SE (0.74) and lowest level of harmony is observed among FC users (0.60) as shown by H-index values on Panel C on the combined market.

The results show diversity in accounting treatment for G&G costs among extractive companies adopting the different accounting methods with exception of EA users that exhibit complete harmony in treatment. Overall, FC users exhibit the highest level of diversity in treatment of G&G costs. The findings highlight the need for effort to harmonise the accounting treatment for G&G costs among extractive companies to promote consistency and comparability of accounts. This study recommends, given the nature of diversity both within and across methods, future standardisation efforts should, first be aimed at eliminating diversity within the individual methods before

focusing on across methods and this should be done gradually and not aggressively to avoid the extent of lobbying and oppositions that characterise past attempts. Moreover, given that FC users exhibit highest level of diversity more focus should be given in harmonising treatment within this method and since fully capitalising G&G costs is used by just a small proportion of companies and also violates prudence as well as matching concepts, consistent with Constantatos *et al.* (2021), this study recommends that future standard, if possible, prohibits the full capitalisation of G&G costs.

Table 9.1B Harmony Indices for Geological and Geophysical Costs

Panel A: Oil and Gas Sector									
Accounting method	Main Market			AIM			Combined Market		
	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)
SE	0.51	0.42	8%	0.80	0.76	2%	0.63	0.57	5%
FC	0.68	0.60	0%	0.65	0.63	0%	0.66	0.64	0%
AOI	1.00	1.00	0%	1.00	1.00	0%	0.85	0.83	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.42	0.35	7%	0.57	0.55	1%	0.48	0.45	2%
Panel B: Mining Sector									
SE	0.86	0.85	0%	1.00	1.00	0%	0.96	0.96	0%
FC	1.00	1.00	0%	0.43	0.36	0%	0.49	0.44	0%
AOI	0.90	0.89	0%	0.89	0.89	0%	0.89	0.89	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.57	0.56	0%	0.65	0.65	0%	0.63	0.62	0%
Panel C: Pooled Sample									
SE	0.55	0.47	6%	0.89	0.87	1%	0.74	0.69	3%
FC	0.76	0.71	0%	0.56	0.55	0%	0.60	0.58	0%
AOI	0.81	0.80	0%	0.92	0.91	0%	0.88	0.88	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.47	0.43	4%	0.61	0.60	1%	0.55	0.53	1%

Source: Author's estimates from research data, 2018 *ADM DA -Archer, Delvaille & McLeay (1995) disclosure adjusted C-index*
Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤X<1*** *-High;* ***0.50 ≤X<0.75*** *-Moderate;* ***0.25 ≤X<0.50*** *-Low;* ***0.00 <X<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

9.2.3 Intra-Method and Inter-Method Comparability for Geological & Geophysical Costs

9.2.3.1 Oil & Gas Sector

Panel A of Table 9.1C presents the intra and inter-method comparability in the accounting treatment for G&G cost among oil and gas companies. As shown by the WM C-index value of 0.5 among oil & gas companies listed on the main market, there is a moderate intra-method comparability in the accounting treatment. This implies that among oil and gas companies listed on the main market, there is 50% probability that two oil and gas companies selected randomly among those adopting the same accounting method treat G&G costs in the same way. This probability is woefully too low for companies operating in the same sector, listed on the same market and adopting the same accounting method. Surprisingly, the level of intra-method comparability is relatively better among those listed on the AIM where the WM C-index value of 0.8 or 80% probability which suggests high intra-method of comparability. Rather on the combined market, there is moderate intra-method comparability with WM C-index value of 0.63 or 63% probability. This shows accounting treatment for G&G among oil and gas companies adopting the same accounting method on the LSE is moderately comparable.

The results suggest that the way G&G costs are treated by oil & gas companies adopting same accounting method is not completely comparable indicating some extent of intra-method diversity in treatment. This confirms that the extent of diversity in accounting treatment for G&G costs among oil & gas companies listed on the LSE and its resulting impact on comparability even among companies adopting the same accounting method. Given the size and significance of the G&G costs of extractive investments, harmonising accounting treatments of these costs is key for comparability, thus for

decision making by stakeholders hence the need for standardisation efforts to achieve this objective.

Regarding inter-method comparability, the index values shown on Panel A of Table 11C indicate that apart from the complete inter-method comparability between AOI and EA companies on the main market because each of those companies fully expensed G&G costs and high level of inter -method comparability observed between SE and AOI users on the AIM, the level of comparability between the other pairs are either low, very low, or completely not comparable. For instance, the accounting treatment for G&G costs among FC & EA users on both main and AIM are not comparable with BM C value of 0. Across the four methods, the inter-method comparability level as indicated by BM C-index values are low on the main market (0.20), AIM (0.40) and combined market (0.33). The I^{48} Index (both VDT and A & M) index values of zero showing treatments across the four methods are completely not comparable.

Taken overall, the evidence based on the findings suggests that the comparability of accounting treatment for G&G costs among oil and gas companies adopting same method is not very high and much devastating is the comparability across different methods. This should be a source of concern for all users of oil & gas companies' financial reports given how significant G&G costs is in their extractive activities. This underscores the urgent need for efforts to harmony accounting treatment for G&G costs if accounts of oil & gas companies will remain comparable and relevant to users in their decision making. As stated earlier, the nearest possible way to harmonise is to require companies to initially capitalise these costs pending determination and for the few who

[48] I-index tends to zero as more methods are added to the analysis (Jaafar, 2004) and also sensitive to zero proportions because of the multiplication involved (Emenyonu and Gray, 1996). So, where BM C-index return a significant number, but the I-index does not, both are reported but the BM C-index value is accepted because of the superiority of the BM C-index over the I-index (Morris and Parker, 1998).

may want to treat these costs differently use coercive pressure exercised through strict regulations by stock markets to mandate them to comply.

9.2.3.2 Mining Sector

Among mining companies, the WM C-index values reported on Panel B of Table 9.1C suggest high level of intra-method comparability among main market (0.89), AIM (0.94) and combined market (0.92). With high level of consistency among users of various methods in treating G&G costs according to the principles of their accounting method, it can be observed that the intra-method comparability on each of the markets as well as the combined market to be high. Just like, among the oil & gas companies where there is a higher intra-method comparability among AIM listed companies than main market listed companies, among the mining companies too, there is higher intra-method comparability on AIM listed companies than their main market counterparts. Regardless of the high level of intra-method comparability, the absence of complete intra-method comparability highlights the existence of diversity among users of the same method. One would have expected that among companies operating in the same sector, listed on the same market and adopting the same method, treatment of a particular cost component will be in a completely comparable manner but that is not the situation here which should be an issue of concern to standard setters in their quest to achieve comparability of accounts among companies.

The situation is far worse when the treatment is compared across different methods. Except for the high inter-method comparability observed between SE and AOI companies, the comparability between the other pairs (SE & FC; SE & EA; FC & AOI; FC & EA; AOI & EA) is either low, very low or completely not comparable with index values ranging between 0 to 0.33. Across the four accounting methods, the BM C-index values show low inter-method comparability among companies listed on the main

market (0.40), moderate among those on the AIM (0.51) and low on the combined market (0.48). The level of comparability for the accounting treatment for G&G between the four methods estimated by the VDT and A & M *I **indices*** show that there is no inter-method comparability at all with index values of 0.

Like findings on the oil & gas sector, the results suggest that among the mining companies though there is high intra-method comparability, there is lack of intra-method comparability as may be expected of companies operating in the same sector, listed on the same market and adopting the same accounting method. Worst is the comparability between pairs of methods and across all the methods. These again pinpoint to the extent of diversities in treatment for G&G costs among mining companies using the same accounting methods and across different methods and their effect of comparability in treatment. The findings suggest the need for efforts to harmonise the diversities that exist both within and across method to ensure complete comparability within methods and improve comparability across methods.

9.2.3.3 Pooled Sample

Similar to the results found on each of the sectors, the intra-method comparability index values shown on Panel C of Table 9.1C indicate moderate intra-method comparability among extractive companies listed on the main market and high intra-method comparability among those on the AIM and combined market with WM C index values of 0.59, 0.87 and 0.76 respectively. This shows a better chance of selecting companies that adopt the same accounting method and treat G&G costs in a same way among AIM listed than among main market listed companies. This indicates that accounting treatment for G&G costs is not completely comparable among users of the same method both on the main and the alternative markets confirming some disharmony in treatment among users of same method. Between the two sectors, the intra-method comparability

is higher among mining companies (0.92) than among oil & gas companies (0.63) as shown by the WM C-index values on the combined market.

The inter-method comparability between pairs of different methods is low or completely not comparable except for between SE & AOI users who exhibit moderate comparability on the main market (0.64), and high on the AIM (0.90) and combined market (0.80). Inter-method comparability between the four accounting methods is low as indicated by C-index values of 0.39, 0.47 and 0.43 on the main, alternative, and combined markets, respectively. However, the *I* index values of 0 or near zero (0) show complete lack of comparability or very low level of comparability between users of the different methods in the accounting treatment for G&G costs.

Overall, the results of intra-method and inter-method comparability suggest that the way extractive companies listed on LSE treat G&G costs is not completely comparable among users of the same method and across the different methods, the level of comparability is woefully too low meaning users of financial reports of extractive companies in their quest to make investment decisions based on reported earnings may be misled because of the diversities in how companies treat the same costs. This should be an issue of concern for all stakeholders especially users of annual reports. Existing evidence shows that annual reports remain one of the vital sources of information to aid investment decision (Bremer, 1971; Ahmed, 1994; Cooke and Sutton, 1995; Beattie and Jones, 2002). With such widespread diversities which impede comparability both within and across methods, there is urgent need for efforts to standardise the different practices to enhance comparability of accounts. As discussed earlier, the closest possible treatment based on the finding of this research will be to initially capitalise these costs pending determination.

Table 9.1C Intra and Inter - Method Comparability Indices for Geological and Geophysical Costs

Panel A: Oil and Gas Sector	Main Market			AIM			Combined Market		
	C- index	VDT I--index	A&M I -index	C- index	VDT I -index	A&M I -index	C- index	VDT I -index	A&M I -index
Intra-method comparability (WM C-index)	0.50			0.79			0.63		
Inter-method comparability:									
SE &FC	0.12	0.12	0.12	0.21	0.21	0.21	0.18	0.18	0.18
SE & AOI	0.42	0.42	0.42	0.89	0.89	0.89	0.72	0.72	0.72
SE & EA	0.42	0.42	0.42	0.09	0.09	0.09	0.23	0.23	0.23
FC & AOI	0.00	0.00	0.00	0.22	0.22	0.22	0.20	0.20	0.20
FC &EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AOI & EA	1.00	1.00	1.00	0.00	0.00	0.00	0.08	0.08	0.08
SE & FC & AOI & EA	0.20	0.00	0.00	0.40	0.00	0.00	0.33	0.00	0.00
Panel B: Mining Sector									
Intra-method comparability (WM C-index)	0.89			0.94			0.92		
Inter-method comparability:									
SE &FC	0.08	0.08	0.08	0.33	0.33	0.33	0.28	0.28	0.28
SE & AOI	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
SE & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FC & AOI	0.00	0.00	0.00	0.32	0.32	0.32	0.26	0.26	0.26
FC &EA	0.00	0.00	0.00	0.11	0.11	0.11	0.09	0.09	0.09
AOI & EA	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
SE & FC & AOI & EA	0.40	0.00	0.00	0.51	0.00	0.00	0.48	0.00	0.00
Panel C: Pooled Sample									
Intra-method comparability (WM C-index)	0.59			0.87			0.76		
Inter-method comparability:									
SE &FC	0.11	0.11	0.11	0.25	0.25	0.25	0.21	0.21	0.21
SE & AOI	0.64	0.64	0.64	0.90	0.90	0.90	0.80	0.80	0.80
SE & EA	0.30	0.30	0.30	0.05	0.05	0.05	0.14	0.14	0.14
FC & AOI	0.13	0.13	0.13	0.25	0.25	0.25	0.22	0.22	0.22
FC &EA	0.00	0.00	0.00	0.04	0.04	0.04	0.03	0.03	0.03
AOI & EA	0.11	0.11	0.11	0.04	0.04	0.04	0.06	0.06	0.06
SE & FC & AOI & EA	0.39	0.00	0.00	0.47	0.04	0.01	0.43	0.06	0.02

Source: Author's estimates from research data ,2018 *VDT -Van der Tas; A &M - Archer & McLeay*

Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

9.2.4 Concluding Remarks on Accounting for Geological and Geophysical Costs

The previous sections addressed the accounting treatments of G&G costs among extractive companies to identify the current common practice, the level of harmony in treatment and the extent of intra-method and inter-method comparability to determine whether there is the need for standardisation and the possible pathways for standardisation.

The results suggest that accounting treatment for G&G costs is subjected to diversity of treatment ranging from a more aggressive treatment of fully capitalising to more conservative treatment of fully expensing with some mid-level treatment of initially capitalising. The findings show that the most common treatment among extractive companies in the sample is initially capitalising pending determination which could partly be influenced by the large number SE and AOI companies in the sample. It is also noted that apart from SE and AOI users, some FC users also choose this treatment. But it was also observed that fully expensing these costs is also common among most companies with quite a number of companies adopting the different method treating this G&G costs this way. This diversity in treatment found in this study is consistent with similar ones reported by earlier studies (API, 1965; Field, 1969; Lourens and Henderson, 1972). For each of the methods, it is found that there were some users that treated G&G costs differently from their method counterparts apart from EA users who treated these costs in a uniform way.

Consistent with the accounting treatments for G&G costs, the levels of harmony in treatment were observed to generally be not complete among users of the same method apart from EA users. The lack of complete harmony in treatment among users of the same methods further underscore within method diversity and the need to harmonise to

standardise the different practices. Overall, on the pooled sample on the combined market, FC users were identified as showing the highest level of diversity in accounting treatment for G&G costs.

Unexpectedly, the study found intra-method comparability in accounting treatment for G&G costs not to be completely comparable with WM C index values of less than 1 among companies on both sectors and markets which suggest that comparability among companies adopting the same accounting methods is not complete as may be expected. This also indicated intra-method diversities and the need for efforts to harmonise practices within methods. Furthermore, the inter-method comparability between users of pairs of accounting methods and across all the accounting methods were found to be low, very low or completely not comparable except for those between SE & AOI which was not surprising given that AOI has often been argued to be a variant of SE (see Gerhardy, 1999). The low inter-method comparability also highlights the need for standardisation to harmonise the diversity.

Consistent with Brock (1956) and Lourens and Henderson (1972) is study finds that Based on the G&G costs are accounted differently by extractive companies and even among users of the same method there are some diversities. The level of diversity impedes comparability both within and across methods and this underscores the need for standardisation to eliminate these diversities to ensure complete comparability within methods and improve comparability across different methods. To achieve this harmony, this study recommends that future standard should require extractive companies to initially capitalise these costs pending determination. Secondly, standardisation efforts should start from harmonising within methods before focusing on across methods. Third, sufficient disclosures about G&G costs be made available for stakeholders.

9.3 Exploratory Drilling and Well (ED&W) Costs

Exploration is defined as "the detailed examination of a geographical area of interest that has shown sufficient mineral-producing potential to merit further exploration" (IASB, 2010, p. 164). Exploration activities include but not limited to carrying out exploratory drilling works. In hard-core metal mining, exploratory drilling involves the drilling of boreholes from the surface or from underground workings, to seek and locate coal or mineral deposits and to establish geological structure. This is mostly done from underground workings - either the holes are drilled upward, horizontally, or downward as required. It is includes sinking exploratory shafts, cutting drifts and crosscuts, opening shallow pits, and removing overburden core in some areas (ibid.). In the oil & gas exploration, exploratory drilling works largely involve the drilling of exploratory wells.

Exploratory wells are wells drilled to find new fields or to find new reservoirs in fields previously found to be productive of oil or gas in another reservoir. Generally, exploratory wells are not development wells, extension wells, service wells, or stratigraphic test wells (SEC, 2009[49]).

Drilling costs are estimated to represent up to 40% of the entire exploration costs (Cunha, 2002) and the proportion may even be higher depending on the location and depth of the well (Khodja *et al.*, 2010). This shows how material exploratory drilling and well costs are and for that matter the way they are treated can significantly impact reported figures on the financial statement of extractive companies. In this thesis, the

[49] This document was compiled by Netherland, Sewell & Associates, Inc. from the amendments listed in the SEC's Final Rule for the Modernization of Oil and Gas Reporting, published in the Federal Register on January 14, 2009.

costs incurred on exploratory drilling and wells are called “exploratory drilling and well (ED&W) costs”.

Guidance and recommendations under past regulations have proposed different treatments for ED&W costs. For instance, under the SE advocated by FASB and adopted by the SEC in Reg. S-X Rule 4-10, exploratory wells are allowed to be initially capitalised pending determination whilst under the FC these costs were allowed to be fully capitalised as part of exploratory assets (FASB 19, 1977: para 16-19; Jennings, Feiten and Brock, 2000;). Similarly, guidance under SORP in the UK pre-IFRS also recommended SE users to initially capitalise ED&W costs whilst FC users could fully capitalise them (OIAC, 2001, para 53 and 41). However, IFRS 6 allows companies to determine their own accounting policy regarding which E&E expenditures (including ED&W costs) they will recognise as E&E assets (IASB, 2004). This allows companies the flexibility to decide on how these costs are treated in their books and with other ulterior motives, preparers of accounts can choose treatment which satisfy their motives and may not adequately reflect economic substance of transactions.

The following section presents the accounting for ED&W costs to identify the most predominant treatment and diversities in treatments, and to assess the level of harmony in treatment among companies using the same and different accounting methods. It further examines the extent of intra-method and inter-method comparability in the treatments to determine if there is the need for standardisation and, if so, the pathways for such standardisation.

9.3.1 Accounting Treatment for Exploratory Drilling and Well Costs

9.3.1.1 Oil and Gas Sector

Panel A of Table 9.2A shows the accounting treatment for ED&W costs among oil & gas companies. It is evident from the table that all the main market-listed oil & gas companies treated ED&W costs in line with the principles of their accounting methods. All SE users (36; 100%) uniformly initially capitalise exploratory drilling and well costs. Similarly, the only AOI company on the main market initially capitalise these costs. All FC companies fully capitalised these costs except one[50] that initially capitalised these costs pending determination. The EA user in line with the principle of its accounting method fully expensing these costs.

Similarly, among AIM-listed oil & gas companies, all the users of the different methods treat ED&W costs in line with the principle of their accounting methods apart from one SE company[51] which chooses to fully capitalise instead of initially capitalising like its method counterparts and four FC users[52] who initially capitalise instead of fully capitalising. There is uniformity among AOI and EA users in initially capitalising and fully expensing these costs respectively.

On the combined market, it is evident that accounting treatment for ED&W costs is influenced to an extent by the accounting method a company adopts. With majority of

[50] Cadogan Petroleum Plc is a UK-based oil & gas company with MarketCap (size) of £7.03m and was 16 years as 2020. The mean MarketCap and age of main market-listed FC oil & gas companies is £188m and 19 years respectively

[51] Wentworth Resources Plc is 19 years and Market cap of £6.81m. The average age and MarketCap for AIM-listed SE oil & gas companies is 20 years and £93m.

[52] There are PJSC Gazprom Neft (MarketCap: £22,926.74m, age: 25 years), Block Energy Plc (MarketCap: £7.12m, age: 15 years), Falcon Oil & Gas Ltd Plc (MarketCap: £125.73m, age: 40 years) and United Oil & Gas Plc (MarketCap: £15.38m, age: 5 years). The mean MarketCap and age for AIM-listed FC oil & gas companies is £57m and 20 years.

SE and AOI initially capitalising these costs, most FC users fully capitalising them and all EA oil & gas companies fully writing off these costs when incurred. The most common accounting treatment for ED&W costs is for them to be initially capitalised. Though majority of the sampled companies adopt SE and AOI, it can be observed that 22% (5) of FC users also initially capitalise these costs which partly contributes to the dominance of this treatment. Only one SE (1%) company listed on the AIM failed to disclose the accounting treatment for exploratory drilling and well costs.

The results suggest high preference for some form of capitalisation (either initially or full) of ED&W costs and least preference for fully expensing these costs. As evident on the combined market, apart from the EA users who fully expense ED&W costs, none of the other method users fully expense these costs. This finding is consistent with that of Lourens and Henderson (1972) who found that most Australian companies (72%) capitalise exploratory costs including ED&W costs. On the contrary, Field (1969) found that among 38 companies, 20 fully expensed exploratory costs. But he contended his own finding by noting that "it is not likely that any petroleum company would charge successful exploratory drilling costs to income as incurred" (Field, 1969, p. 48). This implies he supports the findings that ED&W costs should be capitalised to some extent.

Though users of each method tend to treat these costs in line with their accounting method, it is evident from the findings that there are still companies which treat these costs differently from their method counterparts which shows diversity in treatment among users of the same methods and therefore require efforts to eliminate these diversities.

9.3.1.2 Mining Sector

From Panel B of Table 9.2A, it is evident that among SE mining companies listed on each of the markets, vast majority initially capitalise ED&W costs with only 1(8%) company listed on the main market fully capitalising instead of initially capitalising. Among the FC mining companies whilst there is complete uniformity among those on the main market to fully capitalise ED&W costs, among AIM counterparts, there is some diversity in the accounting treatment among FC users with 1(11%) company[53] fully expensing and 3 (33%) companies[54] initially capitalising contrary to the treatment by majority 5 (56%).

Among the AOI mining companies, though majority of them initially capitalise these costs, there is 1 (6%) company[55] on the main market and 2[56] (6%) on the AIM that fully expense these costs. As noted earlier, the previous expense and reinstate method which preceded the introduction of AOI, makes users of AOI more likely to expense such pre-development costs with the intention to reinstate these costs if viable discovery is made on an area of interest (Gerhardy, 1999). It could be the reason why these companies fully expense whilst majority of their method users initially capitalise pending decision. But this further aggravate the already worrying situation of diversity in accounting methods. Conversely, there is complete uniformity among EA users in fully expensing ED&W costs.

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[53] Caledonia Mining Corporation Plc (MarketCap: £46.55m; age: 28 years). The method counterparts (mean MarketCap of £74m; mean age: 16 years).

[54] Cadence Minerals Plc (MarketCap: £9.23m; age: 16 years), Hummingbird Resources Plc (MarketCap: £75.82m; age: 15 years) and Vast Resources Plc (MarketCap: £16.80m; age: 16 years). The method counterparts (mean MarketCap of £74m; mean age: 16 years).

[55] Prairie Mining Limited is an Australian company with MarketCap of £49.88m and 63 years. It is smaller but older than average method users (mean MarketCap of £5,760m; mean age: 44 years).

[56] Kefi Minerals Plc (MarketCap: £8.85m; age: 14 years), Patagonia Gold Plc (MarketCap: £13.24m; age: 17 years), The method counterparts (mean MarketCap of £39m; mean age: 16 years). They are both smaller than their method counterparts, but Kefi is slightly younger than its counterparts whilst Patagonia is slightly older.

On the combined market, similar diversity in treatment can be seen among users of the different methods with the greatest level of diversity observed among FC users where there is at least one company applying each of the different accounting treatments. The highest level of harmony in accounting treatment can be observed among EA mining companies.

The results suggest that among mining companies listed on the LSE, ED&W costs are subjected to diverse treatments. And even among users of the same method there are disparities in the treatments. Initially capitalising is identified as the most common treatment among the mining companies just like among the oil & gas companies. This could partly be attributed to the large number of SE and AOI companies in the sample, however, it is notable that initially capitalising exploratory drilling and well costs is also used by FC users as well. And what is even more intriguing is the fact that regardless of initially capitalising being popular, there are still some SE and AOI mining companies that treat these costs differently.

It is striking to note that whilst oil & gas companies prefer to fully capitalise as an alternative treatment to initially capitalising ED&W costs, mining companies prefer to fully expense these costs as an alternative treatment confirm the finding of the IASB staff survey which noted that mining companies are more likely to expense exploration and evaluation expenditure than their oil & gas counterparts (IASB, 2020).

The findings underscore the urgent need for accounting standard to harmonise the practices both within and across methods to foster comparability of accounts and achieve that initially capitalising these costs may be most reasonable treatment for costs mining companies incur on their exploratory drilling works.

9.3.1.3 Pooled Sample

Consistent with the findings on both sectors, as shown on Panel C of Table 9.2A, it is evident that accounting treatment for ED&W costs is diverse with choice ranging between fully capitalising, fully expensing and initially capitalising with initially capitalising being the most popular on both markets and sectors.

Overall, on the combined market, the least preferred treatment for ED&W costs is for them to be fully expensed. For each of the accounting methods, there is a choice between at least two accounting treatments. For instance, among SE users, the choice is between initially capitalising and fully capitalising with majority going with the former treatment. Among AOI users, the choice is between initially capitalising and fully expensing with the cluster around initially capitalising. FC users are the least harmonised as they tend to use either fully capitalise, initially capitalise, or fully expense with majority of them fully capitalising them. From these results, it can be concluded that there is diversity in the accounting treatment of ED&W costs among extractive companies listed on the LSE even among users of the same methods.

One notable difference in treatment between companies listed on the main market and AIM is the fact that whilst main market-listed companies prefer fully expensing a second alternative to initially capitalising, AIM -listed companies rather favour fully capitalising as an alternative. This is not surprising because on the average main market companies are observed to be on the bigger and older than their AIM counterparts (see Table 8.3) hence may have the financial capacity to fully write off significant exploratory drilling and well costs and still report good earnings whilst their smaller AIM counterparts may not have such capacity and may rather aim to build their balance sheet through fully capitalisation (Flory and Grossman, 1978; Frazier and Ingersoll, 1986; Johnson and Ramanan, 1988; Van Riper, 1994; Jeter, 2001).

To offer possible explanation for why some companies treat ED&W costs differently from their method counterparts, age and size analysis are carried out. The analysis of the 2 SE companies that fully capitalise ED&W costs does not allow for definitive conclusion as to whether smaller and newer companies are the ones adopt different treatment from their method counterparts. It is because, of the two, whilst Wentworth Resources Plc[57], an AIM-listed oil & gas company was found to be smaller and newer than its average method users, PJSC Polyus a main market-listed company, is observed to be very old and large company compared to its method counterparts. This may lead one to question the choice of SE method by Wentworth Resources Plc. It might have been influenced by the fact that SE is the most popular method and used by many large and established companies and in order to appear legitimate and attract the needed finance, the company adopts this method though they do not have the financial capacity to write off ED&W costs which are not directly related to commercial discovery (Meyer and Rowan, 1977; Guler, Guillen and Macpherson, 2002). For PJSC Polyus, its decision to fully capitalise ED&W costs may be driven by other ulterior motives rather than lack of financial capacity. This clearly confirms the assertion of Lilien and Pastena (1981) that companies can choose accounting methods but treat cost components in a manner inconsistent with their chosen methods.

Similar diversity in treatment is observed among FC users with 8 companies[58] in the pooled sample on the combined market initially capitalising and 1 surprisingly fully expensing ED&W costs. Analysis of the size and age characteristics of the eight

[57] Wentworth Resources Plc is 19 years and Market cap of £6.81m. The average age and MarketCap for AIM-listed SE oil & gas companies is 20 years and £93m.
Public Joint Stock Company (PJSC) Polyus - is the largest gold producer in Russia and the fourth largest gold producer globally with MarketCap of £17.10bn (as at 21st September 2021) and 99 years of age
58 Out of the 8, 5 are oil & gas companies (Cadogan Petroleum Plc, PJSC Gazprom Neft, Falcon oil & gas ltd, Block Energy Plc and United Oil & Gas Plc) and 3 are mining companies (Cadence and Vast Resources Plc, Hummingbird Resources Plc).

companies did not reveal any consistent patterns. Whilst Cadogan Petroleum Plc, Block Energy Plc, United Oil & Gas Plc, Cadence Mineral Plc, Vast Resources Plc and Hummingbird Resources Plc were observed to be smaller and younger than their method counterparts; PJSC Gazprom Neft and Falcon oil & gas ltd were observed to bigger and older than their method counterparts. For the smaller and newer companies, it is quite unexpected to find them choosing initially capitalisation over fully capitalisation as FC users. The likely explanation for this may be to defer the impact of these costs on current financial performance and position of the company until a future date. Because once, the costs are fully capitalised, IAS 16 *Property, Plant and Equipment* or IAS 38 *Intangible Assets* require that such costs be either depreciated, depleted, or amortised (DDA) depending on how the asset is classified which will end up reducing reported earnings. But by initially capitalising, the managers can defer the impact of such costs on their operating earnings and choose to either write them off or fully capitalise them when they find it most convenient for them. Therefore, deferring costs to future and enhancing current reported earnings. As noted by bonus plan hypothesis, the choice of accounting treatment can be influenced by the results management want to achieve especially if the bonuses are based on reported earnings (Watts and Zimmerman). In addition, given that majority of companies initially capitalise ED&W costs, that may have influenced them to "copy" the others to appear legitimate within the industry (see Irvine, 2002). This could be evidence of mimetic pressure as described DiMaggio and Powell (1991) in institutional theory.

Caledonia Mining Corporation is identified as the only FC company that fully expenses ED&W costs. It is seen to be smaller than its method counterparts but rather older than the average method user. As reported in the extant literature, bigger and older companies prefer aggressive treatment of fully expensing than smaller ones (see

Amernic, 1979; Frazier and Ingersoll, 1986; Johnson and Ramanan, 1988) since they may have the financial capacity to do so but unexpectedly, Caledonia Mining Corporation, a company smaller than its average method user chooses to expense these costs. It could be an attempt by management to reduce reported earnings to minimise tax obligation (Desai *et al.*, 2007; Lisowsky, 2010) and possibly to avoid political costs (Milne, 2002). The nature of diversities as observed among companies based on ages and sizes analyses give a clear perspective that extractive companies are taking advantage of the latitude in regulation to treat costs anyhow based on the results they want to achieve. It is therefore not surprising that Smith and Brock commented that accounting for mining presents such severe problems that their accounts are "regarded rather lightly inside and outside the industry " (Smith and Brock, 1959 p. 14 cited in Luther 1996, p. 68). And not surprising

The widespread diversity in treatment of ED&W costs among extractive companies highlights the need for efforts to harmonise practices regarding these costs to achieve standardisation. To eliminate these diversities in practices, it would be suitable for ED&W costs to be initially capitalised pending determination. This is because, apart from this treatment being the most common practice and for that matter, if any opposition at all will emerge, it will come from a smaller number of companies. For instance, for companies that fully capitalise, initially capitalising will not be a complete departure from their preferred treatment, because the treatment they are likely to oppose is a most conservative treatment of fully expensing these significant costs. And for companies that prefer to fully expense, initially capitalise does not vary significantly from their treatment in that once initially capitalised, these costs may end up being written off eventually if a prospect is found not commercially viable. Moreover, the

effect of initially capitalising on reported performance is not as adverse as writing off such huge costs.

Additionally, by the time companies incur ED&W costs, they will be close to evaluation stage to know whether the prospects have discoveries in commercial quantities to warrant their full capitalisation consistent with definition of assets provided by the Conceptual Framework for financial reporting. Therefore, it is justifiable for these costs to be deferred to the point after evaluation then they can either be expensed or fully capitalised appropriately. As argued by Field (1969), risk in extractive activities reduces as companies progress from prospecting towards development phase. Therefore, strict application of prudence concept to fully expense ED&W costs based on high risk at this stage may not be appropriate. But to ensure better application of matching concept, these costs should be initially capitalised and after decision final treatment can be made. This recommendation is similar to those of Lourens and Henderson (1972) and Coutts (1962) who prefer an aggressive treatment (capitalisation) rather than extremely conservative treatment of writing of ED&W costs when incurred.

Table 9.2A Exploratory Drilling and Well Costs Cross – Classifications

Accounting method	Main Market					AIM					Combined Market				
	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D	Total
Panel A: Oil and Gas Sector															
SE	0	0	36	0	36	1	0	45	1	47	1	0	81	1	83
FC	4	0	1	0	5	14	0	4	0	18	18	0	5	0	23
AOI	0	0	1	0	1	0	0	11	0	11	0	0	12	0	12
EA	0	1	0	0	1	0	2	0	0	2	0	3	0	0	3
Total	4	1	38	0	43	15	2	60	1	78	19	3	98	1	121
Panel B: Mining Sector															
SE	1	0	12	0	13	0	0	39	0	39	1	0	51	0	52
FC	2	0	0	0	2	5	1	3	0	9	7	1	3	0	11
AOI	0	1	17	0	18	0	2	33	0	35	0	3	50	0	53
EA	0	7	0	0	7	0	12	0	0	12	0	19	0	0	19
Total	3	8	29	0	40	5	15	75	0	95	8	23	104	0	135
Panel C: Pooled Sample															
SE	1	0	48	0	49	1	0	84	1	86	2	0	132	1	135
FC	6	0	1	0	7	19	1	7	0	27	25	1	8	0	34
AOI	0	1	18	0	19	0	2	44	0	46	0	3	62	0	65
EA	0	8	0	0	8	0	14	0	0	14	0	22	0	0	22
Total	7	9	67	0	83	20	17	135	1	173	27	26	202	1	256

Source: Author's estimates from research data, 2018 *A - fully capitalised; B – fully expensed; C – initially capitalised; D – not disclosed*

9.3.2 Level of Harmony in Accounting Treatment for Exploratory Drilling and Well Costs

9.3.2.1 Oil & Gas sector

Panel A of Table 9.2B presents the harmony index values for the accounting treatments for ED&W costs among oil and gas companies. Among companies listed on the main market, the H and ADM C-index values indicate that there is complete harmony among SE, AOI and EA with index values of 1. It is only FC users that exhibit moderate level of harmony (H-index value =0.68; ADM C-index value= 0.60) in accounting treatment for exploratory drilling and well costs with treatment spread between fully capitalising and initially capitalising. Across all the methods, the level of harmony is high with H

and ADM C-index values of 0.79. This index value suggests two things - first, though the level of harmony is interpreted as high but because the index value is less than 1, indicates some level of the diversity in treatment among oil & gas companies. Second, the high harmony also shows the greater preference for a particular accounting treatment among main market-listed oil & gas companies, in this case, initially capitalising these costs pending decision.

Conversely, among the AIM-listed counterparts, the level of harmony in treatment across all the methods is moderate (H-index value =0.65; ADM C-index value= 0.62) suggesting greater diversity in treatment. Within the methods, it is observed among AOI and EA users there is complete level of harmony but high level of harmony among SE users (H-index value =0.96) and rather greater diversity is exhibited by FC users with moderate level of harmony (H-index value =0.65).

On the combined market, similar diversity is observed across the different method with H-index value of 0.69 and ADM C-index value of 0.68 suggesting moderate level of harmony in accounting for ED&W costs. AOI and EA still maintained complete harmony because users of these method uniformly treated ED&W costs in line with the principles of their accounting methods. However, with index values of less than 1, SE and FC users exhibit some diversities in treatment of exploratory drilling and well costs. There is high level of harmony among SE but moderate level of harmony among FC users. The highest level of harmony is observed among EA and AOI companies and the lowest level of harmony among FC companies. Because of the low non-disclosure level, the ADM C-index values indicate the same level of harmony as the H-index values.

It is quite clear from these results that the level of harmony in the accounting treatment

for ED&W costs seems high, however, there are some disharmonies within some of the methods and across all methods. For instance, though the level of harmony is high among SE and complete among AOI oil and gas companies, they both initially capitalise ED&W costs whilst FC companies with moderate level of harmony fully capitalise these costs and EA companies with complete level of harmony fully expense these costs. Put together, these oil & gas companies are adopting different treatment for the same cost component which is worrying. This therefore indicates the need for an accounting standard to regulate accounting practices with the oil & gas companies to eliminate all diversities both within and across methods.

To harmony practice, it is recommended that future standard for EI requires all companies to initially capitalise ED&W costs pending decision because as noted from the earlier discussions on the accounting treatment for ED&W costs, it is the most common practice among sampled companies and also method users whose treatments are consistent with initially capitalising (AOI and SE) exhibit high level of uniformity as shown by index values on Table 12B.

9.3.2.2 Mining Sector

Among mining companies listed on the main market, though the level of harmony within users of individual methods seems either high (for SE and AOI) or complete (for FC and EA), the level of harmony across all the method is moderate with H-index value of 0.57 and ADM C-index value of 0.56 suggesting disharmony in the accounting treatment for ED&W costs among main market-listed mining companies. Similarly, among the AIM-listed companies, there is moderate level of harmony across all the methods with H-index value of 0.65 and ADM C-index value of 0.65. But what is quite notable is the low level of harmony exhibited by the FC users on the AIM with H-index and ADM C-index values of 0.43 and 0.36 respectively suggesting greater level of

diversity in treatment among same method users. On the other hand, AIM-listed SE and EA users exhibit complete harmony whilst the AOI show high level of harmony. On the combined market, it is evident that the level of harmony in accounting treatment for ED&W costs remain complete among EA companies, high among SE and AOI, moderate across all the methods and rather low among FC users.

The lack of complete harmony among users of the different methods apart from EA users indicate diversity in treatment among users of the same method which is worrying. Since one would have expected companies operating in the same sector and adopting the same accounting method to treat cost components in the same way but this is not the case here which requires urgent attention from accounting standards setting bodies if comparability of accounts remain a core objective of IFRS.

9.3.2.3 Pooled Sample

Consistent with the findings on each of the sectors, the index values for the pooled sample shown on Panel C of Table 9.2B suggest that level of harmony in the accounting treatment for ED&W costs is moderate across all method among extractive companies listed on both the main (H-index value =0.67; ADM C-index value= 0.67) and alternative (H-index value =0.64; ADM C-index value= 0.63) as well as the combined (H-index value =0.65; ADM C-index value= 0.64) markets. These results suggest that there are some diversities in the way extractive companies listed on the LSE treat ED&W costs. Among users of the same methods on the pooled sample, it is observed that EA users exhibit complete harmony in fully expensing these costs, but among the SE and AOI users, the level of harmony is high (not complete) which still indicate some low level of diversity within the methods. On the contrary, the level of diversity is comparatively greater among FC users who exhibit moderate level of harmony on each of the markets.

Overall, the highest level of harmony in accounting treatment for ED&W costs is observed among EA users who uniformly write off these costs when incurred. The second highest level of harmony is observed among SE, and this is followed closely by AOI, and the lowest level of harmony is observed among FC users.

The results suggest that there is diversity in accounting treatment for ED&W costs among extractive companies listed on the LSE both among those adopting same method and different methods. The results also suggest that FC users exhibit the greatest diversity in treatment among sampled companies and for that matter, consistent with the recommendation of Constantatos *et al.* (2021), it is suggested that any attempt to harmony accounting practices in EI should aim at eventually eliminating the FC. But since past attempts to eliminate FC have proved futile (see Van Riper, 1994; Cortese, Irvine and Kaidonis, 2009), there is the need for the change to be gradual and fully backed by all powerful stakeholders such as investors, professional bodies, auditing firms and also there should be the attempt to get bigger companies within the industry to accept the proposed treatment or method so that once they practice, new entrants into the EI (smaller and new companies) may end up "copying" from them. DiMaggio and Powell (1983) argue that one way to achieve change is through mimetic isomorphism, where newer and younger companies in an industry or sector characterised by high uncertainty and risk tend to imitate already existing or established companies within the sector in order to appear legitimate. By this, as well-established extractive companies are made to accept the proposed changes and to practice them, there may be spill over on new entrants who may end up imitating these proposed changes from these big companies in a manner consistent with mimetic pressure as described by DiMaggio and Powell (1991).

Table 9.2B Harmony Indices for Exploratory Drilling and Well Costs

Panel A: Oil and Gas Sector									
Accounting method	Main Market			AIM			Combined Market		
	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)
SE	1.00	1.00	0%	0.96	0.92	2%	0.98	0.95	1%
FC	0.68	0.60	0%	0.65	0.63	0%	0.66	0.64	0%
AOI	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.79	0.79	0%	0.65	0.62	1%	0.69	0.68	1%
Panel B: Mining Sector									
SE	0.86	0.85	0%	1.00	1.00	0%	0.96	0.96	0%
FC	1.00	1.00	0%	0.43	0.36	0%	0.49	0.44	0%
AOI	0.90	0.89	0%	0.89	0.89	0%	0.89	0.89	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.57	0.56	0%	0.65	0.65	0%	0.63	0.62	0%
Panel C: Pooled Sample									
SE	0.96	0.96	0%	0.98	0.95	1%	0.97	0.96	1%
FC	0.76	0.71	0%	0.56	0.55	0%	0.60	0.58	0%
AOI	0.90	0.89	0%	0.92	0.91	0%	0.91	0.91	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.67	0.67	0%	0.64	0.63	1%	0.65	0.64	0.4%

Source: Author's estimates from research data, 2018 *ADM DA-Archer, Delvaille & McLeay (1995) -disclosure adjusted C-index*

Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

9.3.2 Intra-Method and Inter-Method Comparability for Exploratory Drilling and Well Costs

9.3.2.1 Oil & Gas Sector

Panel A of Table 9.2C shows the intra and inter-method comparability index values for the accounting treatment for ED&W costs among oil & gas companies. Consistent with earlier discussion on level of harmony index values, the comparability index values indicate that there is a high level of intra-method comparability among oil and gas companies in the accounting treatments for ED&W costs as shown by WM C- index values of 0.99 on main market, 0.92 on AIM and 0.95 on the combined market. The 0.99 WM C- index for the main market can be interpreted as the probability of randomly

selecting two oil and gas companies (without replacement) that adopt the same accounting method and treat ED&W costs the same way. Though the intra-method comparability seems high, one would have expected that there should rather be complete comparability among users of the same method, but this is clearly not the case, suggesting that there are some intra-method diversities which are worth attention and hence the need for regulating the practice. Comparably, the intra-method comparability accounting for ED&W costs is observed to be higher on the main market than AIM suggesting greater within method diversity among AIM-listed oil & gas companies than their main market counterparts.

Notwithstanding the high intra-method comparability in accounting treatment of ED&W costs, it is observed that the inter-method comparability as shown by BM C-index values is woefully very low or completely not comparable among the different pairs of accounting method (SE & FC; SE & EA; FC & AOI; FC & EA; AOI & EA) with the exception of the high or complete inter-method comparability between SE and AOI users, which is not surprising because the AOI has often been argued to be variant of SE (Gerhardy, 1999). Similarly, the inter-method comparability across the four accounting methods is observed to be low when measured by BMC C-index but completely not comparable when measured by the VDT and A& M I^{59} indices.

These results show that the comparability in the way oil & gas companies adopting the same accounting method treat ED&W costs is not complete though that would have been the expectation for companies operating in the same sector and adopting the same method but that is not the case here as evidence by this research. Secondly, among those adopting different accounting methods the comparability in the treatment of ED&W

[59] Refer to footnote 22

costs are very low which means investor comparing results of these companies may be misled. These findings further confirm the need for regulation to promote comparability of accounts of oil & gas companies through harmonising the different methods and treatments both within methods and across methods.

9.3.2.2 Mining Sector

Among mining companies, it is evident that intra-method comparability as shown by the WM C-index values is high on each of the markets as well as the combined market with WM C-index values of 0.89, 0.94 and 0.92 respectively as shown on Panel B of Table 12C. This also buttresses the observation among the oil & gas companies that there is high comparability among mining companies using the same method, but not complete comparability as may be expected for companies in the sector, adopting the same method. This, as earlier alluded to show some diversity within same method users in the way for exploratory drilling and well costs are treated. The intra-method comparability is higher among AIM listed mining companies than their main market counterparts which suggests that AIM-listed mining companies that adopt same accounting method tend to treat these costs in a more comparable manner than their main market counterparts indicating greater harmony within method in treatment for ED&W costs among main market listed companies.

In terms of inter-method comparability among mining companies, apart from high comparability between SE and AOI companies, there is evidence of low, very low or no comparability among users of the pairs of accounting method with BM C-index values less than 0.50. Across the four methods, there is low inter-method comparability among mining companies on the main (BM C-index value =0.40) and combined (BM C-index value =0.48) market, moderate comparability among those on the AIM (BM

C-index value =0.51). The inter-method comparability as suggested by VDT, and A&M *I* index values are completely not comparable.

9.3.2.3 Pooled Sample

Consistent with the findings on both sectors, it is evident from Panel C of Table 9.2C that the intra-method comparability of the accounting treatment for ED&W costs is high on each of the markets on the pooled sample, but no complete intra-method comparability is observed which suggests some harmony within-method diversities in treatment among users of the same methods. In terms of inter-method comparability, apart from the high comparability observed between SE and AOI users, there is rather either low, very low or no comparability among the users of the pairs of method (SE & FC; SE & EA; FC & AOI; FC & EA; AOI & EA). Similarly, the inter-method comparability across the four methods (SE & FC & AOI & EA) are observed to be low when measured with BM C-index but completely not comparable when estimated with VDT and A& M *I* indices.

These results show that though the intra-method comparability in the accounting treatment for ED&W costs among extractive companies seem high, there is evidence of within method diversities which deserves attention in addressing to ensure users of the same method treat same cost component in the same way and eliminate all variations within methods thereby emphasising the need for regulation of the EI. Furthermore, the low inter-method comparability is even much worrying since across users of different methods the comparability of the accounting treatment for exploratory drilling and well costs is either low, very low or completely not comparable.

These indicate the urgent need for an accounting standard to harmonise the diversity that exist in the EI through regulation. And as noted earlier the most possible treatment

to achieve such harmony and improve comparability is by requiring all extractive companies to initially capitalise ED&W costs. This is because this is the most popular treatment and also allow companies the chance to defer these costs up to the point when the technical feasibility and commercial viability of an area can be informed before finally decision as to either fully capitalise or expense can be made. As discussed earlier, this treatment is likely to receive little or no opposition as it is the treatment adopted by majority of companies, not only SE and AOI users but a number of FC users as well. And for EA users this treatment is not a completely at varies with their preferred treatment because initially capitalised costs may end up being written off if commercially viable and technically feasible discoveries are not made. Furthermore, this treatment is also more consistent with general accounting principle and the definition of asset as provided by the 2018 Conceptual Framework for Financial reporting (IASB, 2018, chapter 4).

Table 9.2C Intra and Inter-Method Comparability Indices for Exploratory Drilling and Well Costs

Panel A: Oil and Gas Sector	Main Market			AIM			Combined Market		
	C- index	VDT I–index	A&M I -index	C- index	VDT I -index	A&M I -index	C- index	VDT I -index	A&M I -index
Intra-method comparability (WM C-index)	0.99			0.92			0.95		
Inter-method comparability:									
SE &FC	0.20	0.20	0.20	0.23	0.23	0.23	0.22	0.22	0.22
SE & AOI	1.00	1.00	1.00	0.98	0.98	0.98	0.99	0.99	0.99
SE & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FC & AOI	0.20	0.20	0.20	0.22	0.22	0.22	0.22	0.22	0.22
FC &EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AOI & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SE & FC & AOI & EA	0.28	0.00	0.00	0.44	0.00	0.00	0.42	0.00	0.00
Panel B: Mining Sector									
Intra-method comparability (WM C-index)	0.89			0.94			0.92		
Inter-method comparability:									
SE &FC	0.08	0.08	0.08	0.33	0.33	0.33	0.28	0.28	0.28
SE & AOI	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
SE & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FC & AOI	0.00	0.00	0.00	0.32	0.32	0.32	0.26	0.26	0.26
FC &EA	0.00	0.00	0.00	0.00	0.00	0.11	0.09	0.09	0.09
AOI & EA	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
SE & FC & AOI & EA	0.40	0.00	0.00	0.51	0.00	0.00	0.50	0.00	0.00
Panel C: Pooled Sample									
Intra-method comparability (WM C-index)	0.95			0.93			0.94		
Inter-method comparability:									
SE &FC	0.16	0.16	0.16	0.26	0.26	0.26	0.24	0.24	0.24
SE & AOI	0.93	0.93	0.93	0.95	0.95	0.95	0.94	0.94	0.94
SE & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FC & AOI	0.14	0.14	0.14	0.25	0.25	0.25	0.25	0.23	0.23
FC &EA	0.00	0.00	0.00	0.04	0.04	0.04	0.03	0.003	0.03
AOI & EA	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.05	0.05
SE & FC & AOI & EA	0.47	0.00	0.00	0.48	0.00	0.00	0.48	0.00	0.00

Author's estimates from research data ,2018 *VDT -Van der Tas; A &M - Archer & McLeay*

Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

9.3.4 Concluding Remarks on Accounting for Exploratory Drilling and Well Costs

The previous sections have examined how ED&W costs incurred by extractive companies are accounted for by users of different accounting methods to identify the most common practice (treatment) and assess the level of harmony in accounting treatment as well as intra-method and inter-method comparability in the accounting treatment to determine whether there is the need for standardisation and to suggest pathways for standardisation.

The results show that the most common accounting treatment of ED&W costs is for them to be initially capitalised pending determination. Though, the number of SE and AOI companies in the sample is high, it was noted that other method users also treat these costs this way adding to its popularity. This makes it the most possible option for future standardisation efforts to harmonise the diversity in accounting for exploratory drilling and well costs among companies in the EI.

Again, it was striking to note that, there is greater preference for ED&W costs to be fully capitalised as an alternative treatment among oil & gas companies whilst their mining counterparts prefer to fully expense these costs. Similarly, among the main-market listed companies there is greater preference to fully expense these costs whilst AIM-listed counterpart prefer to fully capitalise these costs as an alternative treatment to initially capitalising them. These, to some extent, reflect the financial capacity of main market listed companies to charge these costs against profit and remain profitable whilst AIM counterparts may not have such capacity as noted by extant literature.

It was also found that most of the companies treated these costs in a manner consistent with the principles of their accounting methods. Notwithstanding this, it was observed that some companies still treated these costs in a manner not consistent with the way

their method counterparts treat them leading to some disharmonies even among users of the same method. For each of the different methods on the pooled sample on the combined market, it was observed that there were some within-method diversities in treatment suggesting there are companies that employ those method but treat these costs component differently from their fellow method users. Overall, FC users exhibited the lowest level of harmony of treatment ED&W costs with the highest level of harmony observed among EA users.

Consistently, it is observed that the level of intra-method comparability of accounting treatment for ED&W costs is high on each of the sectors and markets implying that among companies adopting the same accounting method, they tend to treat these costs in a comparable way, but the level of intra-method comparability was never found to be completely comparable as would have been expected among companies adopting the same accounting method. This indicates intra-method diversities which requires attention to eliminate these diversities and to improve overall comparability among users to complete levels.

In terms of inter-method comparability, this study finds that apart from the high inter-method comparability between SE and AOI users, the inter-method comparability between the other pairs is either low or completely not comparable. Similar low to no comparability is observed across the four different methods which suggests the need for standardisation to harmonise the different methods and treatment within the methods. To achieve the desired harmony and improve comparability both within and across method, there is the need for a new standard for EI and this standard should offer clear guidance on how companies should treat the various pre-development cost components. And for ED&W costs, it is recommended that future standard requires

companies to initially capitalise them pending decision; also to mandate disclosures of how ED&W costs are treated by reporting entities.

9.4 Other Exploratory (OE) Costs

Aside the exploratory drilling and well costs, extractive companies also incur other costs during the exploratory phase of their activities and these other costs are put together and called other exploratory Costs (OE costs here forth). These costs include costs of shooting rights, trenching, and sampling and the likes. These costs also form a significant proportion of pre-development costs for extractive companies (Sigam and Garcia, 2012; Constantatos *et al.,* 2021).

According to Jennings, Feiten and Brock (2000), under Reg. S-X Rule 4-10, "all exploratory costs were expensed when incurred, except those costs applicable to exploratory wells" under the SE whilst "all exploratory costs are capitalised" by FC users (p. 109). Conversely, SORP recommended that FC users fully capitalise other exploratory costs whilst SE initially capitalise them (OIAC, 2001: para 41 and 50). Under Australian regulation both pre-IFRS and post IFRS, other exploratory costs can either be carried forward or expensed. Again, IFRS 6 also allows the chance to choose their own accounting policy which implies companies can decide whether to fully capitalise, initially capitalise or fully expense other exploratory costs which is likely to lead to diversity in treatment of the same cost by even seemingly similar companies.

This following section presents the accounting treatment for OE costs among extractive companies to identify the current practice and the extent of diversities in treatment among users of the same and different accounting methods. It further discusses the level of harmony in accounting treatment as well as the extent of intra-method and inter-method comparability in the treatment to determine if there is the need for standardisation and the pathways for so doing.

9.4.1 Accounting Treatment for Other Exploratory Costs

9.4.1.1 Oil and Gas Sector

Panel A of Table 9.3A presents the accounting treatments for OE costs among oil and gas companies. As evident from the table, among SE oil & gas companies listed on the main market, there seems to be a split between initially capitalising (20, 56%) OE costs or fully expensing (13, 36%) them with the majority initially capitalising. The remaining 8% did not disclose how they treat these costs. Among FC users, the most common treatment is for these costs to be fully capitalised (4, 80%) in line with the principle of their accounting method with just 20% (1[60]) initially capitalise instead. The only AOI oil & gas company listed on the main market initially capitalised whilst the EA company fully expensed them. Overall, among oil & gas listed on the main market, it is common for OE costs to be either initially capitalised (22, 51%) or fully expensed (14, 33%) with majority preferring to initially capitalise pending determination.

Similar diversity in treatment is observed among the AIM-listed oil & gas companies. Though majority (44, 94%) of SE users initially capitalise OE costs, there is one SE company that fully capitalises[61] and another that fully expenses[62] instead. Likewise, among the FC users, though majority (14, 78%) fully capitalise, there are two[63] method users that initially capitalise instead. However, among AOI and EA users, there is complete harmony with members treating these costs in a manner consistent with the principles of their accounting method.

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[60] Cadogan Petroleum Plc is a UK-based oil & gas company with MarketCap (size) of £7.03m and was 16 years as 2020. The mean MarketCap and age of main market-listed FC oil & gas companies is £188m and 19 years respectively

[61] Wentworth Resources Plc is 19 years and MarketCap of £ 6.81m.

[62] Baron Oil Plc is 16 years and MarketCap of £5.85m. The average age and MarketCap for AIM-listed SE oil & gas companies is 20 years and £93m.

[63] Falcon Oil & Gas Ltd Plc (MarketCap: £125.73m, age: 40 years) and United Oil & Gas Plc (MarketCap: £15.38m, age: 5 years). The mean MarketCap and age for AIM-listed FC oil & gas companies is £57m and 20 years.

On the combined market, the diversity observed on each of the markets is again evident with SE and FC users exhibiting the highest level of diversity in treatment but AOI and EA users unanimously treating OE costs in line with the principles of their accounting methods. Overall, the most common practice among sampled oil & gas companies is for OE costs to be initially capitalised pending determination. The second most common treatment is for them to be fully capitalised with fully expensing being the least preferred treatment. The results could be biased by the dominance of SE and AOI users in the sample, but it is evident that even some FC users initially capitalise OE costs adding to its popularity. Additionally, there is evidence to support the fact that some users of same method do not always treat OE in the same way as their fellow method users and this underscores the need for standardisation for the industry if accounts companies will be relevant for decision making.

9.4.1.2 Mining Sector

Among mining companies on the main market as shown on Panel B of Table 9.3A, whilst all EA and FC companies treat OE costs in a manner consistent with the principles of their accounting methods, the other method users exhibit diversity in treatment. For instance, all SE users initially capitalise OE costs except one[64] that fully capitalises them. Similarly, whilst all AOI initially capitalise OE costs, there is one company[65], Prairie Mining Limited, that fully expenses in variance. It is evident that among mining companies listed on the main market, initially capitalising OE costs is

[64] Public Joint Stock Company (PJSC) Polyus - is the largest gold producer in Russia and the fourth largest gold producer globally with MarketCap of £17.10bn (as at 21st September 2021) and 99 years of age

[65] Prairie Mining Limited is an Australian company with MarketCap of £49.88m and 63 years. It is smaller but older than its method counterparts (mean MarketCap of £5,760m; mean age: 44 years).

the most common accounting treatment which is followed by fully expensing them with fully capitalising other exploratory costs being the least common.

The situation is no different among AIM-listed mining companies. Even though all SE and EA users harmoniously treated OE costs in line with the principle of their accounting methods, there are diversities in the way FC and AOI users treat these costs. However, there are diversity in treatment among users of FC and AOI with few of the members treating these costs differently. Among the FC users apart from the majority (5, 56%) that fully capitalise these costs, there are 3 (33%) companies that initially capitalise and 1 (11%) that fully expenses. In similar fashion, there are 2 AOI users that fully expense instead of initially capitalising like their method users. Overall, among mining companies on the AIM, initially capitalising is the most common accounting treatment for other exploratory costs as this followed by fully expensing with fully capitalising being the least common treatment.

On the combined market, apart from EA users that uniformly expense OE costs when incurred for the other methods, the study finds some diversity in treatments. With such wide diversity in treatment of the same costs, it will make comparability of their accounts difficult for investors and possibly mislead them in their decision making. Hence, this accentuates the need for efforts to harmonise practices to ensure comparability of accounts.

Overall, among the mining companies the most common accounting treatment for OE costs is for them to initially be capitalised (104, 77%) and the least common treatment is for them to be fully capitalised (8, 6%). Given that initially capitalising is the most common treatment, and it is not only used by AOI and SE companies but also some FC users, it may be the most suitable treatment to adopt to harmony the diversity in

accounting for OE costs because with that if even there will be opposition it will come from a smaller number of companies and with the right coercive, normative and mimetic pressures from stakeholders the opposition can be circumvented. It is also evident that apart from initially capitalising these costs, mining companies prefer to fully expense these costs as an alternative treatment unlike their oil & gas companies who prefer to fully capitalise[66]. This finding is in line with the findings of IASB (2020) that mining companies prefer more conservative method/treatment to aggressive ones.

9.4.1.3 Pooled Sample

Consistent with the findings on both oil & gas and mining sectors, on the pooled sample similar diversities in treatment are observed on both main, alternative, and combined markets among users of all the methods except for EA users that maintain complete harmony in fully expensing OE costs. Overall, initially capitalising (183, 71%) other exploratory costs is the most common accounting treatment among the 256 extractive companies with fully expensing (40, 22%) them being the second most common and fully capitalising (27, 15%) them being the least common method. 6 companies in the sample representing 2% did not disclose how they treat these costs out of which 4 are SE and 2 use FC.

Age and size analysis of the 2 SE companies[67] that fully capitalise OE costs instead of initially capitalising them revealed that though Wentworth Resources Plc is smaller and younger than their average method user, PJSC Polyus is observed to be comparatively bigger and older. For Wentworth, their selection of SE as an accounting method could be attributed to an attempt to imitate accounting method used by bigger companies in

[66] Refer to the distribution of treatment on combined markets shown on Table 9.3A Panels A and B

[67] Wentworth Resources Plc is 19 years and MarketCap of £6.81m and PJSC Polyus- is the largest gold producer in Russia and the fourth largest gold producer globally with MarketCap of £17.10bn (as at 21st September 2021) and 99 years of age.

the industry in order to appear legitimate (Meyer and Rowan, 1977) without necessarily having the financial capacity with the treatment required within the method since SE is mostly used by bigger and well-established companies (Myers 1974; Bryant, 2003; Misund, 2017). For such smaller and newer companies, their motive for fully capitalising OE costs may be to help them build their balance sheet and report good earnings to comply with restrictive covenants and attract the needed capital from investors. On the contrary, for PJSC Polyus, a big and well -established companies and described as one of the largest gold producers in Russia and a top 5 gold producer globally (Polyus, 2021) its decision to fully capitalise instead of initially capitalising just like their method counterparts quite alarming. It could be a strategy to improve reported earnings to the benefit of management if their bonuses are dependent on them as described by the bonus plan hypothesis - management may prefer aggressive treatment (fully capitalisation) which improves earnings figure where their bonus are based on these earnings (see Watts and Zimmerman, 1978, 1990; Irvine, 2008). But this again highlights how random the treatments within methods are. It may be reasonable to conclude that the lack of adequate regulation in the EI allows company to treat costs anyhow regardless of their chosen accounting method, which is largely to the many investors and other users of these companies' annual reports. This will result in building its assets base and possible accumulating a lot of non-performing assets on its balance sheet.

Among the FC users that initially capitalise OE costs are Cadogan Petroleum Plc and Falcon oil & gas ltd Plc. Whilst Cadogan described its method as "modified full cost method" and chooses to treat OE costs differently from its method counterparts, Falcon, switched its accounting method from SE to FC still initially capitalises these costs. Contrary to the disclosure requirement for voluntary change of accounting policy under

IAS 8.29[68], Falcon does not offer adequate explanation on why it changes its policy and the implications of this change on reported figures as EPS. What is even more worrying is the fact that though they changed their accounting method the actual treatment of cost components was not changed appropriately. As a bigger and older company compared to its method users, Falcon's decision to initially capitalise OE costs may be driven by management desire to defer the impact of costs on current reported figures to achieve a desired objective which might be self-motivated by management.

In similar fashion, Prairie Mining Limited an AOI company chooses to fully expenses in variance instead of initially capitalising them. Prairie is older than its average method users but smaller in size than the average method users. Being an old Australian company, its decision to fully expense under AOI may not be as surprising because it may be still using expense and reinstate method which was once allowed under the Australian accounting regulation. It could also be that the company fully expenses these costs to reduce reported earnings to minimise tax obligations or also to avoid political pressure as stipulated by political cost hypothesis (Zimmerman, 1983; Milne, 2002). Whatever the justification for this treatment is, it leads to diversity within method and impedes complete comparability of accounts.

These findings suggest that initially capitalising is the most common treatment among extractive companies in the sample, but this can be partly attributed to the large number of SE and AOI companies in the sample. That notwithstanding, it is notable that some

[68] Disclosure requirement relating to voluntary changes in accounting policy include: [IAS 8.29]

- The nature of the change in accounting policy the reasons why applying the new accounting policy provides reliable and more relevant information for the current period and each prior period presented, to the extent practicable, the amount of the adjustment:
- For each financial statement line item affected, and for basic and diluted earnings per share (only if the entity is applying IAS 33)
- the amount of the adjustment relating to periods before those presented, to the extent practicable if retrospective application is impracticable, an explanation and description of how the change in accounting policy was applied.

FC users also initially capitalising these costs. One other notable observation from Panel C of Table 9.3A on the combined market is the fact that, there is one company from each of the different methods that fully expenses OE costs. This shows the popularity of this treatment across users of the different methods. In agreement with Field (1969)'s argument for conservatism, one may be tempted to conclude that fully expensing OE costs is reasonable. But given that at the time of incurring these costs, the outcome of exploratory activities may not be known with certainty, deferring these costs to a point when outcome can be ascertained before deciding on the final treatment may allow companies to treat these costs in a manner which will reflect economic substance of transaction better. Based on this argument and the popularity of initially capitalising among extractive companies, it is recommended that future attempts to harmonise the diversity in treatment for OE costs should require companies to initially capitalise them pending determination. However, OE costs can be expensed as incurred if these costs are rather general and cannot be linked directly to a successful discovery. Though, it is almost certain that some companies will oppose any new regulation that seeks to standardise accounting practices which significantly change their policy, it is necessary that the IASB learn from the experience of Australian Accounting Standard Board who ensures that standard are given precise and detailed guidance and are also backed by the necessary powers through stock market regulations, national legislation etc (Zhou, Birth and Rankin, 2015). It is understandable that IFRS are principle-based and not rule-based but offering clear guidance with detailed explanations can help reduce the exercise discretion by management which creates diversities.

Table 9.3A: Other Exploratory Costs Cross-Classifications

Panel A: Oil and Gas sector															
Accounting method	Main Market					AIM					Combined Market				
	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D	Total
SE	0	13	20	3	36	1	1	44	1	47	1	14	64	4	83
FC	4	0	1	0	5	14	0	2	2	18	18	0	3	2	23
AOI	0	0	1	0	1	0	0	11	0	11	0	0	12	0	12
EA	0	1	0	0	1	0	2	0	0	2	0	3	0	0	3
Total	4	14	22	3	43	15	3	57	3	78	19	17	79	6	121
Panel B: Mining sector															
SE	1	0	12	0	13	0	0	39	0	39	1	0	51	0	52
FC	2	0	0	0	2	5	1	3	0	9	7	1	3	0	11
AOI	0	1	17	0	18	0	2	33	0	35	0	3	50	0	53
EA	0	7	0	0	7	0	12	0	0	12	0	19	0	0	19
Total	3	8	29	0	40	5	15	75	0	95	8	23	104	0	135
Panel C: Pooled Sample															
SE	1	13	32	3	49	1	1	83	1	86	2	14	115	4	135
FC	6	0	1	0	7	19	1	5	2	27	25	1	6	2	34
AOI	0	1	18	0	19	0	2	44	0	46	0	3	62	0	65
EA	0	8	0	0	8	0	14	0	0	14	0	22	0	0	22
Total	7	22	51	3	83	20	18	132	3	173	27	40	183	6	256

Source: Author's estimates from research data, 2018 **A** *- fully capitalised;* **B** *– fully expensed;* **C** *– initially capitalised;* **D** *– not disclosed*

9.4.2 Level of Harmony in Accounting Treatment for Other Exploratory Costs

9.4.2.1 Oil & Gas Sector

Table 9.3B (Panel A) presents the level of harmony index values for the accounting treatments for OE costs among oil and gas companies. Among AOI and EA users on the main market, there is a complete harmony in the accounting treatment for OE costs with H-index values of 1. This is because among the sampled oil & gas companies listed on the main market, only one company each use these methods. Among SE and FC oil and gas companies listed on the main market, the level of harmony in accounting treatment for OE costs is moderate with H-index value of 0.52 and 0.68 respectively. This is because of the 36% of the SE users fully expensed these costs instead of initially

capitalising like their counterparts and 20% of FC users initially capitalised instead. As a result of 8% of SE companies not disclosing, the level of harmony as indicated by the ADM C-index value of 0.43 is low. Aside that the ADM C-index values for the other methods indicate the same level of harmony as the H-index. Across all the methods, the level of harmony is observed to be low with H and ADM C-index values of 0.44 and 0.36 respectively indicating significant diversity in treatment among companies operating in the same sector and listed on the same market.

Similarly, among AIM-listed companies, there is complete harmony among users of AOI and EA, but level of harmony is high among users of SE and FC. Across the methods, the level of harmony in treatment of OE costs is observed to be moderate with H and ADM C-index values of 0.62 and 0.57 respectively. On the combined market, the highest level of harmony in accounting treatment for OE costs is observed among AOI and EA users with index values of 1. The second highest level of harmony is observed among FC users with H-index value of 0.76 and the lowest of harmony is seen among SE because treatment is spread across initially capitalising, fully expensing and fully capitalising these costs. When measured with ADM C-index, the level of harmony remains the same as indicated by H-index for AOI and EA but for SE and FC the C-index values falls and leaves the harmony level at moderate for both which means there is a fall in level of harmony among FC users because of the 9% non-disclosure rate. Across all the methods, the level of harmony is observed to be moderate as measured by the H-index value (0.52) but rather low in the face of 5% non-disclosure resulting in ADM C-index value of 0.47.

The results indicate that the accounting treatment for OE costs is subject to diversity of treatment and even among users of the same methods, there are some disparities in

treatment which can potentially impede comparability both within and across methods. This underscores the need for efforts to harmonise accounting practices both within and across methods to ensure comparability of accounts. As indicated earlier, since the most predominate treatment for OE costs is for them to be initially capitalised and this treatment is used by other methods users (apart from SE and AOI who are noted for this), it is recommended that future efforts to unify the accounting treatments require companies to initially capitalise these costs pending decision since the other treatment options are used by just a few companies, therefore lobbying would not be expected to be as severe. And as prescribed by DiMaggio and Powell (1983) such a change can be achieved through collaboration from all stakeholders such as standard setting and professional bodies, auditing firms, investors and other financiers to get the other companies to adopt this treatment to foster harmony and promote comparability.

9.4.2.2 Mining Sector

Panel B of Table 9.3B displays the harmony index values of mining companies. Among those listed on the main market, there is complete level of harmony in accounting treatment for OE costs among FC and EA users with index values of 1. But the level of harmony is high among AOI and SE users signifying some level of disharmony as shown by 6% of AOI users fully expensing and 8% of SE users fully capitalising instead of initially capitalising these costs like their method counterparts. Across all the method users on the main market, the level of harmony is observed to be moderate as shown by the index values (H-index = 0.57 and ADM C-index = 0.56) indicating that level of disharmony that exists in treatment of OE costs.

Among those listed on the AIM, complete harmony in treatment is observed among SE and EA users with each of these users treating OE costs in a manner consistent with

principles of their accounting method. However, the level of harmony among AOI mining companies is high but low among FC users. The low harmony level among FC users is because of the spread of accounting treatments between the three alternatives of fully capitalising, fully expensing and initially capitalising. The ADM C-index values indicate the same level of harmony like the H-index values. Similarly, across all the methods, the level of harmony for accounting treatment for OE costs is observed to be moderate and this suggests diversity in treatment among mining companies listed on the AIM and this can potentially impede comparability of their accounts.

On the combined markets, similar diversity is suggested by the index values except for EA users who exhibit complete harmony in fully expensing OE costs with resulting H and ADM C-index values of 1. The greatest diversity is observed among FC with H and ADM C-index values which confirms the assertion of Baker (1976) that there are a lot of defects and inconsistency among FC users. Across all the methods the level of harmony among mining companies on the combined market is observed to be moderate as suggested by index values. The lack of complete harmony among users of most of the methods and across all the methods suggests diversities in accounting treatment for OE costs among mining companies within and across methods and this further highlights the need for efforts to unify these diversities and promote comparability of accounts. As discussed earlier, the closest possible treatment for OE costs is for them to be initially capitalised pending decisions.

9.4.2.3 Pooled Sample

On the pooled sample, it is evident that apart from EA users who exhibit complete harmony in fully expensing OE costs, among all the other method users there are some diversities in treatment with resulting index values of less than 1. It is also evident that

across all the methods, the level of harmony is low on the main market and moderate on both the AIM and combined market further underscoring diversity among extractive companies in the sample. What is quite notable on the combined market is that FC users exhibit the lowest level of harmony in treatment for other exploratory costs with EA users topping the list with complete harmony among its users. As evident on Panel C of Table 7.3, FC users are observed to be smaller and younger compared to other method users and this is noted in the extant literature as well (See Myers, 1974; Bryant, 2003; Misund, 2017). These new and smaller companies may have several motives for adopting different treatments, one of such reasons may be to appear legitimate. To gain acceptance, these companies may imitate what is being done by bigger and well-established companies within the EI which may lead to them treating costs in a manner inconsistent with their method users. Secondly, as new and smaller companies their reliance on debt financing are relatively high (Deakin, 1979) and for that matter may need to maintain good balance sheets to attract more external funding especially from banks and to also avoid breaking debt covenant they may have with their bankers (Watts and Zimmerman, 1986; 1990). These pressures may also push them to adopt some treatments which may be inconsistent with what they must do leading to low level of harmony.

The extent of diversity is not surprising given the widespread absence of accounting regulation for the EI and even the only standard (IFRS 6) issued by IASB to temporarily cater for the EI has merely "codified the existing industry practice" (Cortese, Irvine and Kaidonis, 2007, p. 3) rather than bringing harmony in treatments. With IFRS 6, companies are allowed to continue with their accounting policy before the standard was issued so it is not surprising that diversity persists up to date in the EI. This stresses on the need for standardisation in the industry to foster comparability of accounts. The

importance of comparability of accounts cannot be overemphasized. Apart from it being a key qualitative feature required by the Conceptual Framework, it is extremely important now that the world has become globalised with high cross-border investments (Doidge, Karolyi and Stulz, 2008; Stulz, 2009). As investors' prospect for companies to invest in across borders, annual reports still remain an important source of information to aid them in their investment decision making (Gniewosz, 1990) and if they cannot rely on these reports to compare investment opportunities because of diversity of accounting methods and treatments then it should be an issue of concern to everyone, most especially accounting standard setting boards, no wonder, the issue has resurfaced on the agenda of IASB recently.

Table 9.3B Harmony Indices for Other Exploratory Costs

Panel A: Oil and Gas Sector									
Accounting method	Main Market			AIM			Combined Market		
	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)
SE	0.52	0.43	8%	0.92	0.88	2%	0.69	0.62	5%
FC	0.68	0.60	0%	0.78	0.60	11%	0.76	0.62	9%
AOI	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.44	0.36	7%	0.62	0.57	4%	0.52	0.47	5%
Panel B: Mining Sector									
SE	0.86	0.85	0%	1.00	1.00	0%	0.96	0.96	0%
FC	1.00	1.00	0%	0.43	0.36	0%	0.49	0.44	0%
AOI	0.90	0.89	0%	0.89	0.89	0%	0.89	0.89	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.57	0.56	0%	0.65	0.65	0%	0.63	0.62	0%
Panel C: Pooled Sample									
SE	0.56	0.49	6%	0.95	0.93	1%	0.78	0.73	3%
FC	0.76	0.71	0%	0.62	0.52	7%	0.65	0.56	6%
AOI	0.90	0.89	0%	0.92	0.91	0%	0.91	0.91	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.49	0.45	4%	0.63	0.60	2%	0.57	0.54	2%

Source: Author's estimates from research data, 2018 *ADM DA-Archer, Delvaille & McLeay (1995) disclosure adjusted C-index*
Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

9.4.3 Intra-Method and Inter-Method Comparability for Other Exploratory Costs

9.4.3.1 Oil & Gas Sector

The WM C-index values shown on Panel A of Table 9.3C suggest that the intra-method comparability for the accounting treatment for OE costs is moderate among oil and gas companies listed on the main and combined markets with of 0.51 and 0.69 respectively, but high (WM C-index = 0.90) among their AIM counterparts. The lack of complete intra-method comparability as may be expected of companies listed on the same market who adopt the same accounting methods in treating the same cost component highlights the impact of diversities on comparability even among users of the same method. This indicates that, at present, the treatment of OE costs among users of the same method are not completely comparable and this requires urgent attention from accounting standard setters.

The situation is more worrying with comparability between methods. The inter-method comparability is found to be either low, very low or completely not comparable among users of the pairs of method (SE & FC, SE& EA, FC & AOI, FC & EA and AOI & EA) except for comparability between SE and AOI users which is moderate on the main market but high on both alternative and combined markets which is quite unsurprising. Similarly, the inter-method comparability across the four accounting methods is observed to be very low on the main market, low on both AIM and the combined market as indicated by BM C-index of 0.22, 0.39 and 0.33 respectively. When measured by the VDT *I* index, and A&M *I* index[69], the index values of 0 indicates the accounting

[69] Refer to foot note 40.

treatment between the four methods being completely not comparable among oil & gas companies.

The findings from this study allows the researcher to conclude that accounting treatment for other exploratory costs is subjected to different treatment among oil & gas companies even among those adopting same accounting method. This adversely impacts comparability within methods. What is extremely worrying is the low and no comparability between users of the different methods. This means investors that depend solely on financial reports to make investment decision can potentially be misled since the differences you may observed may be coming from choice of accounting method and treatment and not reflecting the actual economic performance of these companies. Given the high reliance on annual reports as one of the key sources of information for investors, there is the urgent need for standardisation effort to harmonise the diversities that exist both within and across the different across methods to promote comparability of accounts.

9.4.3.2 Mining Sector

The WM C-index values displayed on Panel B of Table 9.3C suggest that comparability in accounting treatment for OE costs among mining companies adopting the same accounting method listed on the main, alternative investment and combined markets is high, though not complete, with index values of 0.89, 0.94 and 0.92 respectively. This indicates higher intra-method comparability among AIM listed mining companies than their main market counterparts.

In terms of inter-method comparability, expectedly, high level of comparability is observed in accounting treatment between SE and AOI users with BM C-index values of 0.87 among those listed in the main market, 0.94 on the AIM and 0.93 on the

combined market. Aside this, the inter-method comparability between the other pairs of method on each of the markets is either low, very low or completely not comparable with values ranging between 0 and 0.33. Similarly, it can be observed that the inter-method comparability between users of the four methods is low among those on the main market, moderate among those on the AIM and low on the combined market as indicated by the BM C-index values of 0.40, 0.51 and 0.48 respectively. However, VDT *I* index, and A&M *I* index values of 0 indicated the inter-method comparability is completely not comparable.

Like findings in the oil & gas sector, it is evident that in the mining sector, there are intra-method diversities suggesting that the accounting treatment for other exploratory costs among mining companies adopting the same method is not completely comparable as may be expected. The situation is worse when accounting treatment among users of different methods are compared which underscores the need for standardisation to harmonise the diversities that exists both within and across methods to enhance comparability of accounts of mining companies.

9.4.3.3 Pooled Sample

Consistent with the findings on both oil & gas and mining sectors, evidence on the pooled sample (Panel C of Table 9.3C) suggests that there is moderate intra-method comparability on the main market but high intra-method comparability on both alternative and combined markets as shown by WM C-index values of 0.61, 0.93 and 0.80 respectively. The lack of complete comparability within method indicates intra-method diversities that need to be eliminated. This provides support for the assertion of Lilien and Pastena (1981) that "… noncomparability can arise from alternative treatments of accounting data even when the same accounting method is applied" (p.

690). The intra-method comparability among AIM listed extractive companies is higher than among main market counterpart suggesting that regarding OE costs, AIM-listed companies treated them in a similar way than those on the main market.

Generally, the inter-method comparability is either low or very low between pairs of method or across all the methods except for between AOI and SE which is moderate on the main market but high on the AIM and combined market. There is no inter-method comparability between the way FC and EA companies listed on main market treat OE costs with resulting BM C-index of 0. Across the different methods, the inter-method comparability is low as indicated by BM C-index values of 0.40, 0.47 and 0.44 respectively. The VDT *I* index of 0, 0.03 and 0.05 on the main, alternative, and combined markets indicate either no or very low inter-method comparability. A & M *I* index values on the other hand indicate that the accounting treatments for OE costs are not comparable as shown by the index values of 0, 0 and 0.01 respectively.

The findings show that the diversity in accounting treatment for OE costs impacts the comparability both within and across methods and this underscores the need for efforts to eliminate these diversities by regulation of financial reporting by the EI. To achieve that, this study recommends that future standard requires companies to initially capitalise OE costs pending decision and the standard should be backed by adequate power to ensure compliance and these powers can emanate from government and governmental bodies (like tax authorities), stock markets, investors, and key stakeholders. There should also be clear guidance on how standards can be applied and should also come with mandatory disclosure to ensure companies do not conceal information from users of annual reports.

Table 9.3C Intra and Inter-Method Comparability for Other Exploratory Costs

	Main Market			AIM			Combined Market		
	C- index	VDT I–index	A&M I -index	C- index	VDT I -index	A&M I -index	C- index	VDT I -index	A&M I -index
Panel A: Oil and Gas Sector									
Intra-method comparability (WM C-index)	0.51			0.90			0.69		
Inter-method comparability:									
SE &FC	0.12	0.12	0.12	0.14	0.14	0.14	0.13	0.13	0.13
SE & AOI	0.61	0.61	0.61	0.96	0.96	0.96	0.81	0.81	0.81
SE & EA	0.39	0.39	0.39	0.02	0.02	0.02	0.18	0.18	0.18
FC & AOI	0.20	0.20	0.20	0.13	0.13	0.13	0.14	0.14	0.14
FC &EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AOI & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SE & FC & AOI & EA	0.22	0.00	0.00	0.39	0.00	0.00	0.33	0.00	0.00
Panel B: Mining Sector									
Intra-method comparability (WM C-index)	0.89			0.94			0.92		
Inter-method comparability:									
SE &FC	0.08	0.08	0.08	0.33	0.33	0.33	0.28	0.28	0.28
SE & AOI	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
SE & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FC & AOI	0.00	0.00	0.00	0.32	0.32	0.32	0.26	0.26	0.26
FC &EA	0.00	0.00	0.00	0.11	0.11	0.11	0.09	0.09	0.09
AOI & EA	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
SE & FC & AOI & EA	0.40	0.00	0.00	0.51	0.00	0.00	0.48	0.00	0.00
Panel C: Pooled Sample									
Intra-method comparability (WM C-index)	0.61			0.93			0.80		
Inter-method comparability:									
SE &FC	0.12	0.12	0.12	0.20	0.20	0.20	0.18	0.18	0.18
SE & AOI	0.67	0.67	0.67	0.93	0.93	0.93	0.84	0.84	0.84
SE & EA	0.28	0.28	0.28	0.01	0.01	0.01	0.11	0.11	0.11
FC & AOI	0.14	0.14	0.14	0.19	0.19	0.19	0.18	0.18	0.18
FC &EA	0.00	0.00	0.00	0.04	0.04	0.04	0.03	0.03	0.03
AOI & EA	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05
SE & FC & AOI & EA	0.40	0.00	0.00	0.47	0.03	0.00	0.44	0.05	0.01

Source: Author's estimates from research data ,2018 *VDT -Van der Tas; A &M - Archer & McLeay*

Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

9.4.4 Concluding Remarks on Accounting for Other Exploratory Costs

The previous sections have examined the accounting treatment for OE costs incurred by extractive companies listed on the LSE to identify the most common treatment, assess the level of harmony and extent of intra-method and inter-method comparability in accounting treatment and to determine the need and pathways for standardisation.

The findings of this study shows that accounting treatment for OE costs is subjected to variety of treatment by extractive companies both oil & gas and mining companies alike even among those who adopt the same accounting method. The results suggest that the most common accounting treatment for OE costs is for them to be initially capitalised pending determination which could be attributed to the large number of SE and AOI companies in the sample. However, it was observed that other method users such as FC users also treat these costs this way. It was also found that fully expensing OE costs was equally popular with at least one member of each of the different methods treating these costs this way. These findings of diversity in treatment of OE costs are consistent with those reported in prior literature. The presence of diversities in accounting treatment both within and across methods, allows the study to conclude that there is the need to harmonise the different practices to ensure standardisation. Given that most companies initially capitalise OE costs and this treatment is also consistent with general accounting principle, this study recommends it as the nearest treatment to achieve standardisation among extractive companies.

The results of the study also indicate that apart from EA users that exhibited complete harmony in fully expensing OE costs, all the users of other methods exhibit some diversities in treatment though they are mostly clustered around the treatment more consistent with their accounting method. Put differently, majority of FC users fully capitalise, SE and AOI tend to initially capitalise, and EA users tend to fully expense

these costs. That notwithstanding, it is observed that there were still companies that adopt each of these methods but treat these costs in a manner inconsistent with the users of their accounting method as a result, apart from EA with complete level of harmony, for the other methods the index values are less than 1 which suggests some level of disharmony (diversity).

It is observed that there is between moderate to high level of comparability in treatment among users of the same method, but the lack of complete comparability further suggests some intra-method diversities exist that need to be eliminated. Conversely, the inter-method comparability in treatment between pairs of methods and across all the methods were found to be either low, very low or completely not comparable except for comparability between SE and AOI users which is not surprising. The results highlight the need to regulate accounting practices in the EI to enhance comparability of accounts and to achieve that this study recommend OE costs to be initially capitalise.

9.5 Chapter Summary

This chapter has discussed the accounting treatment for three pre-development cost components, namely, G&G, ED&W and OE costs to identify the most common treatment, diversity in treatment, assess the level of harmony in treatment and the intra-method and inter-method comparability in treatment to determine whether there is the need for standardisation and if there is, the pathways for standardisation.

The findings have shown that for each of these costs analysed, there are some diversities in the way they treated among both oil & gas and mining companies alike. It was noted that diversity is severe that even among companies that adopt the same accounting methods, there are some which treat these costs differently from the method counterparts.

The effects of the diversities in treatment are reflected in the level of harmony values reported with most of method showing lack of complete harmony as may be expected of companies adopting the same accounting methods in treating the same cost component. The existence of diversities both within and across methods underscore the need for efforts to standardise accounting practices in the extractive industries to promote comparability of accountings.

Finally, the intra-method and inter-method comparability in accounting treatment for each of the cost components are discussed and the evidence under each cost suggests lack of complete intra-method comparability confirming the diversities that exist among users of the same method and the need for efforts to eliminate them. Much worrying is the low inter-method comparability between pairs of methods and across all the methods which further highlight the urgent need for standardisation to promote comparability of accounts of extractive companies.

CHAPTER TEN
ACCOUNTING FOR
APPRAISAL WELL AND WORK COSTS, OTHER EVALUATION COSTS, AND GENERAL ADMINISTRATIVE AND OVERHEAD COSTS

10.0 Introduction

After exploration phase, extractive companies assess the technical feasibility and commercial viability of mineral deposits that have been found through exploration (IASB, 2010). This phase is called evaluation phase as explained in Chapter Two. This chapter analyses how Appraisal Well and Work (AW&W) costs as well as Other Evaluation (OEV) costs are treated by extractive companies. It is followed by General Administrative and Overhead (GA&O) costs.

10.1 Appraisal Well and Work (AW&W) Costs

At the evaluation phase, extractive companies undertake appraisal to ascertain the quantity of potential mineral or oil and gas deposits at a place before development stage can commence (Jennings, Feiten and Brock, 2000). Companies often drill several appraisal wells to help assess the probability that adequate reserves exist to warrant development and to determine the precise location for constructing permanent platform to be used for drilling development wells and production facilities. To do that, oil and gas companies among other things drill appraisal well whilst mining companies engage in appraisal work (activities) such as drilling, trenching, and sampling to determine the quantity and grade of the deposits (IASB, 2010). The costs incurred on appraisal wells and deposit appraisal works are very significant and form substantial proportion of their entire pre-development costs because these activities determine whether an area to be developed or abandoned, and because of the extent of investment in them some of these appraisal wells are later converted to production platforms (Jennings, Feiten and Brock, 2000). Because of how material they are, their treatmant can have significant influence on the overall financial position and performance of the company.

Just like the other costs, though IFRS 6 is less definitive on how AW&W costs should be treated, past guidance and recommendations under the different regulation have already set the tone for diversity in treatment among extractive companies. Jennings, Feiten and Brock (2000) opine that appraisal well and works are the same as exploratory well and works. If this is true, then it may be reasonable to expect such costs to be treated in a less conservative manner through either initial or full capitalisation.

This section discusses how AW&W costs are accounted for by extractive companies listed on the LSE to identify the most predominant practice (treatment), and also assess the level of harmony in treatment and the extent of intra-method and inter-method comparability in the treatments.

10.1.1 Accounting Treatment for Appraisal Well and Work (AW&W) Costs

10.1.1.1 Oil and Gas Sector

From Panel A of Table 10.1A, it is evident that oil & gas companies listed on both the main market and AIM treat AW&W costs in a manner consistent with their accounting methods with some few exceptions. All SE initially capitalise AW&W costs pending decision except one[70] listed on the AIM that fully capitalises in variance. All AOI users initially capitalise in uniformity whilst all EA companies fully expense them. Among FC users there are three[71] companies that initially capitalise AW&W costs instead of fully capitalising like their method counterparts.

[70] Wentworth Resources Plc is 19 years and MarketCap of £ 6.81m. The average age and MarketCap for AIM-listed SE oil & gas companies is 20 years and £93m.
[71] Cadogan Petroleum Plc is a UK-based oil & gas company with MarketCap (size) of £7.03m and was 16 years as 2020. The mean MarketCap and age of main market-listed FC oil & gas companies is £188m and 19 years respectively.

Overall, the results suggest that there is diversity in the way users of SE and FC treat AW&W costs whilst there is complete harmony among AOI and EA users in treating these costs in a manner consistent with their accounting methods. It is evident that from the results that among oil & gas companies, there is a higher chance that AW&W costs are treated in a less conservative manner, thus favouring some level of capitalisation. As majority (91, 75%) of the oil & gas companies initially capitalised AW&W costs and just a few (3, 2%) fully expensed these costs, all of which are EA users which is not surprising. In all 7% (8) of oil & gas companies did not disclose how they treat these costs, 2 of whom are FC users and 6 are SE users.

The results show that much as there is some harmony in accounting treatment for AW&W costs among oil & gas companies using the same accounting method, there are still some companies that treat these costs differently from their method users counterparts treat them indicating intra-method diversity in treatment. This intra-method diversity can render accounts of companies adopting the same method not comparability not even to talk about those using different methods. Secondly, the diversity in methods with members of each method treating these costs in a manner consistent with their accounting methods, implies that the treatments conflict when compared across methods which is likely to impede comparability of accounts. These emphases the need for regulation to ensure harmony in treatments both within and across methods.

10.1.1.2 Mining Sector

On Panel B of Table 10.1A, it can be noted that among mining companies there is harmony in initially capitalising AW&W costs among SE users except one main market listed company that fully capitalises instead. For FC users whilst those on the main

market exhibit complete harmony in fully capitalising these costs, greater diversity can be observed among those listed on the AIM with 1 company fully expensing AW&W costs whilst 3 of them initially capitalise them. Similarly, there is diversity in treatment among AOI and EA users with the choice of treatment ranging between initially capitalising and fully expensing.

Evidence from the combined market suggests that among mining companies there is lack of complete harmony in the treatment of AW&W costs among users of each of the methods since for each of the methods there is at least one user that treat these costs in manner different from its method counterparts. This highlights the fact that the accounting challenge in the EI goes beyond the diversity of methods because even within methods there are diversity of treatment which further aggravates the already worrying situation

The results suggest that though majority of mining companies initially capitalise AW&W costs, the alternative treatment is for them to be fully expensed unlike among their oil & gas counterparts who preferred to fully capitalise them. The dominance of fully expensing these costs in the mining sector may be influenced by large number of EA users within this sector. But beyond that it is also evident that other method users (9% of FC users and 6% of AOI users) also fully expense AW&W costs. This confirms the findings of recent IASB staff survey that found that mining companies are more likely to adopt a more conservative treatment for EE costs than their oil & gas counterparts (IASB, 2020).

10.1.1.3 Pooled Sample

Consistent with the diversity of accounting treatment observed among oil & gas and mining sectors, it is evident from the pooled sample (shown on Panel C of Table 10.1A)

that there is widespread diversity in the accounting treatment for AW&W costs among extractive companies listed on the LSE. And the diversity is not only between opposing methods but also within methods. It is clear from the results that for each of the different methods, there are couple of companies that treat AW&W costs differently from their method counterparts, Whilst the choice of treatments are most between two alternatives for most of the methods, among FC users the choice ranges across the three alternative treatments suggesting greater diversity. With FC companies being smaller and younger, the diversity in treatment may be their attempt to manage their accounts to report high earnings and build a better balance sheet to avoid breaking debt covenant and attract investors (Hagerman and Zmijewski, 1979; Ullman, 1985; Watts and Zimmerman, 1986; 1990). Based on the high level of diversity with the FC method, consistent with the recommendation of Constantatos *et al.* (2021), this study suggests that future standardisation attempt should seek either to eliminate the FC or harmony treatments within this method.

The diversity in treatments underscores the need to harmonise practices within and across the methods to hence comparability of accounts. Given that the most common practice for treating AW&W costs is for them to be initially capitalised, it seems sound for future attempt to harmonise accounting practice within the EI to require companies to initially capitalise these costs. This suggestion is appropriate because, if even there is opposition, as witnessed in the past, it will come from a smaller group of companies unlike choosing treatment which majority are not in favour off. The opposition from the minority group can be mitigated by employing the right coercive pressure such as ensuring that there is adequate regulation to back the guidance, educating investors to demand compliance from their companies, and stock markets making compliance a requirement for listing. Additionally, as more and more large and well-established

companies use the recommended treatment new entrants will end up imitating them in a manner consistent with mimetic pressure as described by DiMaggio and Powell (1991) in Institutional Theory. Apart from initially capitalising being a way to avoid opposition from larger number of companies, it seems more consistent with the matching and prudence concepts. By initially capitalising instead of fully capitalising, companies avoid early fully capitalisation of expenditure until the potential benefit can be ascertained with a higher degree of certainty. This ensures that assets are not overstated in the face of uncertainty in line with the prudence principle. Similarly, by initially capitalising, these costs are deferred to a future date, and this ensures proper matching of costs against revenues they help the company in generating in line with the matching concept.

One other notable difference in treatment between main and alternative market companies is that whilst initially capitalising is the most common treatment for AW&W costs among companies listed on both markets, it can be observed that the proportion of main market listed companies (10%) that prefer to fully expense these costs is slightly higher than the AIM counterparts (9%). Conversely, the proportion of AIM listed companies (12%) that prefer to fully capitalise is higher than main market counterparts (8%). It can be explained by the fact that since main market companies are bigger and older than AIM counterparts, they have financial capacity to fully expense AW&W costs and remain profitable and hence their preference for fully expensing as an alternative treatment unlike the AIM counterparts who are mostly smaller and younger. This finding is in line with that of Deakin (1979), Misund (2017) and Misund, Osmundsen, and Sikveland (2015).

Table 10.1A Appraisal Well and Work Costs Cross-Classifications

Panel A: Oil and Gas Sector															
Accounting method	Main Market					AIM					Combined Market				
	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D	Total
SE	0	0	31	5	36	1	0	45	1	47	1	0	76	6	83
FC	4	0	1	0	5	14	0	2	2	18	18	0	3	2	23
AOI	0	0	1	0	1	0	0	11	0	11	0	0	12	0	12
EA	0	1	0	0	1	0	2	0	0	2	0	3	0	0	3
Total	4	1	33	5	43	15	2	58	3	78	19	3	91	8	121
Panel B: Mining Sector															
SE	1	0	12	0	13	0	0	39	0	39	1	0	51	0	52
FC	2	0	0	0	2	5	1	3	0	9	7	1	3	0	11
AOI	0	1	17	0	18	0	2	33	0	35	0	3	50	0	53
EA	0	6	1	0	7	0	11	1	0	12	0	17	2	0	19
Total	3	7	30	0	40	5	14	76	0	95	8	21	106	0	135
Panel C: Pooled Sample															
SE	1	0	43	5	49	1	0	84	1	86	2	0	127	6	135
FC	6	0	1	0	7	19	1	5	2	27	25	1	6	2	34
AOI	0	1	18	0	19	0	2	44	0	46	0	3	62	0	65
EA	0	7	1	0	8	0	13	1	0	14	0	20	2	0	22
Total	7	8	63	5	83	20	16	134	3	173	27	24	197	8	256

Source: Author's estimates from research data, 2018 **A** *- fully capitalised;* **B** *– fully expensed;* **C** *– initially capitalised;* **D** *– not disclosed*

10.1.2 Level of Harmony in Accounting Treatment for Appraisal Well and Work Costs

10.1.2.1 Oil & Gas Sector

Panel A of Table 10.2B presents the harmony index values for the accounting treatment for AW&W costs for oil & gas companies. It can be observed that there is a complete harmony in the accounting treatment among SE, AOI and EA users listed on the main market with H-index values of 1. However, given that one FC company initially capitalises instead of fully capitalising the level of harmony is moderate as shown by H-index value of 0.68. The ADM C-index value indicate complete harmony for AOI and EA users but moderate harmony for SE and FC users. This is because 14% of SE

users did not disclose. Across all the accounting methods, the H-index value of 0.77 suggests high level of harmony on the main market but given the 12% non-disclosure rate the ADM C-index (059) shows moderate level of harmony.

Among those on the AIM, there is a complete harmony among EA (1) and AOI (1) users but high harmony level among SE (0.96) and FC (0.78) users as shown by the H-index values. With 11% non-disclosure rate among FC users, the level of harmony falls to moderate level as indicated by ADM C-index value of 0.60. But for SE companies the level of harmony remains high with ADM C-index value of 0.92 and complete for AOI and EA. These results suggest diversity in treatment among users of SE and FC. Across all the methods, the moderate level of harmony in treatment is indicated by the H and ADM C-index values. Similarly, on the AIM, FC users exhibit the greatest diversity in treatment of AW&W costs.

Overall, considering the oil & gas companies as a whole as indicated under the combined market, the level of harmony in accounting treatment for AW&W costs is complete for EA and AOI companies but high for SE and FC users. The level of harmony across all the methods is observed to be moderate as shown by the H -index value of 0.68. The ADM C-index values suggest the same level of harmony for all the other methods except for FC where the 9% non-disclosure rate leaves the harmony level at moderate.

The results suggest that apart from AOI and EA users who exhibit complete harmony in the treatment of AW&W costs, within the other methods, there are some diversities in treatment with the greatest diversity in treatment is exhibited by FC users. These results highlight the need for efforts to harmony treatment within and across the different methods. And as noted earlier, the close treatment to harmonise the different

treatment is to initially capitalise these costs pending decision

10.1.2.2 Mining Sector

Panel B of Table 10.2B reports the harmony index values for mining companies for accounting treatment for costs of AW&W costs. On the main market, there is complete harmony in the treatment among FC users and high level of harmony among the users of the other methods as shown by the H and ADM C-index values. Across all the methods, there is rather a moderate level of harmony which shows greater diversity in treatment across the different methods.

Conversely, on the AIM, whilst SE users exhibit complete harmony, AOI and EA users show high harmony and FC users show low level of harmony as indicated by the H and ADM C-index values. Across the different methods, the level of harmony in treatment of AW&W costs is moderate with H and ADM C-index values of 0.66. On the combined market, none of the methods exhibit complete harmony in treatment of AW&W costs as their index values are less than 1. Across all methods, there is moderate level of harmony in accounting treatment for AW&W costs with index values of 0.64.

10.1.2.3 Pooled Sample

Consistent with the findings on each of the sectors, H-index values for extractive companies listed on the main market as presented in Panel C of Table 10.2B suggest that the level of harmony among users of the methods is high with index of 0.96 for SE users, 0.76 for FC users, 0.90 for AOI users and 0.78 for EA users. The ADM C-index values indicate the same level of harmony except for FC users where the ADM C-index value of 0.71 indicates moderate level of harmony. On the main market, whilst the

highest level of harmony is observed among SE users, the lowest level of harmony is seen among FC users.

On the AIM, the H-index and ADM C-index values indicate high level of harmony among the users of all the methods except FC users who exhibit moderate level of harmony. Overall, on the combined market, none of the users of each of the methods exhibit complete harmony in the way they account for AW&W costs which indicates disharmony in accounting treatment for these costs even among users of the same method. The situation is even worse among FC users where the level of harmony is rather moderate. The level of harmony across the different methods for main, alternative, and combined markets is moderate as shown by the H-index values of 0.67, 0.64 and 0.65 respectively.

Between the two sectors, the H-index indicates higher level of harmony among oil & gas companies than their mining counterparts. Within each of the sectors the lowest level of harmony is observed among FC users. Comparing the level of harmony between the main market and the AIM, the users of all the method exhibit level of harmony on the AIM than on the main market except for FC companies where the level of harmony is higher on the main market than the AIM.

These results reveal that there is diversity of accounting treatment for AW&W costs among extractive companies even among those adopting the same accounting method. These highlight the need to harmonise the different practices through standardisation to promote consistency and comparability of accounts.

Table 10.1B Harmony Indices for Appraisal Well and Work Costs

Panel A: Oil and Gas Sector									
Accounting method	Main Market			AIM			Combined Market		
	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)	H-index	ADM DA C-index	Non-disclosure rate (%)
SE	1.00	0.74	14%	0.96	0.92	2%	0.97	0.84	7%
FC	0.68	0.60	0%	0.78	0.60	11%	0.76	0.62	9%
AOI	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.77	0.59	12%	0.64	0.59	4%	0.68	0.59	7%
Panel B: Mining Sector									
SE	0.86	0.85	0%	1.00	1.00	0%	0.96	0.96	0%
FC	1.00	1.00	0%	0.43	0.36	0%	0.49	0.44	0%
AOI	0.90	0.89	0%	0.89	0.89	0%	0.89	0.89	0%
EA	0.76	0.71	0%	0.85	0.83	0%	0.81	0.80	0%
Across all	0.60	0.59	0%	0.66	0.66	0%	0.64	0.64	0%
Panel C: Pooled Sample									
SE	0.96	0.77	10%	0.98	0.95	1%	0.97	0.88	4%
FC	0.76	0.71	0%	0.62	0.52	7%	0.65	0.56	6%
AOI	0.90	0.89	0%	0.92	0.91	0%	0.91	0.91	0%
EA	0.78	0.75	0%	0.87	0.86	0%	0.83	0.83	0%
Across all	0.67	0.59	6%	0.64	0.62	2%	0.65	0.61	3%

Source: Author's estimates from research data, 2018 ADM DA -Archer, Delvaille & McLeay (1995) disclosure adjusted C-index
Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

10.1.3 Intra-Method and Inter-Method Comparability for Appraisal Well and Work Costs

10.1.3.1 Oil & Gas Sector

The intra-method comparability in accounting treatment for AW&W costs for oil & gas companies as shown by the WM C-index values of 0.99, 0.94 and 0.96 on Panel A of Table 10.2C is high on each of the markets. These suggest that there is a high chance of selecting companies among oil & gas sector that adopt the same accounting method and treat AW&W costs the same way. But the lack of complete intra-method comparability indicates the presence of intra-method diversities that deserve attention

from standard setters. On the contrary, the inter-method comparability between pairs of different methods on each of the markets is either very low or completely not comparable with BM C-index values less than 0.25 except for the comparability between SE and AOI which is either complete or high as expected. Across the four methods, their inter-method comparability is observed to be low on each of the markets as shown by the BM C-index values. The VDT and A&M *I* -index values of zero indicate no inter-method comparability among oil & gas companies adopting the different accounting methods. This should be worrying for users of financial reports of these companies since AW&W costs form significant proportion of pre-development costs (Jennings, Feiten and Brock, 2000) and the way they are treated can affect the overall performance and position of the business. As the diversity of methods and treatments impede comparability as shown here, it will be difficult for users to uncover the true performance of companies and make the best investment decision out of competing alternatives.

10.1.3.2 Mining Sector

Among mining companies, intra-method comparability in accounting treatment for AW&W costs is seen to be high on each of the markets showing high chance of selecting two mining companies on each market that adopts the same accounting method and treat AW&W costs the same way. But as indicated earlier, with companies in the same sector employing the same accounting method, it would have been expected that they will treat a cost item the same way so the lack of complete intra-method comparability in itself indicates some level of diversity within method small as it may be.

Like the findings in the oil & gas sector, the inter-method comparability between pairs of accounting methods is low or completely not comparable with BM C-index values less than 0.25. The only exception is the comparability between SE and AOI which is not surprising because AOI is often described as variant of SE (Gerhardy, 1999). Across the four methods, the BM C-index shows low inter-method comparability on the main market and moderate comparability on the alternative and combined markets. However, the VDT *I* index and A & M *I* - index values of zero indicate no inter-method comparability among mining companies listed on the main market. On the AIM and combined market, VDT *I* index of 0.3 and 0.3 respectively indicate low level of comparability whilst the A&M *I* index value of 0.16 indicate very low level of comparability. These results show the effects of the diversity in accounting treatment on the comparability of accounting and highlights the need for efforts to harmony the different treatments to enhance consistency and comparability of accounts.

10.1.3.3 Pooled Sample

Consistent with the findings on each of the sectors, the intra-method comparability index values of 0.94 for each of the markets presented on Panel C of Table 10.2C makes it clear that among extractive companies listed on the LSE, there is high comparability among companies adopting the same accounting method but none of them is completely comparable as may be expected of companies adopting the same accounting method.

Regardless of the high comparability among companies adopting the same accounting methods, the inter-method comparability levels between the different pairs of accounting methods on each of the markets (SE& FC, SE & EA, FC & AOI, FC & EA and AOI & EA) is on the average very low excepts for between SE and AOI where

there is high inter-method comparability as shown by BM C- index values of 0.93 on main market, 0.95 on the AIM and 0.94 on the combined market.

Across the four accounting methods, the BM C-index indicate moderate level of inter-method comparability on the main market (0.50) and low on both the AIM (0.48) and combined market (0.49). VDT *I* index values suggest low inter-method comparability whilst A & M *I* index values suggest very low level of inter-method comparability.

These results reveal that the intra-method comparability for the accounting treatment for AW&W costs is high but there is lack of complete comparability among companies using the same accounting method and the situation is worst when the treatment is compared between the different method and across all the methods. This evidence indicates the need to harmonise accounting treatment for AW&W costs among extractive companies to achieve higher comparability both within and across methods. And as indicated earlier, the closest treatment to achieve harmony is to require AW&W costs to be initially capitalised pending decision since this treatment is the most common on the sampled extractive companies.

Table 10.1C Intra and inter-method Comparability for Appraisal Well and Work Costs

	Main Market			AIM			Combined Market		
	C-index	VDT I–index	A&M I-index	C-index	VDT I-index	A&M I-index	C- index	VDT I-index	A&M I-index
Panel A: Oil and Gas Sector									
Intra-method comparability (WM C-index)	0.99			0.94			0.96		
Inter-method comparability:									
SE &FC	0.20	0.20	0.20	0.14	0.14	0.14	0.15	0.15	0.15
SE & AOI	1.00	1.00	1.00	0.98	0.98	0.98	0.99	0.99	0.99
SE & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FC & AOI	0.20	0.20	0.20	0.13	0.13	0.13	0.14	0.14	0.14
FC &EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AOI & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SE & FC & AOI & EA	0.28	0.00	0.00	0.40	0.00	0.00	0.38	0.00	0.00
Panel B: Mining Sector									
Intra-method comparability (WM C-index)	0.86			0.93			0.91		
Inter-method comparability:									
SE &FC	0.08	0.08	0.08	0.33	0.33	0.33	0.28	0.28	0.28
SE & AOI	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
SE & EA	0.13	0.13	0.13	0.08	0.08	0.08	0.10	0.10	0.10
FC & AOI	0.00	0.00	0.00	0.32	0.32	0.32	0.26	0.26	0.26
FC &EA	0.00	0.00	0.00	0.13	0.13	0.13	0.11	0.11	0.11
AOI & EA	0.18	0.18	0.18	0.13	0.13	0.13	0.15	0.15	0.15
SE & FC & AOI & EA	0.46	0.00	0.00	0.53	0.30	0.16	0.51	0.30	0.16
Panel C: Pooled Sample									
Intra-method comparability (WM C-index)	0.94			0.94			0.94		
Inter-method comparability:									
SE &FC	0.16	0.16	0.16	0.21	0.21	0.21	0.20	0.20	0.20
SE & AOI	0.93	0.93	0.93	0.95	0.95	0.95	0.94	0.94	0.94
SE & EA	0.12	0.12	0.12	0.07	0.07	0.07	0.09	0.09	0.09
FC & AOI	0.14	0.14	0.14	0.19	0.19	0.19	0.18	0.18	0.18
FC &EA	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05
AOI & EA	0.16	0.16	0.16	0.11	0.11	0.11	0.13	0.13	0.13
SE & FC & AOI & EA	0.50	0.25	0.13	0.48	0.24	0.12	0.49	0.25	0.13

Source: Author's estimates from research data ,2018 *VDT -Van der Tas; A &M - Archer & McLeay*

Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

10.1.4 Concluding Remarks on Accounting for Appraisal Well and Work Costs

The previous sections have discussed the accounting treatment for AW&W costs incurred during the pre-development phase by oil & gas, and mining companies listed on the LSE.

It is evident from the analysis that accounting treatment for AW&W costs ranging between them being fully capitalised, fully expensed, and initially capitalised. Though it is observed that the choice of treatment tends to align with the principles of the company's accounting method, there were instances where users of the same method did not necessarily treat these costs the same way. The most dominant accounting treatment was found to be initially capitalising and the least common is for them to be fully capitalised.

In line with the accounting treatment, the levels of harmony also indicated that there is diversity both within users of the same method and across all methods. On the pooled sample, none of the different methods exhibited complete harmony in the treatment of these costs. It was also striking to note that FC users exhibit the highest level of diversity in treatment for AW&W costs suggesting the need for effort to harmony treatments within this method if companies will still be permitted to use it.

Consistent with the level of harmony, the intra-method comparability in treatment is observed to be high but no complete comparability is observed as expected of companies adopting the same accounting method. On the contrary, the inter-method comparability for the accounting treatment was observed to be low or completely not comparable except for the comparability between SE and AOI which was mostly high.

The results have confirmed that there are diversities in accounting treatment for AW&W costs and these diversities lower the level of harmony and comparability of

accounts. These results highlight the need to harmonise the different practice through standardisation to enhance comparability of accounts. In order to achieve this, there is the need for AW&W costs to be treated in a less conservative manner through initially capitalising because this is the most common practice among extractive companies and for that matter may not face much opposition. And secondly, by initially capitalising these costs, companies will be able to wait for the potential outcome of their exploration efforts, thus the economic viability and technical feasibility of an area to be determined before such costs are treated through either be fully capitalised or fully expensed. This will allow transactions to be treated in a manner more consistent with accounting principles and convention than just fully capitalising or fully expensing when the outcome is not known.

10.2 Other Evaluation (OEV) Costs

OEV costs consist of costs incurred by extractive companies to appraise their discoveries to ensure whether these quantities are commercially viable. These include costs for examining and testing extraction methods, metallurgical or treatment process and detailed engineering studies to determine how best the reservoir can be developed to obtain maximum recovery as well the costs to determine the technical feasibility as well as commercial viability of the project.

The following sections discuss the accounting treatment for OEV costs to determine the most common treatment and assess the level of harmony in treatment within and across methods, and finally to determine the extent of intra-method and inter-method comparability.

10.2.1 Accounting Treatment for Other Evaluation Costs

10.2.1.1 Oil and Gas Sector

Panel A of Table 10.3A presents the accounting treatment for OEV costs by oil and gas companies. Among the main market listed companies, users of all the different methods treat OEV costs in a manner consistent with the principles of their accounting methods except for FC users where one company[72] initially capitalises instead of fully capitalising like its method counterparts. This shows that there is great harmony in treatment among all the method users apart from FC users who exhibit some disharmony in treatment for OEV costs. However, on the AIM apart from AOI and EA users who exhibited total uniformity in treating OEV costs in line with the principles of their accounting methods, among SE and FC users there are some disharmonies in treatment. Among SE users on the AIM, all of them initially capitalise OEV costs but for one that fully capitalises instead. In a similar fashion, all FC users fully capitalise OEV costs except for four different companies that choose to initially capitalise these costs pending determination leading to disharmony among its method users. Overall, on the combined market, whilst AOI and EA are consistent in maintaining harmony in treatment for other evaluation costs, SE and FC users exhibit some disharmonies in treatment. The result suggests some diversity in accounting treatment for OEV costs among oil & gas companies even among users of the same methods (SE and FC). This shows that there is a need for effort to harmonise accounting treatment for OEV costs in the oil & gas sector to achieve better comparability of accounts.

The results show that oil & gas companies treat OEV costs mostly in line with the principle of their chosen accounting method, though there are still some companies that

[72] Refer to footnote 25

treat these costs differently from their method counterparts. Secondly, it is noted that the most common treatment of OEV costs among oil & gas companies is for them to be initially capitalised pending decision with this treatment being applied by not only SE and AOI companies but by FC users (22%) as well. It is also interesting to note that oil & gas companies prefer fully capitalising as an alternative treatment for OEV costs which suggest that there is less preference for these costs to be treated in the most conservative way (fully expense).

The findings suggest that there are some diversities within methods which need to be eliminated if utmost harmony is needed. The results also show that the diversity of methods is what creates differences in treatment since most users of the same method treat OEV costs in similar manner. Therefore, attempts to harmonise treatment should aim at reducing the number of alternative methods companies can apply in treating OEV costs. Given that most oil & gas companies prefer to initially capitalise OEV costs, it seems reasonable for the recommended accounting method to require these costs to be treated as such to avoid excessive opposition and lobbying and also because this treatment allows proper application of matching and prudence concepts. Even though none of the EA users initially capitalises but the number of companies adopting this method is small and for that matter if even there is any opposition from them it would not be as massive as coming from a larger group. Moreover, a company that fully expenses may not find it too difficult to initially capitalise because by initially capitalising there is chance of completely writing off costs in the future if an area proves not to be commercially viable and technically feasible.

10.2.1.2 Mining Sector

As can be seen from Panel B of Table 10.3A, there is diversity in treatment for OEV

costs among the main market-listed mining companies using all the different methods apart from FC users who exhibited complete harmony in fully capitalising these costs. All the SE and AOI users initially capitalised OEV costs except for 1 company in each case that treat these costs differently from its method counterparts. For instance, the SE company[73] instead of initially capitalising it rather fully capitalised OEV costs whilst the AOI company[74] fully expensed these costs instead. Majority (6, 86%) of the EA companies fully expense these costs except 1 (14%) that initially capitalised them. Based on the analysis, it is evident that among mining companies listed on the main market it is common for them to initially capitalise OEV costs pending decision. It can be seen at least one company from each of the methods initially capitalise other evaluation cost except FC users. The least common accounting treatment among main market listed mining companies is fully capitalising OEV costs.

Among those on the AIM, except for SE users where all of them initially capitalise OEV costs, among the users of the other methods, there are few that treat OEV costs in a manner not consistent with their method counterparts. For instance, 3 FC companies representing 33% instead of fully capitalising OEV costs they initially capitalise them. Among AOI users, there are 2 companies (6%) that fully expense these costs instead of initially capitalising them and among EA users there is 1 company that initially capitalise these costs instead of fully expensing them. It is evident that initially capitalising OEV costs is a common accounting treatment among mining companies on the AIM with even 33% of FC users and 8% of EA users even choosing to treat these costs this way. Overall, on the combined market, similar diversity in accounting

[73]Public Joint Stock Company (PJSC) Polyus - is the largest gold producer in Russia and the fourth largest gold producer globally with Market Cap of £17.10bn (as at 21st September 2021) and 99 years of age.

[74] Prairie Mining Limited is an Australian company with MarketCap of £49.88m and 63 years. It is smaller but older than its method counterparts (mean MarketCap of £5,760m; mean age: 44 years).

treatment is observed among the users of the various accounting methods with initially capitalising being the most common accounting treatment and the fully capitalising them the least common accounting treatment.

The analysis has revealed that aside the diversity of accounting methods used by the mining companies, there is diversity in accounting treatment even among users of the same method making the problem more challenging and underscore the need for efforts to harmonise these diversities both in methods and treatments. Given that majority (106, 79%) of the mining companies prefer to initially capitalise OEV regardless of their accounting method, it seems to be the most appropriate treatment to harmonise the different practices.

Consistent with IASB (2020), the findings of this research suggest that mining companies prefer to fully expense OEV costs instead of fully capitalising them as among their oil& gas counterparts. It is noted that mining companies prefer to fully expense OEV costs as an alternative treatment to initially capitalising.

10.2.1.3 Pooled Sample

As can be seen on Panel C of Table 10.3A, the accounting treatments for the pooled sample show some diversities in accounting practices for OEV costs by extractive companies listed on each of the markets with each of the methods having at least one of their method users treating costs in a different way from their method counterparts. It is notable for each of the methods, the users adopt two different accounting treatment for OEV costs with majority treating these costs in a manner consistent with their accounting methods. For instance, among SE extractive companies on the main market, the choice of treatment is between fully capitalising and initially capitalising with

majority of them initially capitalising. Among FC users, the choice is between fully capitalising and initially capitalising with majority of them fully capitalising.

It is also evident that aside majority of companies on each market initially capitalising other evaluation costs, between the two markets, it can be observed that the proportion of AIM-listed companies (12%) that prefer to fully capitalise as an alternative treatment is higher than the proportion among main market (10%). Overall, across all the sampled extractive companies, initially capitalising (195, 76%) OEV costs is the most common accounting treatment and the least common is for these costs to be fully expensed (23, 9%). In all, 4% of the sampled companies did not disclose how they treat other evaluation costs, all of whom are oil & gas SE users.

The results reveal the worrying extent of diversity in accounting treatment for OEV costs among extractive companies adopting same and different method and this further confirms that the use of the same method may not necessarily translate into treating cost components the same way by different companies. This underscores the need for effort to harmonise the different practice within the industry to enhance comparability of accounts. And as noted earlier, the closest treatment to harmonise accounting treatment for OEV costs is to initially capitalise them pending decision as this treatment is used by users of the different methods.

Table 10.2A Other Evaluation Costs Cross – classifications

Panel A: Oil and Gas Sector															
Accounting method	Main Market					AIM					Combined Market				
	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D	Total
SE	0	0	27	9	36	1	0	45	1	47	1	0	72	10	83
FC	4	0	1	0	5	14	0	4	0	18	18	0	5	0	23
AOI	0	0	1	0	1	0	0	11	0	11	0	0	12	0	12
EA	0	1	0	0	1	0	2	0	0	2	0	3	0	0	3
Total	**4**	**1**	**29**	**9**	**43**	**15**	**2**	**60**	**1**	**78**	**19**	**3**	**89**	**10**	**121**
Panel B: Mining Sector															
SE	1	0	12	0	13	0	0	39	0	39	1	0	51	0	52
FC	2	0	0	0	2	6	0	3	0	9	8	0	3	0	11
AOI	0	1	17	0	18	0	2	33	0	35	0	3	50	0	53
EA	0	6	1	0	7	0	11	1	0	12	0	17	2	0	19
Total	**3**	**7**	**30**	**0**	**40**	**6**	**13**	**76**	**0**	**95**	**9**	**20**	**106**	**0**	**135**
Panel C: Pooled Sample															
SE	1	0	39	9	49	1	0	84	1	86	2	0	123	10	135
FC	6	0	1	0	7	20	0	7	0	27	26	0	8	0	34
AOI	0	1	18	0	19	0	2	44	0	46	0	3	62	0	65
EA	0	7	1	0	8	0	13	1	0	14	0	20	2	0	22
Total	**7**	**8**	**59**	**9**	**83**	**21**	**15**	**136**	**1**	**173**	**28**	**23**	**195**	**10**	**256**

Source: Author's estimates from research data, 2018 **A** *- fully capitalised;* **B** *– fully expensed;* **C** *– initially capitalised;* **D** *– not disclosed*

10.2.2 Level of Harmony in Accounting Treatment for Other Evaluation Costs

10.2.2.1 Oil & Gas Sector

Panel A of Table 10.3B reports the level of harmony index values for the accounting treatment for OEV costs by oil and gas companies. Among oil & gas companies listed on the main market, there is complete harmony in accounting treatment for OEV costs among users of SE, AOI and EA methods with H-index values of 1. This is because for each of the methods, all the users treated OEV costs in a manner consistent with the principles of their accounting method. On the contrary, the level of harmony among FC users is observed to be moderate with H-index value of 0.68. The ADM C-index values indicate the same level of harmony for the users of all the methods except SE users who because of the 25% non-disclosure rate leaves the level of harmony at moderate level instead of complete as indicated by the H-index. Across all the methods, there is moderate harmony as shown by the H-index value of 0.74 but rather low harmony as indicated by the ADM C-index value of 0.46 in accounting treatment for OEV costs.

These results evidence that there is diversity in accounting treatment for OEV costs across the methods.

Similarly, among those listed on the AIM, there is complete harmony among AOI and EA users with H-index values of 1, high (0.96) level of harmony among SE users and moderate (0.65) harmony among FC users. The ADM C-index values suggest the same level of harmony as indicated by the H-index values. Like the finding on the main market, the level of harmony across all the methods on the AIM is also moderate with H and ADM C-index values of 0.65 and 0.62 respectively which suggests there are diversities in the way OEV costs are treated by mining companies.

On the combined market, it is evident that the level of harmony remains complete for users of AOI and EA because users of each of the methods are consistent in treating OEV costs in the same way. However, for SE and FC users the H-index values are less than 1 suggesting some level of disharmony. For SE users, the level of harmony is high (0.97) because though majority of SE companies (72, 87%) initially capitalised these costs, there was still 1% that fully capitalised these costs. In the case of FC, the level of harmony as indicated by H-index value of 0.66 indicate moderate level of harmony because 22% of FC oil & gas companies initially capitalised OEV costs instead of fully capitalising them as their method counterparts. The ADM C-index values suggest the same level of harmony as indicated by the H -index values. Among SE companies though the ADM C-index value (0.75) is relatively lower when compared to the H-index value (0.97) this is because of the 12% non-disclosure rate, the lack of complete harmony suggests there are diversities in treatment among these users.

It is notable that FC users exhibit the greatest level of diversity in the treatment of OEV costs which suggests that the diversity of accounting treatment among FC users

deserves to be eliminated through standardisation and for that matter future standard should either try to harmonise practices within this method or gradually aim at completely eliminating it. As reported by Nobes and Stadler (2021) no companies under IFRS fully comply with the US definition of FC and for that matter it could be that companies just label their accounting method as FC but practices within the method are in disarray. Across all the methods, the level of harmony on the combined market remains moderate further underscoring there are diversity in accounting treatment and highlighting the need for efforts to harmonise the different practice to foster comparability in the treatment of OEV costs.

10.2.2.2 Mining Sector

Panel B of Table 10.3B shows the H-index and ADM C-index values for the accounting treatment for OEV costs among mining companies. There is a complete harmony in accounting treatment for OEV costs among FC mining companies listed on main market with H-index value of 1. For the other methods, the H-index values indicate high level of harmony. Similar level of harmony is suggested by the ADM C-index for all the methods except for EA where the level of harmony is moderate with index value of 0.71. Among mining companies listed on the main market, the high level of harmony in treatment for OEV costs is seen among FC and the lowest level of harmony is seen among EA companies. Across all the methods, the level of harmony of accounting treatment for OEV among main market -listed mining companies is moderate as shown by the H and ADM C-index values of 0.60 and 0.59 respectively.

Among mining companies on the AIM, the H-index values indicate complete harmony in the accounting treatment among users of SE (1), high level of harmony among AOI (0.89) and EA (0.85) and moderate level of harmony among FC users (0.56). Because

all the companies disclosed how they treat other evaluation costs, the resulting ADM C-index values suggest the same level of harmony as the H-index values.

On the combined market, none of the method users exhibited complete harmony in treatment for OEV costs showing that there are at least one company within each method that treat these costs in a different way from its fellow method users. Again, among mining companies, the greatest level of diversity is observed among FC users further underscoring the need for practices within this method to either be fully harmonised or eliminated through standardisation.

10.2.2.3 Pooled Sample

From Panel C of Table 10.3B, it is evident that there is no complete harmony among users of the different methods in the treatment of OEV costs among extractive companies as indicated by index values less than 1. Among extractive companies on the main market, the H-index values indicate high level of harmony among users of all the different methods but when measured using ADM C-index and taking into consideration non-disclosing companies the level of harmony remains high for AOI and EA users but moderate among SE and FC users. However, across the different methods, there is moderate harmony in treatment indicating some level of diversity in treatments. On the main market, the highest level of harmony is seen among SE users and the lowest among FC users.

Among companies listed on the AIM, high level of harmony is observed among users of all the method except FC users who rather exhibit moderate level of harmony as indicated by both H and ADM C index values. Similarly, on the combined market, the highest level of harmony in accounting treatment for OEV costs as shown by the H-index is seen among SE users (0.97) and the lowest level of harmony is observed among

FC users (0.67). Given that on the average SE companies are larger[75] and well established (see Abdo, 2016; Misund, 2017), they tend to be more consistent in their treatment and practices unlike FC users (Baker, 1976) who are mostly smaller and newer in the industry and may be trying to find their foot within such a powerful industry and may try to copy practices from established companies (DiMaggio and Powell, 1991) which may be inconsistent with their chosen accounting methods. There is therefore the need to harmonise practices with each of the accounting methods especially among FC users to ensure accounts are comparable. To achieve this, as noted earlier the closest treatment is to require OEV costs to be initially capitalised pending decision.

Table 10.2B Harmony Indices for Other Evaluation Costs

Panel A: Oil and Gas Sector									
Accounting method	Main market			AIM			Both Markets		
	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)
SE	1.00	0.56	25%	0.96	0.92	2%	0.97	0.75	12%
FC	0.68	0.60	0%	0.65	0.63	0%	0.66	0.64	0%
AOI	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.74	0.46	21%	0.65	0.62	1%	0.67	0.56	8%
Panel B: Mining Sector									
SE	0.86	0.85	0%	1.00	1.00	0%	0.96	0.96	0%
FC	1.00	1.00	0%	0.56	0.50	0%	0.60	0.56	0%
AOI	0.90	0.89	0%	0.89	0.89	0%	0.89	0.89	0%
EA	0.76	0.71	0%	0.85	0.83	0%	0.81	0.80	0%
Across all	0.60	0.59	0%	0.66	0.66	0%	0.64	0.64	0%
Panel C: Pooled (combined sector)									
SE	0.95	0.63	18%	0.98	0.95	1%	0.97	0.83	7%
FC	0.76	0.71	0%	0.62	0.60	0%	0.64	0.63	0%
AOI	0.90	0.89	0%	0.92	0.91	0%	0.91	0.91	0%
EA	0.78	0.75	0%	0.87	0.86	0%	0.83	0.83	0%
Across all	0.66	0.52	11%	0.65	0.64	1%	0.65	0.60	4%

Source: Author's estimates from research data, 2018 *ADM DA -Archer, Delvaille& McLeay (1995) disclosure adjusted C-index*
Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

[75] see Table 8.3

10.2.3 Intra-Method and Inter-Method Comparability for Other Evaluation Costs

10.2.3.1 Oil & Gas Sector

Panel A of Table 10.3C presents the inter and intra-method comparability of the accounting treatment for OEV costs by oil and gas companies. The intra-method comparability (WM C) index values of 0.99, 0.92 and 0.95 for the main market, AIM and combined market respectively show a high level of comparability among companies adopting the same accounting method in treating other evaluation costs. This means there is a 99% chance of randomly selecting two oil and gas companies adopting the same accounting method and treating OEV costs the same way on the main market. This shows high level of intra-method comparability in the accounting treatment for OEV costs. The level of intra-method comparability is higher among companies on the main market than those on the AIM suggesting great uniformity among main market listed companies in treating OEV costs.

Regardless of the high intra-method comparability, there is evidence of either no inter-method comparability or low inter-method comparability in accounting treatment for OEV costs. Apart from the high comparability observed between SE and AOI companies, the inter-method comparability between the other pairs of accounting methods is either low or completely not comparable at all. Across the four accounting methods, it is observed that there is low inter-method comparability when measured with the BM C-index, but there is no inter-method comparability when measured with VDT and A&M I indices as the index value of 0 suggests that the accounting treatment for OEV costs is completely not comparable among users of the different accounting methods. This is an area where lack of consistency and comparability exists, and in

order to harmonise accounting practices by extractive industries' firms this area needs to be addressed in any attempts to standardise the practice.

10.2.3.2 Mining Sector

Panel B of Table 10.3C shows the intra and inter-method comparability index values for the accounting treatment for OEV costs among mining companies. As evident on the table, there is high level of intra-method comparability with WM C-index values of 0.86 on the main market, 0.93 on the AIM and 0.91 on the combined market. The probability is higher on the AIM than on the main market which shows AIM listed mining companies treated OEV costs in similar ways than their main market counterparts.

Notwithstanding, the high intra-method comparability, there is evidence of no or very low inter-method comparability in the way OEV costs are treated by mining companies adopting different accounting methods as shown by the BM C, VDT and A&M *I* indices. Apart from the high inter-method comparability in accounting treatment for OEV costs between SE and AOI companies, the inter-method comparability between the other pairs is either completely not comparable, very low or low on both markets as well as the combined market. The inter-method comparability across the four different accounting method when measured by the BM C-index is observed to be low on the main market, moderate on both the AIM and combined market with index values of 0.46, 0.53 and 0.51 respectively. But when measured by the VDT *I* index there is no inter-method comparability across the four methods on the main market but low inter-method comparability on the AIM and combined market as shown by index values of 0, 0.30 and 0.30 respectively. A&M *I* index values on the other hand show no inter-method comparability across the users of the four accounting methods on the main

market but very low inter-method comparability among mining companies on the AIM and combined market as reported by index values of 0, 0.16 and 0.16 respectively.

The results suggest that the way OEV costs are treated among mining companies is not completely comparable across users of the different methods which indicates the need for effort to harmonise practice to promote comparability across the methods and to achieve this there is the need for attention to be paid to eliminate the diversities within methods and then across methods. The possible treatment to achieve this for new standard to be issues which will require OEV costs to be initially capitalised pending determination.

10.2.3.3 Pooled Sample

Consistent with the findings on the each of the sectors, Panel C of Table 10.3C confirms the high level of intra-method comparability in the accounting treatment for OEV costs as indicated by the index values of 0.93, 0.94 and 0.94 for the main market, AIM and combined market respectively. The extent of intra-method comparability is slightly higher on the AIM than on the main market. This is quite surprising because given the fact that main market companies are more regulated than the AIM listed companies (Campbell and Tabner, 2011), one would have expected companies on the main market to treat costs in similar fashion, at least by users of the same method; however, the result suggest the main market companies rather exhibit relatively lower intra-method comparability.

In terms of comparability between companies adopting different accounting methods, apart from the completely and high inter-method comparability observed between users of SE and AOI companies listed on each of the markets, the level of inter-method comparability between users of different methods is observed to either be low, very low

or completely not comparable. Across the four accounting methods, the BM C-index values of 0.49 for each of the market indicate low inter-method comparability in the accounting treatment for other evaluation costs. VDT *I* index values of 0.25, 0.26 and 0.27 for the main market, AIM and combined market respectively, suggest low inter-method comparability and A&M *I* index values indicate very low inter-method comparability in the way users of the four methods treat other evaluation costs.

This shows that though the treatment of OEV costs is comparable among extractive companies adopting the same accounting method, among those adopting different accounting methods their inter-method comparability is either very low, low or completely not comparable indicating the need for efforts to harmonise the different practices to improve both intra and inter-method comparability of accounts. As alluded earlier, this can be achieved by requiring all extractive companies to initially capitalise OEV costs since this is the most common treatment. There should be mechanism to coerce companies that treat these costs differently to do so by it been a requirement for stock market listing or it being demanded by investors. Additionally, there should be effort to get older and bigger companies to buy into the idea and once they treat these costs this way, new entrants may be tempted to "copy" their accounting method and treatment in order to appear legitimate (DiMaggio and Powell, 1991).

Table 10.2C Intra and Inter-method Comparability indices for Other Evaluation

	Main Market			AIM			Combined Market		
	C- index	VDT I--index	A&M I -index	C- index	VDT I--index	A&M i -index	C- index	VDT I-index	A&M I--index
Panel A: Oil and Gas Sector									
Intra-method comparability (WM C-index)	0.99			0.92			0.95		
Inter-method comparability:									
SE &FC	0.20	0.20	0.20	0.23	0.23	0.23	0.23	0.23	0.23
SE & AOI	1.00	1.00	1.00	0.98	0.98	0.98	0.99	0.99	0.99
SE & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FC & AOI	0.20	0.20	0.20	0.22	0.22	0.22	0.22	0.22	0.22
FC &EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AOI & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SE & FC & AOI & EA	0.28	0.00	0.00	0.44	0.00	0.00	0.41	0.00	0.00
Panel B: Mining Sector									
Intra-method comparability (WM C-index)	0.86			0.93			0.91		
Inter-method comparability:									
SE &FC	0.08	0.08	0.08	0.33	0.33	0.33	0.28	0.28	0.28
SE & AOI	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
SE & EA	0.13	0.13	0.13	0.08	0.08	0.08	0.10	0.10	0.10
FC & AOI	0.00	0.00	0.00	0.31	0.31	0.31	0.26	0.26	0.26
FC &EA	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.03
AOI & EA	0.18	0.18	0.18	0.13	0.13	0.13	0.15	0.15	0.15
SE & FC & AOI & EA	0.46	0.00	0.00	0.53	0.30	0.16	0.51	0.30	0.16
Panel C: Pooled Sample									
Intra-method comparability (WM C-index)	0.93			0.94			0.94		
Inter-method comparability:									
SE &FC	0.16	0.16	0.16	0.26	0.26	0.26	0.24	0.24	0.24
SE & AOI	0.92	0.92	0.92	0.95	0.95	0.95	0.94	0.94	0.94
SE & EA	0.12	0.12	0.12	0.07	0.07	0.07	0.09	0.09	0.09
FC & AOI	0.14	0.14	0.14	0.25	0.25	0.25	0.22	0.22	0.22
FC &EA	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
AOI & EA	0.16	0.16	0.16	0.11	0.11	0.11	0.13	0.13	0.13
SE & FC & AOI & EA	0.49	0.25	0.13	0.49	0.26	0.13	0.49	0.27	0.14

Source: Author's estimates from research data ,2018 *VDT -Van der Tas; A &M - Archer & McLeay*

Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤x<1*** *-High;* ***0.50 ≤x<0.75*** *-Moderate;* ***0.25 ≤x<0.50*** *-Low;* ***0.00 <x<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

10.2.4 Concluding Remarks on Accounting for Other Evaluation Costs

The previous sections have discussed how OEV costs incurred during pre-development phase of their extractive activities are treated to identify the most common treatment and assess the level of harmony in treatment and the extent of intra and inter-method comparability.

The analysis highlights that accounting treatment for OEV costs takes one of three alternatives which are either fully capitalise, fully expense, or initially capitalise. It was obvious from the analysis that initially capitalise OEV costs is the most common accounting treatment with just a few companies fully expensing it. It was also notable that FC companies exhibit the greatest diversity in treatment of other evaluation and for that matter any attempt to harmonise practices should pay particular attention to users of the FC but not forgetting the methods as well since they also exhibit some level of diversity.

In terms of level of harmony, there is complete harmony in the way AOI and EA oil & gas companies in our sample treat these costs, but high harmony is exhibited by SE with FC users exhibiting moderate level of harmony. Among mining companies, none of the method users exhibit complete harmony in the accounting treatment for OEV costs on the combined market. The highest level of harmony is seen among SE users, but FC users exhibit the lowest level of harmony. Among all the sampled companies, it is observed that SE, AOI and EA on the AIM show higher level of harmony than their main market counterparts. Between the two sectors, oil & gas companies exhibit higher level of harmony than their mining counterparts.

The intra-method comparability is observed to be high across the different sectors and markets suggest high probability that users of the same accounting method treat OEV

costs the same way, but this is not completely comparable. However, with respect to inter-method comparability there is evidence of either no or low inter-method comparability between all the pairs of accounting methods except for SE and AOI which is not surprising because AOI is argued to be variants of SE method. The inter-method comparability across all four accounting methods is observed to be largely low or completely not comparable with few occasional index values suggesting moderate level of comparability.

The result has revealed the existence of diversity in accounting treatment for OEV costs both among users of the same and different methods and how these impedes inter-method comparability. This has also highlighted the need for standardisation to harmonise the different practices if comparability remains an important qualitative characteristics information as explained by the Conceptual Framework of accounting. It therefore suggests that the closest possible treatment for OEV costs to harmonise the different practices is to require these costs to be initially capitalised by extractive companies since the number of companies that do not adopt this treatment are just a few compared to those that adopt. Therefore, efforts should be implemented to get the others to also adopt this treatment through either coercive, mimetic, or normative pressures from various stakeholders.

10.3 General Administrative and Overhead (GA&O) Costs

At the pre-development phase of extractive activities, companies incur GA&O costs and how they treat these costs can have significant impact on the financial position as well as performance of the company. These costs include, but not limited to, the costs of running site offices, cost of stationaries, wages, and salaries of site staff and many more. It may seem obvious for GA&O costs to be expensed because they are less likely

to be directly connected to discoveries. However, where companies can establish such a link between GA&O costs and an area of commercial discoveries then there may be the chance for them to be capitalised or initially capitalised (IASB, 2020[76]). Lourens and Henderson (1972) in their survey of Australian extractive companies find that GA&O costs are fully expensed by majority (72%) of them. The treatment of these costs in the USA is not clear but Field (1969) gives the impression that they are likely to be expensed. Under IFRS 6, GA&O costs are not listed as one of the qualifying expenditures that companies are allowed to classify as E&E assets (IASB, 2004: para 9; Chaudhry *et al.,* 2015). However, since the list of expenditures listed by the standard is non-exhaustive, companies can decide to include GA&O costs as a qualifying expenditure and capitalise them as part of E&E assets. With such a leeway given by the standard, there is likelihood for diversity in policy as well as treatment in accounting for GA&O costs. This section discusses the results of how companies account for GA&O costs to determine the most common (treatment) practice, assess the level of harmony in treatment and the extent of intra and inter-method comparability in treatments.

10.3.1 Accounting Treatment for General Administrative and Overhead Costs

10.3.1.1 Oil and Gas Sector

Panel A of Table 10.4A presents the accounting treatment for GA&O costs for oil and gas companies. Among the main market-listed oil & gas companies, there is harmony in treatment by user of AOI and EA with the AOI user initially capitalising GA&O costs and the EA fully expensing them. However, among the SE users, it is observed

[76] October staff paper

though majority (31%, 18) of the disclosing companies initially capitalised GA&O costs there are seven others (19%) that fully expense instead. This shows that among SE companies, there is diversity in treatment with choices made between initially capitalising and fully expensing. Similarly, among FC users, there is diversity in treatment with one company choosing to initially capitalise GA&O costs instead of fully capitalising them like its method counterparts.

In similar fashion, among the AIM-listed companies, apart from AOI and EA users that exhibit complete harmony in treating GA&O costs according to principles of their accounting methods, there are diversities in treatments among SE users with one company each either fully capitalising or fully expensing GA&O costs instead of initially capitalising. Likewise, among FC users there are two companies that initially capitalise and one that fully expenses these costs at variance to fully capitalising them. The diversities among SE and FC users are further reflected on the combined market.

The results suggest that among oil & gas companies, there is diversity in the accounting treatment for GA&O costs among SE and FC users. Overall, the most prominent accounting treatment for GA&O costs is for them to be initially capitalised (69, 57%) with fully expensing (12, 10%) being the least common treatment. 21% (25) of the oil & gas companies did not disclose how they treat GA&O costs with majority of them being SE companies listed on the main market. It is worthy to note that initially capitalising is not a treatment applied by only SE and AOI users but some FC users (3, 13%) as well making it is most preferred method across the different method users. The findings also suggest that oil & gas companies listed on the main market would prefer fully expensing GA&O costs to fully capitalising as an alternative treatment for initially capitalising. Whilst those on the AIM have higher prefer to fully capitalise them as an

alternative treatment. This is not surprising because main market companies are bigger and more-established and may have the capacity to fully expense these costs and remain profitable unlike their AIM counterparts who are mostly smaller and younger (Johnson and Ramanan, 1988; Mallin and Ow-Yong, 2012).

The lack of harmony in treatment for GA&O costs, even among users of the same methods, underscores the need to harmonise the different practices to eliminate diversity and this can best be achieved through withdrawing the current IFRS 6 and developing an independent standard for the extractive industries that limits the extent of flexibility and provide clear-cut guidance on how such costs should be treated.

10.3.1.2 Mining Sector

Among mining companies on the main market, apart from EA users who exhibit complete harmony in fully expensing GA&O costs and FC users who failed to disclose how they treat these costs, for the method users there are diversities in treatment. There is 1 SE and 2 AOI users that fully expense GA&O costs instead of initially capitalising. Similarly, on the AIM, there are diversity among all the different method users except EA users with choice mostly between fully expensing and initially capitalising. There is only one AOI user that surprising fully capitalised GA&O costs.

The results show that there are diversity in treatment of GA&O costs by mining companies with the costs either being fully expensed or initially capitalised. It is evident from the combined market that at least one company among each of the different methods fully expenses GA&O costs not excluding FC users who normally prefer to fully capitalise costs. Notwithstanding, this study finds that initially capitalising is the most pre-dominate treatment among the sampled mining companies and this partly attributable to the large number of AOI and SE companies in the sample. This makes it

difficult to conclude on the most suitable treatment to harmonise accounting for GA&O costs among mining companies. Given the extent of lobbying and opposition to regulation which has characterised the EI in the past, it may be reasonable for future standard to harmonise treatment for GA&O costs to require that these costs are initially capitalised for a number of reasons. One of the reasons is the fact that it is a treatment consistent with the most widely used methods (thus SE and AOI) and since it widely used it means if there is any opposition against this treatment at all it will emanates from smaller proportion of companies which should be easier to manage than if it came from a larger group. Secondly, initially capitalising GA&O costs allows companies to defer costs until a point when it can be established that costs is directly related to discovery before appropriate treatment can be applied. This allows costs to be treated in a manner consistent with definition of assets as described by the Conceptual Framework.

10.3.1.3 Pooled Sample

Panel C of Table 10.4A displays the accounting treatments for GA&O costs for extractive companies, thus both oil and gas and mining companies. Consistent with the observations in both the oil & gas and mining sectors, among the pooled sample, there is diversity in treatment among users of all the methods except EA users.

On the combined market, though majority of SE users initially capitalise GA&O costs pending determination, there are still 11 other SE users who fully expense these costs and even 1 other company that fully capitalise these costs. Similarly, among FC companies a higher proportion representing 41% (14) fully capitalised these costs but 18% (6) choose to initially capitalise and 9% (3) fully expense to the contrary. Out of 65 AOI extractive companies on the combined market, 68% (44) initially capitalise

these costs, 5% (3) fully expense, 2% (1) fully capitalise and the remaining 26% (17) did not disclose how they treat these costs. One of the SE users that fully expenses GA&O costs is Avocet Mining Plc. This company is noted to be smaller and younger than the average method users in mining sector on the main market. It is quite surprising to find a smaller and younger company adopting a conservative treatment since for most smaller companies, because of their high reliance of external financing such as debts (Deakin, 1979), they rather prefer more aggressive treatment which involves some level of capitalisation at least to build their balance sheet (Misund, 2017) and not to break debt covenant as described by the debt-to-equity hypothesis (Watts and Zimmerman, 1986). The possible explanation for the company's decision to fully expense GA&O costs could be because it is a small company and most its exploration activities are sub-contracted to external parties as noted by Field (1969) and capitalised. Therefore, any other costs such as GA&O costs may be immaterial and are written off when incurred. But whatever, their reason may be their treatment is inconsistent with how their method users treat these costs and leads intra-method diversity in treatment with the potential to impede comparability even among users of the same method.

Among the AOI users that fully expense GA&O costs instead of initially capitalising is Ferro-Alloy Resources Limited and Kaz Minerals Plc. Of the two, whilst both are smaller than their average method users, Ferro-Alloy Resources Limited is an older the average users and Kaz Minerals plc is a younger than average users. Given that they are both smaller, one would have expected them to capitalise at least initially pending like the other method users but surprisingly they fully expensed. But as explained earlier, it could be that most of the pre-development activities are sub-contracted to external parties and for those GA&O costs are mostly small and immaterial and can be easily written off without affecting financial performance that much but the resulting

disharmony in treatment cannot be avoided. Whilst AOI users either fully expense or initially capitalise GA&O costs, Orosur Mining Inc is the only AOI company that chooses to fully capitalise these costs. Analysis of size relative to its method counterparts revealed that it is smaller but older than its average method user. As a smaller company, there may be justification for it to prefer an aggressive treatment which will result in bigger asset values and better balance sheet to attract investors and to maintain appropriate gearing ratio as required by debt financiers (Kalay, 1982).

Overall, among the 256 extractive companies in this study sample, majority (50%; 128) of them initially capitalised GA&O costs, 13% (34) fully expensed them, 6% (16) fully capitalised and as many as 30% (78) did not disclose how they treated GA&O costs in annual reports. With such a high number of extractive companies not disclosing how they treat GA&O costs in the annual reports, it gives every cause for worry since non-disclosure could be interpreted as an attempt to conceal information from users of the annual report which can impede the quality of decision making based on the reported figures (Donnelly and Mulcahy 2008).

The findings indicate the existence of diversity in accounting treatment for GA&O costs among extractive companies in the sample even among companies adopting the same accounting method which is very worrying. The diversities may be a result of the flexibility allowed under the current IFRS 6 (IASB, 2020). With this, managers take advantage and adopt treatment which manages their companies' earnings to enhance their bonuses or probably reduce their earnings to reduce their tax obligation or avoid other political costs. This is consistent with the bonus plan and political cost hypotheses of the positive accounting theory (Watts and Zimmerman, 1986). This is not surprising that because political cost is more prevalent in the oil & gas sector (see Zimmerman,

1983). One other worry evidence is the high level of non-disclosure among users of SE and FC these aggravate the problem of diversity as opined by Archer, Delvaille and McLeay (1995). In agreement, Constantatos *et al.* (2021) allude that lack of transparency through non-disclosure hinders comparability. Skinner (1994) also notes that managers tend not to disclose their accounting policy when they manage earnings. This is because when companies do not disclose how they treat these costs; managers are able easily to adopt treatments which is most favourable to them but not necessarily reflecting the economic substance of transactions.

The results as observed on the combined markets suggest that among oil & gas companies, there is greater preference for GA&O costs to be fully capitalised as an alternative treatment to them being initially capitalised whilst their mining counterparts prefer to fully expense as an alternative. This confirms the finding of IASB staff survey (2020).

The extent of diversity in treatment of GA&O costs even among users of the same methods highlights the need to harmonise accounting practices for these costs through the issue of accounting standard for the EI. In order to harmonise the diverse practices, it is recommended that future standard requires companies to initially capitalise GA&O costs pending decision since this is the treatment preferred by most extractive companies and for that matter the extent of opposition against will not be that much. It is worthy to note that fully expensing is equally popular with at least one member of the different methods applying this treatment showing the potential for this treatment to pass as a potential solution to diversity. But such conservative treatment has always faced swift opposition from companies especially smaller and newer ones when the amounts involved are huge and material. They argue fully expensing these costs serve

as a disincentive for undertaking more exploratory works and negatively affect their financial performance making them unattractive to investor and less competitive (Myers, 1974; Sunder, 1976; Deakin, 1979). Because of such vehement opposition against such conservative treatment, it is expected that though there will be some objection against initially capitalising but may not be as massive as may come with a more conservative treatment of fully expensing these costs as incurred hence the recommendation for future standard to require companies to initially capitalise GA&O costs.

Table 10.3A General Administrative and Overhead Costs Cross-Classifications

Panel A: Oil and Gas Sector															
Accounting method	Main Market					AIM					Combined Market				
	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D	Total
SE	0	7	11	18	36	1	1	43	2	47	1	8	54	20	83
FC	4	0	1	0	5	10	1	2	5	18	14	1	3	5	23
AOI	0	0	1	0	1	0	0	11	0	11	0	0	12	0	12
EA	0	1	0	0	1	0	2	0	0	2	0	3	0	0	3
Total	4	8	13	18	43	11	4	56	7	78	15	12	69	25	121
Panel B: Mining Sector															
SE	0	1	8	4	13	0	2	16	21	39	0	3	24	25	52
FC	0	0	0	2	2	0	2	3	4	9	0	2	3	6	11
AOI	0	2	7	9	18	1	1	25	8	35	1	3	32	17	53
EA	0	6	0	1	7	0	8	0	4	12	0	14	0	5	19
Total	0	9	15	16	40	1	13	44	37	95	1	22	59	53	135
Panel C: Pooled Sample															
SE	0	8	19	22	49	1	3	59	23	86	1	11	78	45	135
FC	4	0	1	2	7	10	3	5	9	27	14	3	6	11	34
AOI	0	2	8	9	19	1	1	36	8	46	1	3	44	17	65
EA	0	7	0	1	8	0	10	0	4	14	0	17	0	5	22
Total	4	17	28	34	83	12	17	100	44	173	16	34	128	78	256

Source: Author's estimates from research data, 2018 **A** - *fully capitalised;* **B** – *fully expensed;* **C** – *initially capitalised;* **D** – *not disclosed*

10.3.2 Level of Harmony in Accounting Treatment for General Administrative and Overhead Costs

10.3.2.1 Oil & Gas Sector

Panel A of Table 10.4B shows the index values which measure the level of harmony in accounting treatment for GA&O costs by oil & gas companies. It can be observed that among SE oil and gas companies listed on the main market, the level of harmony in accounting is moderate with H-index value of 0.52. The level of harmony is much lower when the 50% non-disclosers are taken into consideration, the ADM C-index of 0.12 suggests a very low level of harmony in accounting treatment for GA&O costs. Similarly, the level of harmony among FC users listed on the main market as indicated by the H-index value of 0.68 and ADM C-index value of 0.60 suggesting moderate level of harmony. This is because of the lack of complete uniformity in fully capitalising these costs as one FC company chooses to initially capitalise these costs instead. There is complete harmony among AOI and EA companies in treatment of these costs in a manner consistent with the principle of their accounting method. Among the oil & gas companies listed on the main market, whilst there is a complete harmony among AOI and EA users, there are diversities in treatment among SE and FC users. However, across all the methods the level of harmony is rather low with H-index value of 0.40 and ADM C-index of 0.12. These results reveal the need to harmonise accounting treatment for GA&O costs among oil & gas companies to promote consistency and uniformity within and across methods to enhance comparability.

Among the AIM-listed oil & gas companies, apart from AOI and EA users that exhibit complete harmony in treatment, it can be observed that there are some diversities among users of SE and FC users with H-index values of less than 1. Whilst the level of harmony among SE is high, that among FC is moderate with H-index values of 0.91

and 0.62 respectively. Across all the oil & gas companies listed on the AIM, there is moderate level of harmony (H-index = 0.65 and ADM C-index = 0.53) indicating that treatments among these companies are uniform throughout but there exist some diversities. Similarly, on the combined market among oil & gas companies, aside the AOI and EA users with complete harmony in treating GA&O costs, the index values suggest some level of diversity in treatment among SE, FC users and across all the methods, with FC users exhibiting the greatest diversity in treatment of GA&O costs.

The results reveal that GA&O costs are subjected to different treatments by oil & gas companies listed on the LSE and what is even striking is the fact that even among users of the same method there is lack of complete harmony in how these cost components are treated. This underscores the need for standardisation to harmonise the different accounting treatments both within methods and across methods to promote comparability of accounts. And as indicated earlier, to harmonise the different accounting treatment, it is recommended that GA&O costs to be initially capitalised pending determination since it is most prevalent treatment.

10.3.2.2 Mining Sector

The index values reported on Panel B of Table 10.4B indicate that aside EA users who exhibit complete harmony in the treatment of GA&O costs, on each of the markets, there are some diversities in treatment among users of the other methods with H-index values of less than one.

For instance, on the main market, SE users exhibit high level of harmony with H-index value of 0.80, and AOI users exhibit moderate harmony in treatment with H-index value of 0.65. It was not possible to measure the level of harmony for FC users because none of them disclosed how they treated GA&O costs. Across all the methods, the level of

harmony is moderate with H-index of 0.53 suggesting fairly equal split between initially capitalising and fully expensing GA&O costs. The ADM C-index values suggest low level of harmony for all the different method users because of high non-disclosure rate.

Among those listed on the AIM, it can be observed that there is complete level of harmony among EA (1) users, high harmony among SE (0.80) and AOI (0.86) but rather moderate level of harmony among FC (0.52) users as shown by the H-index values. However, taking into consideration the high number of non-disclosing companies, the ADM C-index values suggest low level of harmony for all the methods except for AOI (0.50) where there is moderate level of harmony. On the combined market, it can be observed that mining companies that adopt EA treat GA&O costs in a completely harmonious way by fully expensing them as indicated by the H-index value of 1 but given that 26% of them did not disclose how they treat these costs, the ADM C-index of 0.53 suggests moderate level of harmony. Among SE and AOI users the H-index value of 0.80 suggests high level of harmony but with the high non-disclosures among both methods, the ADM C-index values 0.21 for SE and 0.36 for AOI suggest low level of harmony. As noted among oil & gas companies, the lowest level of harmony in treatment of GA&O costs is observed among FC users with H-index value of 0.52 suggesting moderate level of harmony but the 55% non-disclosure leaves the ADM C-index value at 0.07 which indicates very low level of harmony. Similar level of harmony are observed among the different methods on the combined market with only EA users displaying complete harmony in fully expensing GA&O costs. Across the different methods, the level of harmony is moderate as indicated by the H-index values of 0.53, 0.63 and 0.59 on the main, alternative, and combined markets respectively. The ADM C-index values suggest rather very low levels of harmony owing to the high non-disclosure rate.

The results reveal the existence of diversity in accounting treatment for GA&O costs among mining companies even among those adopting same accounting methods. The evidence confirms the findings of Stadler and Nobes (2020) that the choice of accounting methods by companies may just be "labels" because actual practices within methods may differ.

10.3.2.3 Pooled Sample

The index values reported on Panel C of Table 10.4B shows the level of harmony of accounting treatment for GA&O costs among the pooled sample. Consistent with the previous observations, apart from EA users that display complete harmony in treatment, among all the other method users, there are diversities as indicated by index values of less than 1. On the main market, all the other method users exhibit moderate level of harmony as indicated by the H-index values but across the four methods, the level of harmony is rather low. On the other hand, on the alternative and combined markets, SE and AOI exhibit high harmony levels, but FC shows rather low level of harmony leaving the FC as the method with highest level of diversity in treatment. The ADM C-index values show relatively lower level of harmony for each of the methods because of the high level of non-disclosing companies.

The results indicate that extractive companies apply different accounting treatments to account for GA&O costs leading to lack of complete harmony in treatment even among users of the same method. It is notable from the findings that FC users exhibit highest level of diversity in treatment which is not very surprising. Given that FC users are normally smaller and younger compared to users of the other methods, it is not surprising to find greater diversity in the treatment of GA&O costs. Because being new companies in a highly risky industry like oil & gas industry (Wise and Spear, 2002), they are likely to copy the accounting method of established companies in order to appear legitimate consistent with mimetic pressure described by DiMaggio and Powell

(1991), but they may not necessarily have the financial strength to apply these policies consistently in dealing with transactions hence leading to diversity in treatments among them.

The low level of harmony among FC users allow this study to conclude that future standardisation attempts should pay particular attention to FC to either harmonise practices within it or in agreement to Constantatos *et al.* (2021) it should not be allowed in future standard setting. It is almost predictable that attempt to eliminate FC will face intense lobby and opposition as has been witnessed in the past (see Cortese, Irvine and Kaidonis, 2009) but with the right coercive pressure emerging from various stakeholders such as standard setters, professional accounting bodies, investors, and governmental agencies such standardisation can be achieved (Guler, Guillen and Macpherson, 2002; Irvine, 2008; Ashworth, Boyne and Delbridge, 2009).

Aside the high diversity among FC users, SE and AOI users also exhibit some level of diversity though it is not as high as that observed among FC users. These findings stresses on the need to standardisation to harmonise the different accounting methods and treatments. This is extremely urgent if comparability remains a key qualitative characteristic of accounting information. To achieve this harmony, this study recommends that the closest treatment to harmonise the different practices across the methods is to initially capitalise GA&O costs pending determination. Aside this treatment being popular among extractive companies and may not face much opposition as a least common treatment. Again, it will prevent early full capitalisation of costs when the potential to produce economic benefits has not yet been determined which

may be inconsistent with the definition of asset as provided by 2018 IASB Conceptual Framework[77].

Table 10.3B Harmony Indices for General Administrative and Overhead Costs

Panel A: Oil and Gas Sector									
Accounting method	Main Market			AIM			Combined Market		
	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)	H-index	ADM ND-Adjusted C-index	Non-disclosure rate (%)
SE	0.52	0.12	50%	0.91	0.84	4%	0.75	0.43	24%
FC	0.68	0.60	0%	0.62	0.30	28%	0.64	0.37	22%
AOI	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
EA	1.00	1.00	0%	1.00	1.00	0%	1.00	1.00	0%
Across all	0.40	0.12	42%	0.65	0.53	9%	0.56	0.35	21%
Panel B: Mining Sector									
SE	0.80	0.36	31%	0.80	0.16	54%	0.80	0.21	48%
FC	n/p	0.00	100%	0.52	0.11	44%	0.52	0.07	55%
AOI	0.65	0.14	50%	0.86	0.50	23%	0.80	0.36	32%
EA	1.00	0.71	14%	1.00	0.42	33%	1.00	0.53	26%
Across all	0.53	0.18	40%	0.63	0.23	39%	0.59	0.21	39%
Panel C: Pooled Sample									
SE	0.58	0.17	45%	0.88	0.47	27%	0.77	0.34	33%
FC	0.68	0.29	29%	0.41	0.17	33%	0.46	0.19	32%
AOI	0.68	0.17	47%	0.90	0.61	17%	0.84	0.46	26%
EA	1.00	0.75	13%	1.00	0.49	29%	1.00	0.59	23%
Across	0.45	0.15	41%	0.63	0.35	25%	0.56	0.27	31%

Source: Author's estimates from research data, 2018 *ADM DA -Archer, Delvaille & McLeay (1995) -disclosure adjusted C-index*
Benchmarks for index values: ***1.00*** *– complete harmony/comparability;* ***0.75 ≤X<1*** *-High;* ***0.50 ≤X<0.75*** *-Moderate;* ***0.25 ≤X<0.50*** *-Low;* ***0.00 <X<0.25*** *-Very low;* ***0.00*** *– no harmony/comparability;* ***n/p*** *– computation not possible because of non-disclosure*

10.3.3 Intra-Method and Inter-Method Comparability for General Administrative and Overhead Costs

10.3.3.1 Oil & Gas Sector

Table 10.4C (Panel A) presents the intra and inter- method comparability in accounting treatment for GA&O costs among oil and gas companies. It is evident that the level of intra-method comparability among oil & gas companies is moderate on the main market, but high on both alternative and combined markets with WM C-index values

[77] 2018 IASB Conceptual Framework (see paragraphs 4.5; 4.14 – 4.18)

of 0.50, 0.89 and 0.75 respectively suggesting that among oil & gas companies adopting the same accounting method the way they treat GA&O costs is not completely comparable. Between the two markets, the level of intra-method comparability for GA&O costs is higher on the AIM than on the main market.

In terms of inter-method comparability in the accounting treatment for GA&O costs among companies adopting different accounting methods, among those listed on main market, there is moderate level of inter-method comparability between SE and AOI companies with index values of 0.61 but on the alternative and combined markets the inter-method comparability is high with BM C and VDT, and A&M *I* index values of 0.61, 0.96 and 0.86 respectively. This is not surprisingly since the AOI is often argued to be a variant of SE (Gerhardy, 1999; Power, Cleary and Donnelly, 2017). Aside the comparability between SE and AOI which is quite high, the inter-method comparability between the different pairs of method (SE & FC, SE & EA, FC & AOI, FC & EA, AOI & EA) is either low or completely not comparable with BM C and VDT and A&M *I* index values of less than 0.5. Across the four methods, the BM C-index values suggest that the comparability in the treatment of GA&O costs is low but completely not comparable when measured with the VDT and A&M *I* index with values of 0.

It has often been argued in the existing literature that diversity of accounting methods impedes comparability (Flory and Grossman, 1978; Katz, 1985; Cortese, Irvine and Kaidonis, 2009; Abdo, 2016; 2018) and the evidence in this study confirms these assertions that diversity of method and treatment within methods hinder both intra and inter-method comparability of accounts of oil & gas companies.

10.3.3.2 Mining Sector

Among mining companies listed on the main market, there is 75% chance that two companies randomly selected that adopt the same accounting methods treat GA&O costs in the same way. Though this shows high intra-method comparability, it is not complete as may be expected among users of the same method. The probability is much higher on the AIM with WM C-index value of 0.84 which also indicates higher intra-method comparability. Similarly, on the combined market, there is high intra-method comparability with index value of 0.81. It is obvious that none of the intra-method comparability is complete, which is a source of concern, because it indicates that there is intra-method diversity since users of the same method do not treat these costs in a completely harmonious way.

The inter-method comparability index values for the mining companies on the main market could not be calculated for any combination involving FC users because none of the FC companies disclosed how they treated these costs. Expectedly, the inter-method comparability between SE and AOI users are observed to be moderate on the main market, and high on both alternative and combined markets with BM C and VDT, and A&M *I* index values of 0.72, 0.83 and 0.80 respectively. On the contrary, the inter-method comparability between pairs of method is observed to be moderate (0.58) between SE & FC and FC & AOI users because users of these methods either initially capitalising or fully expensing GA&O costs. On the contrary, the inter-method comparability is rather low between FC & EA users on the AIM and combined market and rather very low between AOI & EA users because treatment is largely at variance. Across all the methods, the BM C-index values suggest low comparability and the VDT, and A&M *I* index values suggest very low inter-method comparability in how GA&O costs are treated by mining companies in the sample.

The results among mining companies have also confirmed the lack of complete comparability in treatment of GA&O costs among users of the same method and some low level of inter-method comparability between some of the pairs of methods. These underscore the need for efforts to harmonise both the intra and inter-method diversities to enhance comparability of treatment of GA&O costs.

10.3.3.3 Pooled Sample

Consistent with the findings on both sectors, the WM C-index values reported on Panel C of Table 10.4C suggest moderate intra-method comparability on the main market but rather high intra-method comparability on the alternative and combined markets. It is obvious that there is no complete comparability among users of the same method indicating the existence of intra-method diversities which need to be eliminated in future standardisation attempts.

Aside the moderate inter-method comparability observed among SE & AOI on the main market and high on both alternative and combined markets, inter-method comparability between the other pairs of method is observed to be either low or very low with index values of less than 0.25. These suggest that the way different method users treat GA&O costs are not very comparable which is worrying because this can adversely affect investment decisions. Similarly, across the four methods, with the exception of moderate inter-method comparability observed on the AIM, the comparability level on the main and combined markets are low as indicated by the BM C-index values. The VDT and A&M *I* index values suggest rather very low inter-method comparability or no comparability at all.

Overall, the results suggest that the accounting treatment for GA&O costs is quite comparable among users of the same method but not completely comparable as may be

expected among users of the same method. The lack of complete intra-method comparability indicates the existence of intra-method diversities need to be eliminated through standardisation of practice within methods. In addition, the level of inter-method comparability in the accounting treatment for GA&O costs are observed to be low or not comparable at all which provides evidence to support assertions in the extant literature that diversity of accounting methods impedes comparability.

The results underscore the need for standardisation to harmonise the diversity that exists both within and across methods. This study therefore stresses that future standardisation efforts should not only aim at harmonising practices across methods alone but equally important is harmonising practices within methods.

Table 10.3C Intra and Inter-Method Comparability for General Administrative and Overhead Costs

Panel A: Oil and Gas Sector	Main Market			AIM			Combined Market		
	C-index	VDT I-index	A&M I-index	C-index	VDT I-index	A&M I-index	C-index	VDT I-index	A&M I-index
Intra-method comparability (WM C-index)	0.50			0.89			0.75		
Inter-method comparability:									
SE &FC	0.12	0.12	0.12	0.17	0.17	0.17	0.16	0.16	0.16
SE & AOI	0.61	0.61	0.61	0.96	0.96	0.96	0.86	0.86	0.86
SE & EA	0.39	0.39	0.39	0.02	0.02	0.02	0.13	0.13	0.13
FC & AOI	0.20	0.20	0.20	0.15	0.15	0.15	0.17	0.17	0.17
FC &EA	0.00	0.00	0.00	0.08	0.08	0.08	0.06	0.06	0.06
AOI & EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SE & FC & AOI & EA	0.22	0.00	0.00	0.44	0.00	0.00	0.38	0.00	0.00
Panel B: Mining Sector									
Intra-method comparability (WM C-index)	0.75			0.84			0.81		
Inter-method comparability:									
SE &FC	n/p	n/p	n/p	0.58	0.58	0.58	0.58	0.58	0.58
SE & AOI	0.72	0.72	0.72	0.83	0.83	0.83	0.80	0.80	0.80
SE & EA	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
FC & AOI	n/p	n/p	n/p	0.57	0.57	0.57	0.57	0.57	0.57
FC &EA	n/p	n/p	n/p	0.40	0.40	0.40	0.40	0.40	0.40
AOI & EA	0.22	0.22	0.22	0.04	0.04	0.04	0.08	0.08	0.08
SE & FC & AOI & EA	0.40	n/p	n/p	0.51	0.12	0.04	0.48	0.15	0.06
Panel C: Pooled Sample									
Intra-method comparability (WM C-index)	0.60			0.86			0.77		
Inter-method comparability:									
SE &FC	0.14	0.14	0.14	0.28	0.28	0.28	0.25	0.25	0.25
SE & AOI	0.62	0.62	0.62	0.89	0.89	0.89	0.80	0.80	0.80
SE & EA	0.30	0.30	0.30	0.05	0.05	0.05	0.12	0.12	0.12
FC & AOI	0.16	0.16	0.16	0.28	0.28	0.28	0.26	0.26	0.26
FC &EA	0.00	0.00	0.00	0.17	0.17	0.17	0.13	0.13	0.13
AOI & EA	0.20	0.20	0.20	0.03	0.03	0.03	0.06	0.06	0.06
SE & FC & AOI & EA	0.35	0.00	0.00	0.50	0.06	0.01	0.45	0.10	0.03

Source: Author's estimates from research data ,2018 *VDT -Van der Tas; A &M - Archer & McLeay*

Benchmarks for index values: **1.00** *– complete harmony/comparability;* **0.75 ≤x<1** *-High;* **0.50 ≤x<0.75** *-Moderate;* **0.25 ≤x<0.50** *-Low;* **0.00 <x<0.25** *-Very low;* **0.00** *– no harmony/comparability;* **n/p** *– computation not possible because of non-disclosure*

10.3.4 Concluding Remarks on Accounting for General Administrative and Overhead Costs

The previous sections have discussed the accounting treatment for GA&O costs incurred during pre-development phase of extractive activities to identify the common practices, measure the level of harmony in treatment and assess the extent of comparability both within and across methods. It is observed that there is diversity in the accounting treatment for GA&O costs among users of the different accounting methods though they tend to cluster along the treatment in line with the principle of their accounting method. But among the sampled companies it was observed that the most common treatment for GA&O costs is for them to be initially capitalised and the least common treatment is for them to be fully capitalised.

The levels of harmony show that there are diversities in treatment both within and across methods with FC users exhibiting the highest form of diversity in treatment. But because of the high number of non-disclosing companies, the ADM C-index values were found to be relatively lower suggesting lower levels of harmony than the H-index values.

It was also observed that there is high intra-method comparability in the way extractive companies adopting the same accounting method treat GA&O costs. Though high, the lack of complete intra-method comparability further confirms the existence of diversities within each of the methods. The inter-method comparability between pairs of method and across the different methods were observed to be low, very low or completely not comparable with just few exceptions, confirming that accounting treatment between methods are not comparable and hence the need for standards to regulate accounting practices in the extractive industries to promote comparability of accounts to enrich decision making of investors.

10.4 Chapter Summary

This chapter has discussed the accounting treatment for three pre-development cost components, namely, appraisal well and work (AW&W) costs, other evaluation (OEV) costs and GA&O costs to identify the common practice in terms of treatments, to assess the level of harmony in treatment and the intra-method and inter-method comparability in treatment to determine whether there is the need for standardisation and if there is, the pathways for standardisation.

The findings have shown that for each of these costs analysed, there are some diversities in the way they were treated among both oil & gas and mining companies. It was noted that diversity is still severe even among companies that adopt the same accounting methods because some companies treat these costs differently from their method users' counterparts.

The effects of the diversities in treatment are reflected in the level of harmony values reported with most of the method showing lack of complete harmony which is surprising given that they adopt the same accounting methods in treating the same cost component. The existence of diversities both within and across methods underscore the need for efforts to standardise accounting practices in the extractive industries to promote comparability of accountings.

Finally, the intra-method and inter-method comparability in accounting treatment for each of the cost components are discussed and the evidence under each cost suggests lack of complete intra-method comparability confirming the diversities that exist among users of the same method and the need for efforts to eliminate them. Much worrying is the low inter-method comparability between pairs of methods and across the all the methods which further highlight the urgent need for standardisation to promote comparability of accounts of extractive companies.

CHAPTER ELEVEN
CONCLUSIONS

11.1 Introduction

The purpose of this chapter is to present the summary of the key findings, implications of the results, limitations, and direction for future research. It starts by presenting the summary of the key findings of the research. This is followed by the implications and limitations of the research in that order. The chapter ends with suggestions for future research.

11.2 Summary of Key Findings

This research sets forth to examine the extent of diversity of accounting treatments for pre-development costs among extractive companies and explore the need and pathways for standardisation. The summary of the key findings as they address the research questions and objectives are presented below.

11.2.1 Current Accounting Practice for Pre-Development Costs

Overall, with respect to the research questions: How do extractive companies treat pre-development cost components? Are there (dis)harmonies in the way extractive companies in general treat pre-development cost components? Are there (dis)harmony in the way extractive companies that adopt the same accounting method treat pre-development cost components? Are there (dis)harmonies in the way extractive companies that adopt the different accounting methods treat pre-development cost components?

This research finds that diverse accounting practices/methods are used by extractive companies listed on the LSE in treating pre-development costs. These methods range from the most conservative EA to the most aggressive FC methods. Specifically, SE, AOI, FC and EA methods are employed. It finds that among the oil & gas companies, SE is the most common method whilst AOI tends to be the most common among mining companies. However, on each of the markets, SE is found to be the most popular method. Overall, among all sampled companies, SE is identified as the most predominant method and it is most common among companies that originate from countries like UK, Russian, Canada and Ireland. The second most common method is

the AOI which is mostly used by companies from Australia and Bermuda. FC is the third most common method and is used by companies from US. The least popular method is the most conservative EA.

Analysis of the choices between the sectors reveals that mining companies appear to be more heterogeneous in their choice of methods than their oil & gas counterparts. Similarly, AIM listed companies apply a wide range of methods than their main market counterparts. Analysis of sampled companies' (pooled) characteristics based on market capitalisation and ages reveals that EA and SE users are, on the average, bigger and older than FC users who are mostly smaller and newer (younger).

Beyond the choice of accounting method/policy, this study examines how eight different pre-development cost components are treated by users of the various methods to identify if there is diversity in treatment among users of the same method and also to identify the most common practice in terms of treatment for each cost component. It finds that for each of the eight (8) pre-development cost components analysed, there were some disharmonies in treatments among the companies, even among those who adopt the same accounting method. Even though some treated cost components in a manner consistent with the principles of their accounting method, there were still some that treated these costs differently. The study finds that most of the companies that treat costs differently from their method counterparts, were not always smaller and newer compared to mean size and age of their method users, nonetheless the smaller and newer ones form the majority.

Among the eight cost components, apart from pre-licencing costs which the study finds greater tendency for them to be fully expensed by users of the different methods, for the other cost components the most common treatment (practice) is to be initially capitalised them pending decision. The popularity of initially capitalising may be partly due to high number of SE and AOI users in the sample but it was also evident that there are instances where other method (like FC) users also initially capitalise cost components. Whilst in the oil & gas sector, the study finds that companies prefer to fully capitalise most of the cost components (apart from G&G costs) as an alternative treatment to initially capitalising, mining sector companies prefer to fully expense most of these costs except licencing and other acquisition. Overall, the study finds that it is common practice for pre-licencing costs to be fully expensed but the other cost

components to be initially capitalised. Among disclosing companies, the cost component with the highest level of harmony is identified to be pre-licencing costs (H-index = 0.97) and the one with the widest diversity is geological and geophysical costs (H-index = 0.55).

Based on the findings, this study concludes that future accounting standard should require extractive companies to fully expense pre-licencing costs in line with IAS 38 but for the other cost components, they should be required to initially capitalise them pending determination. This treatment will prevent early capitalisation of pre-development costs when the potential outcome is not known which will be in breach of the definition of asset provided by the Conceptual framework. Secondly, initially capitalising will prevent the strict application of prudence concepts which serves as disincentive because in the face of high uncertainty, prudence concept will require a complete write off of such costs. This treatment is likely to be objected to by many extractive companies especially the smaller ones since they may not have the financial capacity to write off such high costs and remain profitable. And for some, it will discourage them from undertaking exploratory works though that is the only way they can discover natural resources. So, by initially capitalising, these costs can only be eventually written off if future economic benefit is not going to flow to the company.

Furthermore, initially capitalising will allow costs to be deferred until a point when the potential outcome of exploration can be determined with a higher degree of certainty and with that the appropriate treatment can be applied in a manner consistent with accounting principles and conventions. It will ensure proper matching of cost to the revenue they help in generating consistent with the matching principle. Lastly, it is almost certain that any attempt to regulate the EI will witness some form of opposition or lobbying as has always characterised the EI. Therefore, one way to reduce the extent of opposition is by adopting a method or treatment which is used by the majority and with that if even there is opposition it will come from a smaller group. With this, since initially capitalising is the most pre-dominate treatment among extractive companies, it is recommended that the all the pre-development costs, except pre-licencing costs, should be treated in this manner.

11.2.2 Level of Harmony in Accounting Treatments for Pre-Development Costs

With respect to the question, what are the levels of harmony in accounting treatment for pre-development cost components? Overall, the study finds that based on the pooled sample, the level of harmony in the treatment of pre-development costs among users of each of the methods as measured by the H-index ranges between low to high with few occasions when the level of harmony is found to be complete. The absence of complete harmony among users of the same method in the treatment of some cost components suggests that there are users of that method that treat cost components differently from their method counterparts. EA users exhibit either complete or high level of harmony in treatment for all the cost components except for licencing and other acquisition costs which the level of harmony is low. The level of harmony in the treatment of cost components is high among SE and AOI users with few exceptions.

It is evident from the findings that FC users show the widest diversity (lowest level of harmony) in practices therefore this method is concerning and worrying – therefore a firm action is required to be made to sort out this issue. Based on this, this research suggests that standard setters need to pay attention to the FC method and consider it carefully in accounting regulation for EI. It should either be eliminated, or efforts should be made to seriously harmonise practices within it. As witnessed in the past, an attempt to eliminate FC will face fierce opposition from its users but with the right coercive pressure exercise through the regulation, stock market requirement and demand from investors and other financiers, this should be achieved.

Conversely, this study finds that there is a relatively lower level of harmony in accounting treatment for cost components among users of each of the methods when non-disclosing companies are taken into consideration as measured by ADM C-index. The level of harmony in treatment for pre-licencing costs and general administrative and overhead costs are found to be low among users of each of methods. This suggests companies failed to disclose information regarding these cost components and hence high non-disclosure rate reduced the level of harmony in treatment. The high level of non-disclosure and its resulting impact on harmony levels further indicate the need for new regulation in the EI to require mandatory disclosure of information as with most IFRSs though the current IFRS 6 does not have mandatory disclosure requirements.

Additionally, this study finds that across all the methods, apart from pre-licencing costs with high level of harmony, for the other cost components the level of harmony is moderate with the lowest level of harmony observed in the treatment for G&G costs, general administrative and overhead costs, licencing and other acquisition costs, and other exploration costs based on the pooled sample and the H-index values. This suggests that future attempt to harmonise accounting practices in the EI should pay particular attention to these "controversial" cost components by offering clear guidance on how they should be treated.

Based on these findings, this study concludes that though the level of harmony in treatment is either moderate or high, among users of each of the accounting methods, there are some diversities in treatments that deserves attention from standard setters if the elimination of differences remains of the key objectives of IFRSs. FC users exhibits the lowest level of harmony in treatment of pre-development costs and G&G cost is one of the cost components with lowest level of harmony in treatment even users of the same methods.

11.2.3 Extent of Intra-Method and Inter-Method Comparability in Accounting Treatment

With respect to the research question, how comparable are the treatments of pre-development cost components within-methods and between (across)-methods? The study finds that among the different cost components analysed, the intra-method comparability is relatively lower in the way licencing and other acquisition costs, G&G costs and General Administrative and Overhead costs are treated among users of the same method, which implies that clear guidelines are needed on how these costs should be treated to reduce diversities in treatment. Furthermore, this study finds that the intra-method comparability of accounting treatments for the different cost components are either moderate or high with few exceptions as shown by the WM C-index values. Even though the WM C-index values suggest between moderate to a high level of intra-method comparability for each of the cost components, it is worrying to note that none of them exhibits complete intra-method comparability as would have been expected of companies operating in the same sector, listed on the same market, and adopting the same accounting method in treating the same cost components. The lack of complete intra-method comparability suggests the existence of diversities in treatments among

users of the same method and this underscores the need for effort to harmonise practices within method to foster comparability in treatment.

These findings allow this study to conclude that, for each of the existing accounting methods there are some diversities and therefore future efforts to standardise practices in the EI should not seek to proposed any of the existing methods outrightly, without first harmonising the diversities within that proposed method. To ensure complete comparability within any of the existing method, there is the need for guidelines to eliminate intra-method diversities in treatment of cost components.

In terms of inter-method comparability, this study finds that the accounting treatment for pre-licencing costs is highly comparable between pairs of different accounting methods and across all the four methods. This is because most of the companies in the sample regardless of their accounting method choice fully expensed pre-licencing costs in line with the guidance of IAS 38 Intangible Assets. Apart from pre-licencing costs, the inter-method comparability for the other cost components are found to be generally low, very low or completely not comparable. Inter-method comparability in accounting treatment for cost components such as G&G costs, other exploration costs, licencing and other acquisition costs and General administrative and overhead costs were found to be relatively low with G&G cost exhibiting the lowest of inter-method comparability. This suggests that future standardisation efforts should provide adequate and clear guidance on how these cost components should be treated since there is lack of harmony among preparers of accounts on how these costs should be treated.

Additionally, this study finds that the inter-method comparability in accounting treatment for all the cost components except pre-licencing costs, between pairs of different accounting methods (SE&FC, SE&AOI, SE&EA, FC&AOI, FC&EA and AOI&EA) and across all the four methods (SE&FC&AOI&EA) is either low, very low or completely not comparable with some few exceptions. One of these exceptions is the inter-method comparability between SE and AOI users, which for most of the cost components are found to be high or moderate. This is not surprising because AOI has been described as a variant of the SE method.

These suggest that the multiplicity of accounting methods makes comparability difficult and hence this study concludes that there is an urgent need for standardisation to promote comparability of accounts of companies in the EI through eliminating some of

the choices and harmonising treatment within methods. As one of the core mandates of IFRSs is to eliminate differences and promote comparability, the issue of diversity in accounting methods coupled with diversities of treatment within methods deserves attention from IASB. Based on the findings, this study supports the numerous calls for standardisation for the EI and strongly advocates for separate accounting standard to deal with the age-long issue of diversity in accounting methods.

11.2.4 The Need for Standardisation in the EI

Regarding the question, is there the need to standardise accounting practices by EI? The findings of this research provide compelling evidence in support of the urgent need for standardisation of accounting practices in the EI. The findings confirms the existence of diverse accounting methods and further adds that beyond the diversity of accounting methods that prior studies have reported, there are diversities in treatments even within individual methods which impedes intra-method comparability. It also provides evidence to support the assertion that the diversity of accounting methods adversely affects comparability both within and between methods.

The low, very low or no inter-method comparability in accounting treatments of the cost components is concerning. If these cost components are not treated in a comparable way, then they will eventually affect the overall comparability of financial reports. And since financial reports remain one of the key sources of information for investors in undertaking their investment decisions, the lack of comparability of accounts can mislead them.

Given the importance of comparability as a key qualitative characteristic of accounting information and the economic significance of the EI, evidence provided by this research allows the study to conclude that there is the need for standardisation of the EI to deal with the multiplicity of accounting methods used in accounting for pre-development costs and also harmonise practices within accounting methods to foster comparability of accounts and make financial reports relevant for decision making.

11.2.5 Pathways for Standardisation in the EI

In response to the question, what are the pathways for standardising accounting practices in the EI? For each of the eight cost components analysed, this study identifies the most common treatment/ practice among sample companies and recommends it has

the most likely treatment to harmonise the different practices. Adopting the most common treatment among extractive companies implies that if even there will be opposition or lobbying, it will come from the minority which may be easier to manage than if it comes from the majority.

For pre-licencing costs, this study recommends that it is treated in line with IAS 38 and be fully expensed when incurred. As noted above there is high harmony in fully expensing these costs among both oil & gas and mining companies. Aside pre-licencing costs, for the other cost components, the study recommends that they should all be initially capitalised when incurred pending determination. By deferring these costs till after evaluation, this recommendation overcomes the limitations of the 2010 DP proposal which would have allowed full capitalisation of costs when the uncertainty is high. When these costs are initially capitalised, companies can keep them in a suspense account and carry them forward till the point when there is a high degree of certainty, and the outcome of exploration can be determined with some of level of confidence. As noted by Field (1969), the uncertainty surrounding exploratory activities reduces when companies advance through the phases. After evaluation companies will be able to decide if an area is commercially viable and technically feasible to develop and at this stage, the appropriate treatment, either to fully capitalise or fully expense these costs can be decided on.

Based on these recommended treatments, this study proposes this pathway to achieve standardisation. Because the recommended treatments align more with the principles of SE method and evidence from this study show that there are some diversities with the SE, IASB should offer clear guidelines based on these recommended treatments so that accounting treatment within this method is completely harmonised to achieve what this study calls "*harmonised SE method*". Other method users can be allowed to continue using their methods, since any attempt to eliminate any method will be opposed by users of that method. But companies that use other methods different from the harmonised SE methods should be required to restate their financial statements using the harmonised method so that there will be common basis for comparison across methods but for those who will adopt the harmonised SE method, they will not need to restate their financial results.

In addition, this study suggests that future standardisation efforts should pay particular attention to cost components with high levels of diversities in treatment, termed as "controversial" cost components in this study. They include G&G costs, general administrative and overhead costs, licencing and other acquisition costs, and other exploration costs. For these costs, the IASB should offer clear guidance on how they should be treated to avoid the exercise of too much discretion in their treatment. As evident from the Australian experience with AAS 6, clearer and more detailed guidance ensure compliance and reduces diversities in treatment.

Based on the evidence provided in this research, the IASB should not attempt to recommend any of the already existing accounting method for use by extractive companies without first dealing with the diversities that exist within the method. Because at present if all extractive companies even adopt any of the existing accounting methods without practices within it being harmonised, there will still be diversities within method and high comparability of accounts will not be achieved as expected.

Another issue of concern for future standardisation is disclosure practices. Though the current IFRS 6 does not have disclosure requirement, it is recommended that future standard for the EI includes mandatory disclosure requirements so that company can provide full disclosure of information on how pre-development costs are treated with clear description since some of the explanations in the notes to the accounts of the sampled companies were quite confusing.

Lastly, any attempt to regulate accounting practices by the EI is likely to be resisted, opposed, or lobbied against by a group of companies to be affected. As such there is the need for the adequate backing by all powerful stakeholders. To ensure compliance and to mitigate the risk of lobbying, this study recommends that there should be the issue of a separate standard for the EI and the members of the accounting standard setting board should be well constituted and fairly represented by all stakeholder to ensure lobbying and capturing of the board is not possible as it was in the past. Additionally, stock markets should require companies to comply with the requirements of the new standards before they can be listed or to maintain their listing. Furthermore, according to coercive isomorphism hypothesis, investors and other financiers can also be educated to demand compliance with the issued standard to ensure comparability of accounts.

11.3 Implications

11.3.1 Research Implications

Though, there are number of studies on accounting practices in the EI in the extant literature, the focus of these studies has been on the diversity of accounting methods. At present, the diversity of accounting methods used by extractive companies is well documented in the literature but what is lacking is the extent of diversity that exists within methods, and clarity on the concentration of the diverse practices around certain accounting practices. Because of the potential for future standards to recommend one of the existing accounting methods, knowledge of the diversity that exists within methods and awareness of the concentration of practices around certain alternatives will add to knowledge and help shape future standardisation approach.

This research opens up new horizons to researchers by underscoring the need for more studies diving deep into the issue of diversity of accounting methods in the EI. This study moves beyond the diversity of methods to investigate diversity in treatments within methods and by this extend the literature by providing fresh insight into the extent of diversity that exist within method and measuring the level of harmony and comparability using statistical indices. The results show that for each of the existing methods, there are diversities in treatment for components of pre-development costs which impacts the level of harmony and comparability. This means for investors comparing financial reports of extractive companies, care must be taken since their decision could be influenced by their choice of accounting method the companies follow. For auditors, it is necessary for them to pay attention to how accounting policies adopted by clients are applied since some companies can state that they follow a particular accounting method but apply treatments not consistent with their chosen method. The findings of this study should also arouse interest in this area and future research can probe more into what account for diversity and how to eliminate these diversities in treatment.

11.3.2 Policy Implications

The findings of this research give rise to the following policy implications and recommendations:

i. To resolve the issue of diversity of accounting practices in the EI, there is the need for a separate accounting standard to regulate the practices. The nature and complexity of the diversity is such that placing the extractive project under the scope of a revised IAS 38 Intangible Assets as has been proposed by researchers like Nobes and Stadler (2021) will not be appropriate. The EI is unique, and the nature of their operation is significantly different from other industries. A specially designed accounting standard addressing the industry specific challenges is what is needed to resolve this age-long problem of diversity.

ii. The IASB should avoid adopting any of the existing accounting methods as a way of eliminating the diversity of methods. This is because currently there are some diversities in treatments within each of the methods and complete comparability of treatment within methods cannot be achieved at the moment. Instead, if there is the need to select any of the methods, the Board should first of all, harmonise practices within that method before it can be put forward for companies to adopt and use. By this, this study further recommends:

   a. The treatment of some cost components pose challenges to companies and as such are subjected to diverse treatment even among users of the same accounting methods. For these cost components which this study refer to as "controversial" cost components - G&G costs, general administrative and overhead costs, licencing and other acquisition costs, and other exploration costs, the IASB should offer clear guidance on how they should be treated under the proposed method to ensure diversity in treatments can be reduced.

   b. The FC method is one method within which there is high level of diversity in the treatment of cost components. It is recommended that future standardisation effort, critically review the suitability of this method in accounting for pre-development costs. It may be a method adopted by companies that gives them room to manipulate and manage their books. Should it be maintained as one of the methods allowed practices in the form of treatments within it should be harmonised.

iii. Another issue of concern for future standardisation is disclosure practices. Though the current IFRS 6 does not have disclosure requirement, it is recommended that future standard for the EI includes mandatory disclosure requirements so that company can provide full disclosure of information on how pre-development costs are treated.

iv. Lastly, any attempt to regulate accounting practices with the EI is likely to be resisted, opposed, or lobbied against by a group of companies to be affected. As such there is the need for the adequate backing by all powerful stakeholders. To ensure compliance and mitigate the extent of lobbying, to any regulation attempt, the membership of the accounting standard setting board should be well constituted and fairly represented by all stakeholder to ensure lobbying and capturing of the board is not as possible as it was in the past. In addition, stock markets can be brought on board to ensure market compliance with the propose standard by making it a requirement for listing or for those already listed it should be mandatory for them to comply with that standard to maintain their listing. Furthermore, according to coercive isomorphism by DiMaggio and Powell (1983; 1991), investors and other financiers can also be educated to demand compliance by EI.

11.4 Limitations of the Research

The results of this research are subjected to a number of limitations. First, the researcher acknowledges that subjective judgement exercised in categorising the accounting methods of a number of companies where no clear-cut disclosures were made, though, efforts were made to minimise wrong classifications. Some of the companies did not clearly name the accounting method they use and the researcher with the help of supervisors and other professional practitioners had to make meaning of the description provided and classify the accounting method appropriately under one of the four methods.

Second, another limitation of this study is related to the major deficiency with index-based methods (H, I, C) of measuring harmony and comparability as used in this research. Index based methods are generally difficult to test for significance as noted by Canibano and Mora (2000) and Pierce and Weetman (2000). Additionally, there is no consensus on the benchmarks for interpreting index values which means the

interpretation of the values are subjected to discretion because it might be classified as high by one researcher and possibly moderate for another.

Another limitation that is worthy of note relates to the difficulty of establishing whether the non-disclosure of information related to the cost component was as result of non-applicability or failure to disclose. In situations like this, judgement was made to treat these as failure to disclose when calculating the level of harmony index value using the ADM C-index although it might be that the cost component in question might not be applicable to that particular company.

Finally, the study was limited to just one time period, thus, 2018 and covered eight pre-development cost components and sampled companies were selected from among companies listed on the LSE. A more globalised sample with companies from other major stock markets noted for hosting extractive companies such as the Australian stock market, Johannesburg Stock market, Canadian Stock market etc would have provided a more holistic picture. Again, if the study had collected data from multiple periods and used it to measure trend in harmonisation in addition to the state of harmony, it would have provided more insights into the issue under investigation. Any attempts to apply the findings of this study outside these boundaries should be done with care.

11.5 Suggestions for Further Research

There is considerable scope for further research relating to the topic of accounting practice by the EI. Firstly, this study can be replicated for multiple periods. This can give a more complete picture of the extent and trend of accounting practices over time. Because studying multiple periods will help understand the issue not only from one point in time but over a given period as well which will provide additional insight.

Secondly, this research focused on companies listed on LSE alone. Much as the LSE is described as a major source of equity for extractive companies, it would be interesting for a more cross-exchange sample to be used involving companies from other major stock markets around the world like Canada, Australia, and South Africa. Future research could widen the sample by including companies listed on other stock markets.

Furthermore, a review of literature has shown that little is known about the level of harmony and comparability of the accounting treatment for pre-development cost components in the EI. Future studies can therefore explore further the issue of diversity

in the EI by examining the level of harmony and comparability using methods. This study explore how eight pre-development cost components are treated, future studies can investigate how other pre-development cost components such as payment to external contractors, cost of shooting rights and bottom holes contributions are treated.

Finally, future research should explore further the issue of diversity of accounting practices in the EI using a qualitative approach. Views and opinions of various stakeholders such as preparers, auditors, users, analysts, and standard setter can be assessed to buttress the findings of such quantitative studies.

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Appendix A: Material Harmonisation Studies

	Van Der Tas (1988)	Van Der Tas (1992a,1992b)	Emenyonu and Gray (1992)	Archer et al. (1995)	Herrmann and Thomas (1995)	Garcia Benau (1994)	Archer et al. (1996)	Krisement (1997)	McLeay et al. (1999)
Objective (European Material Harmonization or harmony)	The proposal of a methodology *C index *Examples of National and international harmonization	Harmonization * Deferred taxation	Harmony *Inventory valuation *Depreciation *Goodwill *R&D *Fixed Assets *ext. Items	Harmonization * Deferred taxation *Goodwill	Harmony * Fixed Asset valuation *Depreciation Methods *Goodwill *R&D *Inventories *Foreign Currency	Harmony *Foreign Currency *R&D *Leasing	Harmonization * Deferred taxation *Goodwill	Proposal of a methodology *Foreign Currency as an example	Proposal of a methodology *Goodwill as an example

Data Source	Annual Reports	Annual Reports	Annual Reports	Annual Reports	Annual Reports	Survey Data	Annual Reports	Survey Data	Annual Reports
	(1978 - 84)	(1978-88)	-1989	(1986-7 and 1990-2)	(1992-3)	(FEE report for 1989)	(1986-7 and 1990-1)	(FEE Report 1989)	(1987-93)
	National	154 companies	78 companies	89 companies	20 Companies		89 companies		286 companies
	*UK, Netherlands and USA	*Belgium	*France	*Belgium	*Belgium	*Belgium	*Belgium	*Belgium	*Austria
	International	*Denmark	*Germany	*France	*Denmark	*France	*France	*France	*Belgium
	*USA and Netherlands	*France	*UK	*Germany	*France	*Denmark	*Germany	*Denmark	*Denmark
		*Germany		*Ireland	*Germany	*Germany	*Ireland	*Germany	*Finland
		*Greece		*Netherlands	*Ireland	*Greece	*Netherlands	*Greece	*France
		*Ireland		*Sweden	*Netherlands	*Ireland	*Sweden	*Ireland	*Germany
		*Luxembourg		*Switzerland	*Portugal	*Luxembourg	*Switzerland	*Luxembourg	*Ireland
		*UK		*UK	*UK	*Netherlands		*Netherlands	*Luxembourg
		*Netherlands				*UK		*UK	*Netherlands
									*Spain
									*Sweden
									*Switzerland
									*UK

Methodology	*H index *C index	*C index *Chi-square	*I index	*C index	*I index *Adjusted I index *Chi-square	*I index *Adjusted I index (IC) *Chi-square	*Nested hierarchy of log-linear models	*V ratio (heterogeneity+ entropy)	*Nested statistical models
Main conclusions	C index is a good method for measuring harmony	The degree of harmony increases considering the notes to the accounts' for individual and	Relative lack of harmony	C index is an imperfect measure. Little progress in the period. This could be due to small or negative within-	High level of harmony in *FCT *Inventory value *Depreciation Low level of harmony in * R&D	Certain progress has been made. FCT has the higher index	Little progess in the period. This could be due to small or negative within-country comparability	Entropy helps to measure harmonization	Harmony does not depend on there being a uniform method but in adopting the same method under the same circumstances.

consolidated accounts. Positive impact of Fourth Directive on individual accounts and no significant impact on consolidated accounts.	country comparability	*Fixed assets *Goodwill		Increase in disharmony in goodwill.

(Canibano and Mora, 2000, p. 354)

Appendix B: List of Successful Efforts Companies in Sample

No	Admission Date	Company Name	Sector	Country of Incorporation	World Region	Market
1	06/07/1995	Aminex Plc	Oil & Gas	Ireland	Europe	MAIN MARKET
2	29/03/1954	Bp Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
3	22/12/1988	Cairn Energy Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
4	04/04/2014	Canadian Overseas Petroleum Limited	Oil & Gas	Canada	North America	MAIN MARKET
5	18/10/2000	China Petroleum & Chemical Corporation	Oil & Gas	China	Asia	MAIN MARKET
6	04/10/2017	Curzon Energy Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
7	16/03/2018	Energean Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
8	06/04/2010	Enquest Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
9	17/12/2009	Exillon Energy Plc	Oil & Gas	Isle of Man	Europe	MAIN MARKET
10	22/06/2011	Genel Energy Plc	Oil & Gas	Jersey	Europe	MAIN MARKET
11	08/09/2004	Gulf Keystone Petroleum Ltd	Oil & Gas	Bermuda	North America	MAIN MARKET
12	20/02/2008	Hardy Oil & Gas Plc	Oil & Gas	Isle of Man	Europe	MAIN MARKET
13	03/02/2016	Highlands Natural Resources Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
14	28/06/1985	Hunting Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
15	18/07/1995	Jkx Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
16	21/08/2017	Kosmos Energy Ltd	Oil & Gas	United States	North America	MAIN MARKET
17	20/06/2014	Nostrum Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
18	06/12/2006	Oil And Gas Development Company Limited	Oil & Gas	Pakistan	Asia	MAIN MARKET
19	13/07/2011	Ophir Energy Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
20	27/07/2005	Pao Novatek	Oil & Gas	Russian Federation	Europe	MAIN MARKET

21	21/12/2017	Pennpetro Energy Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
22	07/10/2005	Petrofac Limited	Oil & Gas	Jersey	Europe	MAIN MARKET
23	28/10/1996	Pjsc Gazprom	Oil & Gas	Russian Federation	Europe	MAIN MARKET
24	07/05/1997	Pjsc Lukoil	Oil & Gas	Russian Federation	Europe	MAIN MARKET
25	13/12/1996	Pjsc Tatneft	Oil & Gas	Russian Federation	Europe	MAIN MARKET
26	20/02/1973	Premier Oil Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
27	13/01/2016	Rockrose Energy Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
28	19/07/2006	Rosneft Oil Company	Oil & Gas	Russian Federation	Europe	MAIN MARKET
29	20/07/2005	Royal Dutch Shell Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
30	12/11/2013	Societatea Nationala De Gaze Naturale "Romgaz" S.A.	Oil & Gas	Romania	Europe	MAIN MARKET
31	29/05/1997	Soco International Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
32	26/09/1973	Total S.A.	Oil & Gas	France	Europe	MAIN MARKET
33	18/12/2000	Tullow Oil Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
34	25/04/2019	Valeura Energy Inc	Oil & Gas	Canada	North America	MAIN MARKET
35	11/01/2017	Zenith Energy Ltd.	Oil & Gas	Canada	North America	MAIN MARKET
36	15/11/1999	Gail (India) Ld	Oil & Gas	India	Asia	MAIN MARKET
37	19/12/2014	Altyn Plc	Mining	United Kingdom	Europe	MAIN MARKET
38	06/06/1988	Anglesey Mining Plc	Mining	United Kingdom	Europe	MAIN MARKET
39	26/07/2002	Avocet Mining Plc	Mining	United Kingdom	Europe	MAIN MARKET
40	31/07/2018	Kavango Resources Plc	Mining	United Kingdom	Europe	MAIN MARKET
41	17/11/1994	Kenmare Resources Plc	Mining	Ireland	Europe	MAIN MARKET
42	30/04/2007	Pjsc Magnitogorsk Iron & Steel Works	Mining	Russian Federation	Europe	MAIN MARKET
43	05/07/2017	Public Joint Stock Company Polyus	Mining	Russian Federation	Europe	MAIN MARKET
44	25/02/2004	Public Joint Stock Company Severstal	Mining	Russian Federation	Europe	MAIN MARKET

45	02/11/2011	Polymetal International Plc	Mining	Jersey	Europe	MAIN MARKET
46	30/01/2017	Rainbow Rare Earths Limited	Mining	Guernsey	Europe	MAIN MARKET
47	18/12/2017	Shefa Yamim (A.T.M.) Ltd	Mining	Israel	Middle East	MAIN MARKET
48	10/02/2006	Solgold Plc	Mining	United Kingdom	Europe	MAIN MARKET
49	27/07/2009	Tata Steel Limited	Mining	India	Asia	AIM
50	27/09/2004	Aaa Reliance Industries Limited	Oil & Gas	India	Asia	AIM
51	16/11/2004	Amerisur Resources Plc	Oil & Gas	United Kingdom	Europe	AIM
52	06/03/2017	Anglo African Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	AIM
53	14/11/2016	Angus Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
54	29/07/2010	Argos Resources Limited	Oil & Gas	Falkland Islands	Latin America	AIM
55	14/07/2004	Baron Oil Plc	Oil & Gas	United Kingdom	Europe	AIM
56	07/12/2004	Bowleven Plc	Oil & Gas	United Kingdom	Europe	AIM
57	30/06/2005	Clontarf Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
58	16/11/2007	Columbus Energy Resources Plc	Oil & Gas	United Kingdom	Europe	AIM
59	08/02/2017	Eco (Atlantic) Oil & Gas Ltd	Oil & Gas	Canada	North America	AIM
60	04/02/2014	Hurricane Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
61	25/07/2017	I3 Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
62	08/08/2018	Jadestone Energy Inc	Oil & Gas	Canada	North America	AIM
63	17/03/2011	Jersey Oil And Gas Plc	Oil & Gas	United Kingdom	Europe	AIM
64	21/04/2006	Lansdowne Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	AIM
65	17/05/2013	Lekoil Limited	Oil & Gas	Cayman Islands	North America	AIM
66	23/02/2005	Nostra Terra Oil And Gas Company Plc	Oil & Gas	United Kingdom	Europe	AIM
67	20/03/2008	Nu-Oil And Gas Plc	Oil & Gas	United Kingdom	Europe	AIM
68	16/02/2006	Oilex Ld	Oil & Gas	Australia	Pacific	AIM
69	05/04/2006	Pantheon Resources Plc	Oil & Gas	United Kingdom	Europe	AIM

70	13/03/2000	Parkmead Group (The) Plc	Oil & Gas	United Kingdom	Europe	AIM
71	18/08/2000	Petrel Resources Plc	Oil & Gas	Ireland	Europe	AIM
72	24/12/2018	Petrotal Corporation	Oil & Gas	Canada	North America	AIM
73	02/10/2007	Phoenix Global Resources Plc	Oil & Gas	United Kingdom	Europe	AIM
74	24/06/2005	Providence Resources Plc	Oil & Gas	Ireland	Europe	AIM
75	23/10/2007	Range Resources Limited	Oil & Gas	Australia	Pacific	AIM
76	27/09/2002	Regal Petroleum Plc	Oil & Gas	United Kingdom	Europe	AIM
77	15/08/2005	Rockhopper Exploration Plc	Oil & Gas	United Kingdom	Europe	AIM
78	21/09/2016	San Leon Energy Plc	Oil & Gas	Ireland	Europe	AIM
79	01/08/2014	Savannah Petroleum Plc	Oil & Gas	United Kingdom	Europe	AIM
80	20/05/2016	Sdx Energy Inc.	Oil & Gas	Canada	North America	AIM
81	13/12/2005	Serica Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
82	18/05/2018	Serinus Energy Plc	Oil & Gas	Jersey	Europe	AIM
83	27/06/2005	Sirius Petroleum Plc	Oil & Gas	United Kingdom	Europe	AIM
84	12/04/2007	Solo Oil Plc	Oil & Gas	United Kingdom	Europe	AIM
85	13/07/2006	Sound Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
86	21/10/2002	Sterling Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
87	26/06/2017	Touchstone Exploration Inc	Oil & Gas	Canada	North America	AIM
88	17/01/2006	Tower Resources Plc	Oil & Gas	United Kingdom	Europe	AIM
89	29/06/2018	Transglobe Energy Corporation	Oil & Gas	Canada	North America	AIM
90	14/02/2013	Trinity Exploration & Production Plc	Oil & Gas	United Kingdom	Europe	AIM
91	02/03/2005	Uk Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	AIM
92	30/07/2013	Union Jack Oil Plc	Oil & Gas	United Kingdom	Europe	AIM
93	27/07/2004	Victoria Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	AIM

94	25/04/2007	Volga Gas Plc	Oil & Gas	United Kingdom	Europe	AIM
95	02/11/2018	Wentworth Resources Plc	Oil & Gas	Jersey	Europe	AIM
96	18/05/2004	Zoltav Resources Inc	Oil & Gas	Cayman Islands	North America	AIM
97	27/09/2004	Pjsc Mmc Norilsk Nickel	Mining	Russian Federation	Europe	AIM
98	09/11/2017	Afritin Mining Limited	Mining	Guernsey	Europe	AIM
99	04/04/2005	Alba Mineral Resources Plc	Mining	United Kingdom	Europe	AIM
100	25/05/2006	Alien Metals Limited	Mining	British Virgin Islands	North America	AIM
101	15/03/2006	Amur Minerals Corporation	Mining	British Virgin Islands	North America	AIM
102	29/07/2005	Anglo Asian Mining Plc	Mining	United Kingdom	Europe	AIM
103	28/07/2005	Ariana Resources Plc	Mining	United Kingdom	Europe	AIM
104	31/07/2007	Arkle Resources Plc	Mining	Ireland	Europe	AIM
105	09/05/2005	Beowulf Mining Plc	Mining	United Kingdom	Europe	AIM
106	02/12/2013	Bluejay Mining Plc	Mining	United Kingdom	Europe	AIM
107	02/02/2011	Botswana Diamonds Plc	Mining	United Kingdom	Europe	AIM
108	26/03/2012	Bushveld Minerals Limited	Mining	Guernsey	Europe	AIM
109	08/11/2007	Chaarat Gold Holdings Ltd	Mining	British Virgin Islands	North America	AIM
110	02/12/2004	China Nonferrous Gold Limited	Mining	Cayman Islands	North America	AIM
111	31/05/2006	Condor Gold Plc	Mining	United Kingdom	Europe	AIM
112	30/05/2000	Conroy Gold & Natural Resources Plc	Mining	Ireland	Europe	AIM
113	20/01/2006	Ecr Minerals Plc	Mining	United Kingdom	Europe	AIM
114	21/12/2017	Erris Resources Plc	Mining	United Kingdom	Europe	AIM
115	17/12/2010	Georgian Mining Corporation	Mining	British Virgin Islands	North America	AIM
116	25/03/2004	Goldstone Resources Limited	Mining	Jersey	Europe	AIM
117	22/11/2005	Herencia Resources Plc	Mining	United Kingdom	Europe	AIM
118	17/08/2010	Horizonte Minerals Plc	Mining	United Kingdom	Europe	AIM

119	04/05/2001	Ironveld Plc	Mining	United Kingdom	Europe	AIM
120	01/09/2005	Karelian Diamond Resources Plc	Mining	Ireland	Europe	AIM
121	30/12/2013	Kodal Minerals Plc	Mining	United Kingdom	Europe	AIM
122	06/04/2005	Landore Resources Limited	Mining	Guernsey	Europe	AIM
123	10/06/2010	Ncondezi Energy Limited	Mining	British Virgin Islands	North America	AIM
124	04/01/2006	Oriole Resources Plc	Mining	United Kingdom	Europe	AIM
125	10/12/2012	Premier African Minerals Limited	Mining	British Virgin Islands	North America	AIM
126	08/04/2005	Rambler Metals & Mining Plc	Mining	United Kingdom	Europe	AIM
127	02/03/2012	Rockfire Resources Plc	Mining	United Kingdom	Europe	AIM
128	01/11/2010	Savannah Resources Plc	Mining	United Kingdom	Europe	AIM
129	10/05/2005	Serabi Gold Plc	Mining	United Kingdom	Europe	AIM
130	08/06/2011	Strategic Minerals Plc	Mining	United Kingdom	Europe	AIM
131	25/11/2003	Trans-Siberian Gold Plc	Mining	United Kingdom	Europe	AIM
132	27/08/2010	Tri-Star Resources Plc	Mining	United Kingdom	Europe	AIM
133	12/09/2007	Uru Metals Limited	Mining	British Virgin Islands	North America	AIM
134	04/11/2004	W Resources Plc	Mining	United Kingdom	Europe	AIM
135	20/02/2006	Xtract Resources Plc	Mining	United Kingdom	Europe	AIM

Appendix C: List of Full Cost Companies in Sample

No.	Admission Date	Company Name	Sector	Country of Incorporation	World Region	Market
1	23/06/2008	Cadogan Petroleum Plc	Oil & Gas	United Kingdom	Europe	MAIN MARKET
2	17/12/2007	Endeavour International Corporation	Oil & Gas	United States	North America	MAIN MARKET
3	17/08/2006	G3 Exploration Limited	Oil & Gas	Cayman Islands	North America	MAIN MARKET
4	10/10/2018	Gran Tierra Energy Inc.	Oil & Gas	United States	North America	MAIN MARKET
5	28/05/2010	Great Eastern Energy Corporation Limited	Oil & Gas	India	Asia	MAIN MARKET
6	15/12/2005	Novolipetsk Steel	Basic Materials	Russian Federation	Europe	MAIN MARKET
7	12/08/2008	Pjsc Acron	Basic Materials	Russian Federation	Europe	MAIN MARKET
8	12/06/2006	Public Joint Stock Company Gazprom Neft	Oil & Gas	Russian Federation	Europe	AIM
9	11/06/2018	Block Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
10	24/05/2005	Borders & Southern Petroleum Plc	Oil & Gas	United Kingdom	Europe	AIM
11	22/12/1995	Cabot Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
12	03/03/2008	Caspian Sunrise Plc	Oil & Gas	United Kingdom	Europe	AIM
13	19/05/2008	Chariot Oil & Gas Limited	Oil & Gas	Guernsey	Europe	AIM
14	17/01/2008	Egdon Resources Plc	Oil & Gas	United Kingdom	Europe	AIM
15	27/07/2005	Empyrean Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
16	28/03/2013	Falcon Oil & Gas Ltd.	Oil & Gas	Canada	North America	AIM
17	11/11/2004	Europa Oil & Gas (Holdings) Plc	Oil & Gas	United Kingdom	Europe	AIM
18	31/12/2007	Igas Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
19	30/09/2013	Independent Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	AIM
20	06/06/2008	Indus Gas Limited	Oil & Gas	Guernsey	Europe	AIM
21	09/05/2008	Iofina Plc	Oil & Gas	United Kingdom	Europe	AIM
22	25/03/2002	Nautilus Marine Services Plc	Oil & Gas	United Kingdom	Europe	AIM
23	02/06/2004	Rose Petroleum Plc	Oil & Gas	United Kingdom	Europe	AIM

24	21/07/2011	Tomco Energy Plc	Oil & Gas	Isle of Man	Europe	AIM
25	10/11/2015	United Oil & Gas Plc	Oil & Gas	United Kingdom	Europe	AIM
26	31/03/2006	Cadence Minerals Plc	Mining	United Kingdom	Europe	AIM
27	27/06/2005	Caledonia Mining Corporation Plc	Mining	Jersey	Europe	AIM
28	30/09/2010	Central Asia Metals Plc	Mining	United Kingdom	Europe	AIM
29	31/03/2006	Galantas Gold Corporation	Mining	Canada	North America	AIM
30	26/07/2006	Goldplat Plc	Mining	United Kingdom	Europe	AIM
31	10/12/2010	Hummingbird Resources Plc	Mining	United Kingdom	Europe	AIM
32	30/11/2018	Kropz Plc	Mining	United Kingdom	Europe	AIM
33	22/10/2004	Metals Exploration Plc	Mining	United Kingdom	Europe	AIM
34	30/06/2006	Vast Resources Plc	Mining	United Kingdom	Europe	AIM

Appendix D: List of Area of Interest Companies in Sample

No.	Admission Date	Company Name	Sector	Country of Incorporation	World Region	Market
1	14/04/2014	Seplat Petroleum Development Company Plc	Oil & Gas	Nigeria	Africa	MAIN MARKET
2	24/03/2010	Acacia Mining Plc	Mining	United Kingdom	Europe	MAIN MARKET
3	26/07/2010	Afarak Group Plc	Mining	Finland	Europe	MAIN MARKET
4	30/12/1996	Anglo Pacific Group Plc	Mining	United Kingdom	Europe	MAIN MARKET
5	06/12/2006	Berkeley Energia Limited	Mining	Australia	Pacific	MAIN MARKET
6	28/07/1997	Bhp Group Plc	Mining	United Kingdom	Europe	MAIN MARKET
7	08/11/2017	En+ Group Plc	Mining	Jersey	Europe	MAIN MARKET
8	20/06/2007	Ferrexpo Plc	Mining	United Kingdom	Europe	MAIN MARKET
9	28/03/2019	Ferro-Alloy Resources Limited	Mining	Guernsey	Europe	MAIN MARKET
10	19/02/2007	Gem Diamonds Limited	Mining	British Virgin Islands	North America	MAIN MARKET
11	24/05/2011	Glencore Plc	Mining	Jersey	Europe	MAIN MARKET
12	08/11/2006	Hochschild Mining Plc	Mining	United Kingdom	Europe	MAIN MARKET
13	12/10/2005	Kaz Minerals Plc	Mining	United Kingdom	Europe	MAIN MARKET
14	22/09/1961	Lonmin Plc	Mining	United Kingdom	Europe	MAIN MARKET
15	26/11/2018	Mod Resources Limited	Mining	Australia	Pacific	MAIN MARKET
16	22/04/2009	Petropavlovsk Plc	Mining	United Kingdom	Europe	MAIN MARKET
17	03/09/2015	Prairie Mining Limited	Mining	Australia	Pacific	MAIN MARKET
18	01/08/2005	Sirius Minerals Plc	Mining	United Kingdom	Europe	MAIN MARKET
19	26/05/2015	South32 Limited	Mining	Australia	Pacific	MAIN MARKET
20	03/02/2012	88 Energy Limited	Oil & Gas	Australia	Pacific	AIM
21	10/11/2004	Ascent Resources Plc	Oil & Gas	United Kingdom	Europe	AIM
22	16/06/2010	Bahamas Petroleum Company Plc	Oil & Gas	Isle of Man	Europe	AIM

23	24/02/2017	Coro Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
24	12/12/2005	Echo Energy Plc	Oil & Gas	United Kingdom	Europe	AIM
25	07/03/2005	Global Petroleum Limited	Oil & Gas	Australia	Pacific	AIM
26	20/03/2014	Mosman Oil And Gas Limited	Oil & Gas	Australia	Pacific	AIM
27	23/06/2011	Red Emperor Resources Nl	Oil & Gas	Australia	Pacific	AIM
28	02/08/2011	Salt Lake Potash Limited	Oil & Gas	Australia	Pacific	AIM
29	18/07/2007	Spitfire Oil Limited	Oil & Gas	Bermuda	North America	AIM
30	30/11/2015	Tlou Energy Limited	Oil & Gas	Australia	Pacific	AIM
31	15/09/2010	Arc Minerals Limited	Mining	British Virgin Islands	North America	AIM
32	12/09/2016	Aura Energy Limited	Mining	Australia	Pacific	AIM
33	26/03/2018	Bacanora Lithium Plc	Mining	United Kingdom	Europe	AIM
34	08/01/2013	Base Resources Limited	Mining	Australia	Pacific	AIM
35	29/09/2006	Bezant Resources Plc	Mining	United Kingdom	Europe	AIM
36	09/10/2017	Cora Gold Limited	Mining	British Virgin Islands	North America	AIM
37	21/02/2005	Edenville Energy Plc	Mining	United Kingdom	Europe	AIM
38	02/10/1996	Eurasia Mining Plc	Mining	United Kingdom	Europe	AIM
39	10/12/2015	European Metals Holdings Limited	Mining	British Virgin Islands	North America	AIM
40	28/09/2011	Galileo Resources Plc	Mining	United Kingdom	Europe	AIM
41	19/04/2004	Gcm Resources Plc	Mining	United Kingdom	Europe	AIM
42	03/07/2006	Greatland Gold Plc	Mining	United Kingdom	Europe	AIM
43	18/08/2011	Great Western Mining Corporation Plc	Mining	Ireland	Europe	AIM
44	30/06/1997	Griffin Mining Limited	Mining	Bermuda	North America	AIM
45	07/09/2015	Harvest Minerals Limited	Mining	Australia	Pacific	AIM
46	17/12/2002	Highland Gold Mining Ld	Mining	Jersey	Europe	AIM
47	12/02/2015	Ironridge Resources Limited	Mining	Australia	Pacific	AIM

48	31/07/2002	Jubilee Metals Group Plc	Mining	United Kingdom	Europe	AIM
49	27/04/2015	Katoro Gold Plc	Mining	United Kingdom	Europe	AIM
50	18/12/2006	Kefi Minerals Plc	Mining	United Kingdom	Europe	AIM
51	07/09/2012	Kibo Energy Plc	Mining	Ireland	Europe	AIM
52	29/03/2018	Kore Potash Plc	Mining	United Kingdom	Europe	AIM
53	16/12/2005	Mc Mining Limited	Mining	Australia	Pacific	AIM
54	20/04/2011	Oracle Power Plc	Mining	United Kingdom	Europe	AIM
55	19/04/2005	Ormonde Mining Plc	Mining	Ireland	Europe	AIM
56	15/12/2004	Orosur Mining Inc	Mining	Canada	North America	AIM
57	05/03/2003	Patagonia Gold Plc	Mining	United Kingdom	Europe	AIM
58	29/06/2017	Phoenix Global Mining Limited	Mining	Cayman Islands	North America	AIM
59	22/02/2005	Regency Mines Plc	Mining	United Kingdom	Europe	AIM
60	20/08/2004	Richland Resources Ltd	Mining	Bermuda	North America	AIM
61	24/02/2010	Scotgold Resources Limited	Mining	Australia	Pacific	AIM
62	25/03/2011	Sylvania Platinum Limited	Mining	Bermuda	North America	AIM
63	18/11/1999	Tertiary Minerals Plc	Mining	United Kingdom	Europe	AIM
64	29/06/2005	Thor Mining Plc	Mining	United Kingdom	Europe	AIM
65	16/07/2012	Wishbone Gold Plc	Mining	Gibraltar	Europe	AIM

Appendix E: List of Expense All Companies in Sample

No.	Admission Date	Company Name	Sector	Country of Incorporation	World Region	Market
1	30/06/1998	Hellenic Petroleum Sa	Oil & Gas	Greece	Europe	MAIN MARKET
2	24/05/1999	Anglo American Plc	Mining	United Kingdom	Europe	MAIN MARKET
3	05/07/1982	Antofagasta Plc	Mining	United Kingdom	Europe	MAIN MARKET
4	11/04/2016	Bluebird Merchant Ventures Ltd	Mining	British Virgin Islands	North America	MAIN MARKET
5	24/07/2018	Danakali Limited	Mining	Australia	Pacific	MAIN MARKET
6	08/06/2005	Evraz Plc	Mining	United Kingdom	Europe	MAIN MARKET
7	14/05/2008	Fresnillo Plc	Mining	United Kingdom	Europe	MAIN MARKET
8	01/11/1973	Rio Tinto Plc	Mining	United Kingdom	Europe	MAIN MARKET
9	03/02/2017	Diversified Gas & Oil Plc	Oil & Gas	United Kingdom	Europe	AIM
10	01/05/2008	Petro Matad Limited	Oil & Gas	Isle of Man	Europe	AIM
11	10/08/2017	Altus Strategies Plc	Mining	United Kingdom	Europe	AIM
12	13/12/2006	Asiamet Resources Limited	Mining	Bermuda	North America	AIM
13	09/05/2005	Atalaya Mining Plc	Mining	Cyprus	Europe	AIM
14	13/04/2011	Avesoro Resources Inc.	Mining	Canada	North America	AIM
15	04/09/2013	Bluerock Diamonds Plc	Mining	United Kingdom	Europe	AIM
16	15/12/2010	Europa Metals Ltd	Mining	Australia	Pacific	AIM
17	14/08/1998	Firestone Diamonds Plc	Mining	United Kingdom	Europe	AIM
18	29/06/2017	Jangada Mines Plc	Mining	United Kingdom	Europe	AIM
19	15/06/2016	Mkango Resources Ltd	Mining	Canada	North America	AIM
20	31/07/2007	Pan African Resources Plc	Mining	United Kingdom	Europe	AIM
21	21/12/2017	Panthera Resources Plc	Mining	United Kingdom	Europe	AIM
22	11/07/2005	Shanta Gold Limited	Mining	Guernsey	Europe	AIM

Appendix F: Computation of H AND ADM C -INDEX Among Successful Efforts Oil & Gas Companies

COSTS COMPONENTS	A	B	C	D	TOTAL	H-INDEX	No. of pairwise comparisons	Max possible no. of comparisons	ADM C-INDEX	NON-DISCLOSURE %
Pre-likening	0	20	0	16	36	1.00	190	630	0.30	44%
Licencing and Other Acquisition	6	0	29	1	36	0.72	421	630	0.67	3%
Geological and Geophysical	0	14	19	3	36	0.51	262	630	0.42	8%
Exploratory Drilling and Well	0	0	36	0	36	1.00	630	630	1.00	0%
Other Exploratory Appraisal Well and Work	0 0	13 0	20 6	3 30	36 36	0.52 1.00	268 15	630 630	0.43 0.02	8% 83%
Other Evaluation	0	0	31	5	36	1.00	465	630	0.74	14%
Gen Admin & Overhead	0	0	27	9	36	1.00	351	630	0.56	25%

A – fully capitalised; B -fully expensed; C – initially capitalised; D – non-disclosing

Appendix G: Computation of Intra and Inter-Method Comparability Index Values for Pre-Licencing Costs

Computation of Intra and Inter-Method Comparability Index Values for Pre-Licencing Costs For Oil & Gas AIM				
Accounting Treatment for Pre-Licencing Costs				
Accounting Method	**Fullcap**	**Fullexp**	**Incap**	**Total**
SE	0	30	1	31
FC	0	14	0	14
AOI	0	4	0	4
EA	0	2	0	2
TOTAL	**0**	**50**	**1**	**51**

Within Method Calculation				
SE	0	870	0	930
FC	0	182	0	182
AOI	0	12	0	12
EA	0	2	0	2
TOTAL	**0**	**2450**	**0**	**2550**

Between Method Calculation				
SE&FC	0	420	0	434
SE&AOI	0	120	0	124
SE& EA	0	60	0	62
FC&AOI	0	56	0	56
FC&EA	0	28	0	28
AOI&EA	0	8	0	8
SE&FC&AOI&EA	0	692	0	712

	No. of pairwise of comparison	**Maximum possible no. of comparisons**	**C-index**	**van der Tas I'**	**Archer & Mcleay I"**
Within-method (Intra-method) comparability	533	563	0.95		
Between-method (Inter-method) comparability (SE&FC)	420	434	0.97	0.97	0.97
Between-method (Inter-method) comparability (SE& AOI)	120	124	0.97	0.97	0.97
Between-method (Inter-method) comparability (SE&EA)	60	62	0.97	0.97	0.97

Between-method (Inter-method) comparability (FC&AOI)	56	56	1.00	1.00	1.00
Between-method (Inter-method) comparability (FC&EA)	28	28	1.00	1.00	1.00
Between-method (Inter-method) comparability (AOI&EA)	8	8	1.00	1.00	1.00
Between-method (Inter-method) comparability (SE&FC&AOI&EA)	692	712	0.97	0.99	0.98

Appendix H: Summary of Accounting treatments for Pre-Development Costs

Panel A: Oil & Gas Companies				
Pre-development cost component	**Most Common treatment**	**2nd Most Common treatment**	**Least common treatment**	**Non-disclosure rate**
Pre-licencing	*fully expense*	*equal proportion for fully capitalise and initially capitalise*		*36%*
Licencing and Other Acquisition	*initially capitalise*	*fully capitalise*	*fully expense*	*2%*
Geological and Geophysical	*initially capitalise*	*fully expense*	*fully capitalise*	*3%*
Exploratory Drilling and Well	*initially capitalise*	*fully capitalise*	*fully expense*	*1%*
Other Exploratory	*initially capitalise*	*fully capitalise*	*fully expense*	*5%*
Appraisal Well and Work	*initially capitalise*	*fully capitalise*	*fully expense*	*7%*
Other Evaluation	*initially capitalise*	*fully capitalise*	*fully expense*	*8%*
Gen Admin & Overhead	*initially capitalise*	*fully capitalise*	*fully expense*	*21%*
Panel B: Mining Companies				
Pre-development cost component	**Most Common treatment**	**2nd most common treatment**	**Least common treatment**	**Non-disclosure rate**
Pre-licencing	*fully expense*			*63%*
Licencing and Other Acquisition	*initially capitalise*	*fully capitalise*	*fully expense*	*0%*
Geological and Geophysical	*initially capitalise*	*fully expense*	*fully capitalise*	*0%*
Exploratory Drilling and Well	*initially capitalise*	*fully expense*	*fully capitalise*	*0%*
Other Exploratory	*initially capitalise*	*fully expense*	*fully capitalise*	*0%*
Appraisal Well and Work	*initially capitalise*	*fully expense*	*fully capitalise*	*0%*
Other Evaluation	*initially capitalise*	*fully expense*	*fully capitalise*	*0%*
Gen Admin & Overhead	*initially capitalise*	*fully expense*	*fully capitalise*	*39%*
Panel C: Pooled Sample				
Pre-development cost component	**Most Common treatment**	**2nd most common treatment**	**Least common treatment**	**Non-disclosure rate**

Pre-licencing	*fully expense*	*equal proportion for fully capitalise and initially capitalise*		*50%*
Licencing and Other Acquisition	*initially capitalise*	*fully capitalise*	*fully expense*	*1%*
Geological and Geophysical	*initially capitalise*	*fully expense*	*fully capitalise*	*2%*
Exploratory Drilling and Well	*initially capitalise*	*fully capitalise*	*fully expense*	*0%*
Other Exploratory	*initially capitalise*	*fully expense*	*fully capitalise*	*2%*
Appraisal Well and Work	*initially capitalise*	*fully capitalise*	*fully expense*	*3%*
Other Evaluation	*initially capitalise*	*fully capitalise*	*fully expense*	*4%*
Gen Admin & Overhead	*initially capitalise*	*fully expense*	*fully capitalise*	*30%*

Appendix I: Summary of Level of Harmony Index Values

PANEL A: OIL & GAS

	MAIN MARKET										AIM										COMBINED MARKET									
	H-INDEX					ADM C-INDEX					H-INDEX					ADM C-INDEX					H-INDEX					ADM C-INDEX				
Pre-development cost component	**SE**	**FC**	**AOI**	**EA**	**ALL**	**SE**	**FC**	**AOI**	**EA**	**ALL**	**SE**	**FC**	**AOI**	**EA**	**ALL**	**SE**	**FC**	**AOI**	**EA**	**ALL**	**SE**	**FC**	**AOI**	**EA**	**ALL**	**SE**	**FC**	**AOI**	**EA**	**ALL**
Pre-licencing	1.00	0.63	1.00	1.00	**0.93**	0.30	0.30	1.00	1.00	**0.33**	0.94	1.00	1.00	1.00	**0.96**	0.40	0.59	0.11	1.00	**0.41**	0.96	0.90	1.00	1.00	**0.95**	0.36	0.54	0.15	1.00	**0.38**
Licencing and Other Acquisition	0.72	0.68	1.00	1.00	**0.59**	0.67	0.60	1.00	1.00	**0.55**	0.84	0.72	1.00	1.00	**0.59**	0.80	0.71	1.00	1.00	**0.57**	0.78	0.71	0.85	0.56	**0.59**	0.74	0.70	0.83	0.33	**0.57**
Geological and Geophysical	0.51	0.68	1.00	1.00	**0.42**	0.42	0.60	1.00	1.00	**0.35**	0.80	0.65	1.00	1.00	**0.57**	0.76	0.63	1.00	1.00	**0.55**	0.63	0.66	0.85	1.00	**0.48**	0.57	0.64	0.83	1.00	**0.45**
Exploratory Drilling and Well	1.00	0.68	1.00	1.00	**0.79**	1.00	0.60	1.00	1.00	**0.79**	0.96	0.65	1.00	1.00	**0.65**	0.92	0.63	1.00	1.00	**0.62**	0.98	0.66	1.00	1.00	**0.69**	0.95	0.64	1.00	1.00	**0.68**
Other Exploratory	0.52	0.68	1.00	1.00	**0.44**	0.43	0.60	1.00	1.00	**0.36**	0.92	0.78	1.00	1.00	**0.62**	0.88	0.60	1.00	1.00	**0.57**	0.69	0.76	1.00	1.00	**0.52**	0.62	0.62	1.00	1.00	**0.47**
Appraisal Well and Work	1.00	0.68	1.00	1.00	**0.77**	0.74	0.60	1.00	1.00	**0.59**	0.96	0.78	1.00	1.00	**0.64**	0.92	0.60	1.00	1.00	**0.59**	0.97	0.76	1.00	1.00	**0.68**	0.84	0.62	1.00	1.00	**0.59**
Other Evaluation	1.00	0.68	1.00	1.00	**0.74**	0.56	0.60	1.00	1.00	**0.46**	0.96	0.65	1.00	1.00	**0.65**	0.92	0.63	1.00	1.00	**0.62**	0.97	0.66	1.00	1.00	**0.67**	0.75	0.64	1.00	1.00	**0.56**
Gen Admin & Overhead	0.52	0.68	1.00	1.00	**0.40**	0.12	0.60	1.00	1.00	**0.12**	0.91	0.62	1.00	1.00	**0.65**	0.84	0.30	1.00	1.00	**0.53**	0.75	0.64	1.00	1.00	**0.56**	0.43	0.37	1.00	1.00	**0.35**
Payments to ext. contractors	1.00	1.00	n/a	n/a	**0.76**	0.02	0.00	0.00	0.00	**0.02**	1.00	1.00	1.00	n/a	**0.56**	0.00	0.10	0.00	0.00	**0.01**	1.00	1.00	1.00	n/a	**0.51**	0.01	0.08	0.00	0.00	**0.01**

PANEL B: MINING

Pre-licencing	1.00	n/a	1.00	1.00	**1.00**	0.19	0.00	0.04	0.71	**0.15**	1.00	1.00	1.00	1.00	**1.00**	0.21	0.08	0.05	0.15	**0.13**	1.00	1.00	1.00	1.00	**1.00**	0.21	0.05	0.05	0.32	**0.14**
Licencing and Other Acquisition	0.74	1.00	0.72	0.51	**0.50**	0.72	1.00	0.71	0.43	**0.49**	0.78	0.65	0.75	0.38	**0.57**	0.77	0.61	0.74	0.32	**0.56**	0.77	0.70	0.74	0.41	**0.55**	0.76	0.67	0.73	0.38	**0.54**
Geological and Geophysical	0.86	1.00	0.90	1.00	**0.57**	0.85	1.00	0.89	1.00	**0.56**	1.00	0.43	0.89	1.00	**0.65**	1.00	0.36	0.89	1.00	**0.65**	0.96	0.49	0.89	1.00	**0.63**	0.96	0.44	0.89	1.00	**0.62**
Exploratory Drilling and Well	0.86	1.00	0.90	1.00	**0.57**	0.85	1.00	0.89	1.00	**0.56**	1.00	0.43	0.89	1.00	**0.65**	1.00	0.36	0.89	1.00	**0.65**	0.96	0.49	0.89	1.00	**0.63**	0.96	0.44	0.89	1.00	**0.62**
Other Exploratory	0.86	1.00	0.90	1.00	**0.57**	0.85	1.00	0.89	1.00	**0.56**	1.00	0.43	0.89	1.00	**0.65**	1.00	0.36	0.89	1.00	**0.65**	0.96	0.49	0.89	1.00	**0.63**	0.96	0.44	0.89	1.00	**0.62**
Appraisal Well and Work	0.86	1.00	0.90	0.76	**0.60**	0.85	1.00	0.89	0.71	**0.59**	1.00	0.43	0.89	0.85	**0.66**	1.00	0.36	0.89	0.83	**0.66**	0.96	0.49	0.89	0.81	**0.64**	0.96	0.44	0.89	0.80	**0.64**
Other Evaluation	0.86	1.00	0.90	0.76	**0.60**	0.85	1.00	0.89	0.71	**0.59**	1.00	0.56	0.89	0.85	**0.66**	1.00	0.50	0.89	0.83	**0.66**	0.96	0.60	0.89	0.81	**0.64**	0.96	0.56	0.89	0.80	**0.64**
Gen Admin & Overhead	0.80	n/a	0.65	1.00	**0.53**	0.36	0.00	0.14	0.71	**0.18**	0.80	0.52	0.86	1.00	**0.63**	0.16	0.11	0.50	0.42	**0.23**	0.80	0.52	0.80	1.00	**0.59**	0.21	0.07	0.36	0.53	**0.21**
Payments to ext. contractors	n/a	n/a	n/a	n/a	n/a	0.00	0.00	0.00	0.00	**0.00**	1.00	0.56	1.00	n/a	**0.80**	0.31	0.19	0.05	0.00	**0.11**	1.00	0.56	1.00	n/a	0.80	0.17	0.13	0.02	0.00	**0.06**

PANEL C: POOLED SAMPLE																											
Pre-licencing	1.00	0.63	1.00	1.00	**0.95**	0.28	0.14	0.06	0.75	**0.24**	0.96	1.00	1.00	1.00	**0.98**	0.31	0.39	0.06	0.23	**0.23**	0.97	0.91	1.00	1.00	**0.97**	0.30	0.34	0.07	0.39	**0.24**
Licencing and Other Acquisition	0.72	0.76	0.67	0.53	**0.55**	0.69	0.71	0.65	0.46	**0.53**	0.81	0.70	0.80	0.40	**0.58**	0.79	0.69	0.80	0.35	**0.57**	0.78	0.71	0.76	0.42	**0.57**	0.75	0.70	0.75	0.39	**0.56**
Geological and Geophysical	0.55	0.76	0.81	1.00	**0.47**	0.47	0.71	0.80	1.00	**0.43**	0.89	0.56	0.92	1.00	**0.61**	0.87	0.55	0.91	1.00	**0.60**	0.74	0.60	0.88	1.00	**0.55**	0.69	0.58	0.88	1.00	**0.53**
Exploratory Drilling and Well	0.96	0.76	0.90	1.00	**0.67**	0.96	0.71	0.89	1.00	**0.67**	0.98	0.56	0.92	1.00	**0.64**	0.95	0.55	0.91	1.00	**0.63**	0.97	0.60	0.91	1.00	**0.65**	0.96	0.58	0.91	1.00	**0.64**
Other Exploratory	0.56	0.76	0.90	1.00	**0.49**	0.49	0.71	0.89	1.00	**0.45**	0.95	0.62	0.92	1.00	**0.63**	0.93	0.52	0.91	1.00	**0.60**	0.78	0.65	0.91	1.00	**0.57**	0.73	0.56	0.91	1.00	**0.54**
Appraisal Well and Work	0.96	0.76	0.90	0.78	**0.67**	0.77	0.71	0.89	0.75	**0.59**	0.98	0.62	0.92	0.87	**0.64**	0.95	0.52	0.91	0.86	**0.62**	0.97	0.65	0.91	0.83	**0.65**	0.88	0.56	0.91	0.83	**0.61**
Other Evaluation	0.95	0.76	0.90	0.78	**0.66**	0.63	0.71	0.89	0.75	**0.52**	0.98	0.62	0.92	0.87	**0.65**	0.95	0.60	0.91	0.86	**0.64**	0.97	0.64	0.91	0.83	**0.65**	0.83	0.63	0.91	0.83	**0.60**
Gen Admin & Overhead	0.58	0.68	0.68	1.00	**0.45**	0.17	0.29	0.17	0.75	**0.15**	0.88	0.41	0.90	1.00	**0.63**	0.47	0.17	0.61	0.49	**0.35**	0.77	0.46	0.84	1.00	**0.56**	0.34	0.19	0.46	0.59	**0.27**
Payments to ext. contractors	1.00	1.00	n/a	n/a	**0.76**	0.01	0.00	0.00	0.00	**0.00**	1.00	0.72	1.00	n/a	**0.65**	0.08	0.13	0.03	0.00	**0.04**	1.00	0.74	1.00	n/a	**0.67**	0.05	0.10	0.02	0.00	**0.03**

Appendix J: Summary of Intra-Method and Inter-Method Comparability Index Values

Pre-development costs	Intra-method Comparability WM C-index			Inter-method Comparability BM C-index			Inter-method Comparability VDT I-index			Inter-method Comparability A & M I-index		
	MM	AIM	CM	MM	AIM	CM	MM	AIM	CM	MM	AIM	CM
PANEL A: OIL & GAS												
Pre-licencing	0.98	0.95	0.95	0.83	0.97	0.94	0.91	0.99	0.97	0.87	0.98	0.96
Licence and Other Acquisition	0.71	0.83	0.78	0.29	0.40	0.39	0.52	0.00	0.14	0.37	0.00	0.05
Geological and Geophysical	0.50	0.79	0.63	0.20	0.40	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Exploratory Drilling and Well	0.99	0.92	0.95	0.28	0.44	0.42	0.00	0.00	0.00	0.00	0.00	0.00
Other Exploratory	0.51	0.90	0.69	0.22	0.39	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Appraisal Well and Work	0.99	0.94	0.96	0.28	0.40	0.38	0.00	0.00	0.00	0.00	0.00	0.00
Other Evaluation	0.99	0.92	0.95	0.28	0.44	0.41	0.00	0.00	0.00	0.00	0.00	0.00
Gen Admin & Overhead	0.50	0.89	0.75	0.22	0.44	0.38	0.00	0.00	0.00	0.00	0.00	0.00
PANEL B: MINING												
Pre-licencing	1.00	1.00	1.00	1.00	1.00	1.00	n/a	1.00	1.00	n/a	1.00	1.00
Licence and Other Acquisition	0.69	0.73	0.72	0.40	0.48	0.45	0.24	0.32	0.28	0.12	0.18	0.14
Geological and Geophysical	0.89	0.94	0.92	0.40	0.51	0.48	0.00	0.00	0.00	0.00	0.00	0.00
Exploratory Drilling and Well	0.89	0.94	0.92	0.40	0.51	0.48	0.00	0.00	0.00	0.00	0.00	0.00
Other Exploratory	0.89	0.94	0.92	0.40	0.51	0.48	0.00	0.00	0.00	0.00	0.00	0.00
Appraisal Well and Work	0.86	0.93	0.91	0.46	0.53	0.51	0.00	0.30	0.30	0.00	0.16	0.16
Other Evaluation	0.86	0.93	0.91	0.46	0.53	0.51	0.00	0.30	0.30	0.00	0.00	0.16
Gen Admin & Overhead	0.75	0.84	0.81	0.40	0.51	0.48	n/a	0.12	0.15	n/a	0.04	0.06
PANEL C: POOLED SAMPLE												
Pre-licencing	0.99	0.97	0.97	0.92	0.98	0.97	0.91	0.99	0.98	0.87	0.99	0.97
Licence and Other Acquisition	0.70	0.79	0.76	0.43	0.46	0.45	0.27	0.29	0.26	0.14	0.15	0.13
Geological and Geophysical	0.59	0.87	0.76	0.39	0.47	0.43	0.00	0.04	0.06	0.00	0.01	0.02
Exploratory Drilling and Well	0.95	0.93	0.94	0.47	0.48	0.48	0.00	0.00	0.00	0.00	0.00	0.00
Other Exploratory	0.61	0.93	0.80	0.40	0.47	0.44	0.00	0.03	0.05	0.00	0.00	0.01
Appraisal Well and Work	0.94	0.94	0.94	0.50	0.48	0.49	0.25	0.24	0.25	0.13	0.12	0.13
Other Evaluation	0.93	0.94	0.94	0.49	0.49	0.49	0.25	0.26	0.27	0.13	0.13	0.14
Gen Admin & Overhead	0.60	0.86	0.77	0.35	0.50	0.45	0.00	0.06	0.10	0.00	0.01	0.03

Appendix K: Accounting Policy Extracts from Annual Reports

Method	Company	Policy description
Full Cost	Falcon Oil & Gas Ltd	Pre-license costs are recognised in the statement of operations and comprehensive loss as part of exploration and evaluation expenses as incurred. E&E costs, including the costs of acquiring licenses and directly attributable general and administrative costs, initially are capitalised under **full cost accounting**, as either tangible or intangible exploration and evaluation assets according to the nature of the assets acquired. The costs are accumulated in cost centers by well, field or exploration area pending determination of technical feasibility and commercial viability. E&E assets are assessed for impairment if (i) sufficient data exists to determine technical feasibility and commercial viability, or (ii) facts and circumstances suggest that the carrying amount exceeds the recoverable amount. For purposes of impairment testing, E&E assets are allocated to cash-generating units. The technical feasibility and commercial viability of extracting a resource is considered to be determinable when proven reserves are determined to exist. A review of each exploration license or field is carried out, at least annually, to ascertain whether proven reserves have been discovered. Upon determination of proven reserves, intangible exploration and evaluation assets attributable to those reserves are first tested for impairment and then reclassified from E&E assets to a separate category within tangible assets referred to as oil and natural gas interests (Falcon Oil & Gas Ltd, 2018 Annual Report & Accounts, p.13)

Successful Efforts	BP Plc	Oil and natural gas exploration, appraisal and development expenditure - Oil and natural gas exploration, appraisal and development expenditure is accounted for using the principles of the **successful efforts method** of accounting as described below. Licence and property acquisition costs Exploration licence and leasehold property acquisition costs are capitalized within intangible assets and are reviewed at each reporting date to confirm that there is no indication that the carrying amount exceeds the recoverable amount. This review includes confirming that exploration drilling is still under way or planned or that it has been determined, or work is under way to determine, that the discovery is economically viable based on a range of technical and commercial considerations, and sufficient progress is being made on establishing development plans and timing. If no future activity is planned, the remaining balance of the licence and property acquisition costs is written off. Lower value licences are pooled and amortized on a straight-line basis over the estimated period of exploration. Upon recognition of proved reserves and internal approval for development, the relevant expenditure is transferred to property, plant and equipment. Exploration and appraisal expenditure Geological and geophysical exploration costs are recognized as an expense as incurred. Costs directly associated with an exploration well are initially capitalized as an intangible asset until the drilling of the well is complete and the results have been evaluated. These costs include employee remuneration, materials and fuel used, rig costs and payments made to contractors. If potentially commercial quantities of hydrocarbons are not found, the exploration well costs are written off. If hydrocarbons are found and, subject to further appraisal activity, are likely to be capable of commercial development, the costs continue to be carried as an asset. If it is determined that development will not occur then the costs are expensed. Costs directly associated with appraisal activity undertaken to determine the size, characteristics and commercial potential of a reservoir following the initial discovery of hydrocarbons, including the costs of appraisal wells where hydrocarbons were not found, are initially capitalized as an intangible asset. When proved reserves of oil and natural gas are determined

and development is approved by management, the relevant expenditure is transferred to property, plant and equipment. The determination of whether potentially economic oil and natural gas reserves have been discovered by an exploration well is usually made within one year of well completion, but can take longer, depending on the complexity of the geological structure. Exploration wells that discover potentially economic quantities of oil and natural gas and are in areas where major capital expenditure (e.g. an offshore platform or a pipeline) would be required before production could begin, and where the economic viability of that major capital expenditure depends on the successful completion of further exploration or appraisal work in the area, remain capitalized on the balance sheet as long as such work is under way or firmly planned (BP Plc, 2018 Annual Report & Accounts, p.136)

Area of Interest	PRAIRIE MINING LIMITED, 2018 Annual Report & Accounts, p.29	Exploration and Evaluation Expenditure - Expenditure on exploration and evaluation is accounted for in accordance with the **'area of interest' method**. Exploration and evaluation expenditure encompasses expenditures incurred by the Group in connection with the exploration for and evaluation of mineral resources before the technical feasibility and commercial viability of extracting a mineral resource are demonstrable. For each area of interest, expenditure incurred in the acquisition of rights to explore is capitalised, classified as tangible or intangible, and recognised as an exploration and evaluation asset. Exploration and evaluation assets are measured at cost at recognition and are recorded as an asset if: (i) the rights to tenure of the area of interest are current; and (ii) at least one of the following conditions is also met: • the exploration and evaluation expenditures are expected to be recouped through successful development and exploitation of the area of interest, or alternatively, by its sale; and • exploration and evaluation activities in the area of interest have not at the reporting date reached a stage which permits a reasonable assessment of the existence or otherwise of economically recoverable reserves, and active and significant operations in, or in relation to, the area of interest are continuing. Exploration and evaluation expenditure incurred by the Group subsequent to acquisition of the rights to explore is expensed as incurred, up to costs associated with the preparation of a feasibility study
Expense All	Hellenic Petroleum S.A.	(a) Exploration and evaluation assets - During the exploration period and before a commercially viable discovery, oil and natural gas exploration and evaluation expenditures are **expensed**. Geological and geophysical costs as well as costs directly associated with an exploration are **expensed as incurred.** Exploration property leasehold acquisition costs are capitalized within intangible assets and amortised over the period of the licence or in relation to the progress of the activities if there is a substantial difference. Upstream exploration rights are included in licenses and rights in intangible assets (Hellenic Petroleum S.A., 2018 Annual Report & Accounts, p.20)