INTEGRATED REPORTING AND FINANCIAL PERFORMANCE OF MINING COMPANIES LISTED ON THE JSE: EVIDENCE FROM SOUTH AFRICA

Submitted by: Nyasha Rebecca Dlamini

Student number: 223138993

Supervisor: Professor Rajendra Rajaram

This thesis is submitted in partial fulfilment of the requirements for the degree of Master of Accountancy in the School of Accounting, Economics and Finance, College of Law and Management, University of Kwazulu Natal.

DECLARATION

I Nyasha Rebecca Dlamini declare that:

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Nyasha Rebecca Dlamini **07 March 2024**

DEDICATION

I dedicate this piece of work to my son, TJ. When I started this programme, my baby had just turned one year. It required and took a lot from us time-wise as well as in terms of my physical and emotional availability. He sacrificed a lot just to see Mummy get her qualification.

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ACRONYMS

B	Beta
BS	Board Size
EVA	Economic Value Added
IFRS	International Reporting Standards
IR	Integrated Reporting
IIRC	International Integrated Reporting Council
JSE	Johannesburg Stock Exchange
LEV	Leverage
NGO	Non-Governmental Organization
ROA	Return on assets
SA	South Africa
SG	Sales Growth
TQ	Tobin's Q

ABSTRACT

Corporate reporting standards have evolved over time, with companies now employing a framework that demonstrates accountability to stakeholders, the environment, society, and the global economy. South Africa was the initial country to mandate the application of the widely adopted framework to all listed companies. Businesses implementing integrated reporting enjoy various benefits, but studies on the benefits of integrated reporting have lagged behind, particularly regarding the financial benefits to the implementing company. This may be the reason why some countries have not yet adopted this reporting framework. The current study investigated the relationship between integrated reporting and the financial performance and firm value of JSE-listed mining companies. The study adhered to a positivist paradigm and made use of numerical analysis of secondary data. Both random effects and fixed effects models were utilised to assess the effect. The study sample comprised mining companies listed on the JSE from 2005 to 2019. The findings revealed a significant negative relationship between integrated reporting and financial performance as evaluated by ROA and EVA. Additionally, the results indicated a negligible negative relationship between integrated reporting and firm value as measured by Tobin's Q. This suggests that mining companies are not experiencing quantitative benefits from the synergies that arise from the adoption of integrated reporting.

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1. INTRODUCTION AND BACKGROUND

1.1 Introduction

This chapter contains a synopsis of the study's background in which corporate reporting standards have evolved, leading to the recently introduced integrated reporting. A problem statement which outlines the areas to be explored, the study objectives, research questions, and significance are also provided.

1.2 Study Background

Corporate reporting standards or requirements have evolved over the years as companies, and more especially publicly listed companies, are now expected to report on both quantitative and qualitative information. In a bid to provide more meaningful information of a high quality to the various company stakeholders, the concept of integrated reporting (IR) was developed. Integrated reporting has become a widely adopted reporting framework throughout the world including South Africa. It has become the first country that requires mandatory application of this reporting framework for all listed companies. Integrated reporting has attracted the attention of researchers over the years. Despite this, there are still gaps in the research on the benefits of integrated reporting. This may be one of the reasons why some countries have not yet adopted this framework. Roth (2014) noted that because businesses are unsure whether these initiatives will improve financial performance (FP), funding research on integrated reporting and implementation has proved difficult. The objective of the current study objective was to investigate the correlation between integrated reporting and the financial performance and firm value of JSE-listed mining companies. Data on these companies, such as their relevant financial performance, information on firm value (FV) and integrated reports was obtained and analysed to determine whether there has been a positive quantitative change because of the adoption of integrated reporting.

Prior to the introduction of integrated reporting, there were three main frameworks: the triple bottom line, sustainability reporting, and the balanced score card (Vitolla & Raimo, 2018). According to Wild and van Staden (2013), the traditional reporting approach emphasised on financial information in the short term. With the traditional approach, companies only focused on preparing financial statements which reported on financial information relating to the company. The traditional approach only covered the financial activities of the company and therefore only benefited its shareholders and potential investors.

This kind of reporting was limiting as it failed to disclose all the activities deemed to be material in analysing a company. With the broad definition of stakeholders in line with stakeholder theory, there was a need to improve reporting to incorporate sustainability, governance, and social issues. Companies used to present the reports separately and this was not effective for either the companies or the stakeholders.

Sierra et al. (2013) state that an increase in criticism of isolated annual financial and sustainability reporting was brought on by the financial crisis of the 2000s and the subsequent accounting scandals. Investors found it difficult to identify the real forces behind value creation due to reporting fragmentation (Mans-Kemp & Van der Lugt, 2020).

Integrated reporting was introduced in 2010 in response to the need to enhance the reporting of all factors affecting business's capacity to generate value. According to (Wild & van Staden, 2013), IR arose in response to increasing stakeholder demand for information that is more relevant to decision making than is the information supplied by traditional company financial reports and other forms of communication. It therefore provides a bigger picture about the business, particularly on the link between the business's non-financial and financial activities and how the business creates value over time.

Integrated reporting within the South African context was initially introduced by King III, which required entities to issue integrated reports annually (Joubert, 2014). IR is described by King III as "a holistic and integrated representation of the company's performance in terms of both its finance and its sustainability" (IIRC, 2013). King III describes the objective of IR as "to help stakeholders assess whether an organisation can create and sustain its value over the short, medium, and long term," (IoDSA, 2009). According to King III, integrated reporting is a strategy used by organisations to demonstrate their accountability to the three main stakeholder groups – shareholders, environment, and society – and to the global economy (Abeysekera, 2013; IIRC, 2013). Integrated reporting has become mandatory in SA as a result of the 2016 implementation of King IV, which mandates that all JSE-listed businesses apply IR on an "apply and explain" basis.

Businesses implementing IR are enjoying the various benefits that result from integrated reporting. It enables investors to make more informed decisions on investments as it promotes greater transparency in the form of both quantitative and qualitative information. Internally, it offers a clear picture of the business, improves the company's goodwill, and encourages the fostering of fruitful connections with stakeholders. Furthermore, it also

promotes corporate strategy evaluation, permits comparison with competitors, facilitates access to finance and credit markets, improves management quality, and fosters communication among many stakeholders. It also provides information on predicted outcomes (Vitolla & Raimo, 2018).

1.3 Problem Statement

Integrated reporting over the years has gained the attention of many researchers globally (see for instance (Dragu & Tiron-Tudor, 2013; Dumay et al., 2017; Joubert, 2014). There is, however, still too little research on the benefits associated with IR, particularly for the reporting company. Barth et al. (2017), Mukeredzi (2019) and Bernardi and Stark (2018) emphasised that only a modest amount of research has been done on IR, and that this research has concentrated on how IR affects its diverse contexts. IR requires much investment in the form of money and time (Cosma et al., 2018; Hubbard, 2014; Surty et al., 2018; Zhou et al., 2017), therefore most companies need to know whether there is a trade-off on this major investment.

SA as an early adopter and one of the countries that have made IR mandatory therefore provides ample study opportunities for expanding the body of knowledge on the practical benefits of IR. This study's focus is therefore on South African mining companies on the basis of this premise. Unlike most of the previous studies that sampled all the economic sectors, the focus for this study was on one sector of the JSE with the aim of enhancing comparisons and also addressing limited resources. The JSE currently has 11 sectors and one of the major sectors is the basic commodities sector. The mining industry falls under this sector and it contributes significantly to the country's GDP as well as to the provision of employment (Cowling, 2023; Davies et al., 2002).

Researchers globally and in SA have started to embark on studies on the financial benefits of adopting IR (Hoque, 2017; Mukeredzi, 2019; Zhou et al., 2017). There have, however, been conflicting results as some researchers have noted that IR adoption improves a company's financial standing and others have not identified any correlation (Albetairi et al., 2018; Lee & Yeo, 2016; Matemane & Wentzel, 2019; Wen & Yap Kiew Heong, 2017). This study intended to add to the existing views and adding to the current corpus of knowledge by examining the potential relationship between IR and both FP and FV.

Of interest, majority of studies that have attempted to confirm IR correlation with FP and FV have only looked at periods post the adoption or at most compared the results post adoption with results one year prior to adoption (Abogazia et al., 2022; Matemane & Wentzel, 2019), which provides a limited view of the performance and FV. This study therefore looked at the period between 2005 to 2009 prior to adoption and the period between 2010 to 2019 post adoption so as to help close this gap.

1.4 Study Objectives

The objectives of this study were as follows:

- To investigate the effect of IR on the Firm Performance among JSE listed mining companies.
- To determine the impact of IR on Firm Value among JSE listed mining companies.

1.5 Study Questions

The following questions sought to be answered by the study:

- What is the effect of integrated reporting on the Firm Performance of JSE listed mining companies?
- What is the impact of integrated reporting on Firm Value of JSE-listed mining companies?

1.6 Significance of the study

Numerous advantages have been noted as resulting from the application of integrated reporting. These benefits have been categorised as internal and external benefits, internal benefits being direct benefits to the company preparing the integrated reports and external benefits being benefits to the various stakeholders of the company (Vitolla & Raimo, 2018). Of all the benefits that have been identified, very limited research has been done internationally relating specifically to the financial benefits.

The results of obtained from this study will contribute to the empirical literature on integrated reporting. They will benefit both the internal and the external parties of the organisation. Professional accountants, academic institutions, owners of small to medium enterprises (SMEs) as well as other researchers will also benefit from these results. If a positive impact is found, companies will invest more in integration and continuously strive to improve their

reports to ensure that they meet user needs. These outcomes will encourage other unlisted companies as well as other countries that have not yet embraced integrated reporting to benefit from similar advantages.

1.7 Study Delimitations

This study focused on the periods from 2005 to 2019. The period between 2005 and 2009 related to IR pre-adoption period and the period between 2010 and 2019 represented the post-adoption period. This study's population consisted of all JSE-listed mining companies. JSE-listed companies were chosen for this study because they are required to prepare integrated reports and the data for these companies was open to the public.

The sample was based on all 35 JSE-listed mining companies as at 15 July 2023 and made use of the IR framework and prepared integrated reports. The study used non-probability sampling to extract data from all mining companies with the required data, listed on the JSE for a period not less than 10 years and have adopted integrated reporting for a minimum period of three years within the period 2005 to 2019.

1.8 Assumptions

Assumptions and limitations have an impact on present study findings and future researchers' capacity to repeat and build on them. The first assumption of this study was that it is safe to presume that the readers and consumers of this research have a basic comprehension of both the topic matter and the terminology employed in the study. Another key assumption was that the publicly available material used for statistical testing provides all the relevant data.

1.9 Limitations of the study

This study's limitations included the limited number of dependent variables applied. Return on Assets and Economic Value Added were used as measures of FP and Tobin's Q was used as a FV measure. These variables were selected based on the results of previous studies as well for their strengths. EVA measures value created in excess of the required dividends return required by the business investors. This measure was selected because it measures wealth and explains changes in shareholder wealth and it is 50% better than accounting-based measures (Stewart, 2004). ROA measures an organisation's ability to generate profits through

the use of its assets the profitability of an organisation in relation to its assets in profit generation. It has been used by most researchers and is one of the oldest FP measures (Tshipa, 2017). Tobin's Q on the other hand gauges how the market views an organization's operational effectiveness and ability to produce strong financial results. This measure is considered one of the earliest and most frequently used methods of evaluating business success and value (Tshipa, 2017).

Another limitation was that this study was restricted to mining companies that were publicly traded. Other mining companies that may have adopted the IR framework but were not listed on the JSE may have been left out (Ngcobo, 2020).

Another limitation was the focus on only the preparation of integrated reports and not taking into account the quality of the integrated reports (Mukeredzi, 2019). There are various integrated reporting quality measures that could have been considered and implemented in the study, for example the EY quality ratings (Barth et al., 2017) or the JSE Responsible Index (Mukeredzi, 2019).

1.10 Organisation of the study

This chapter provided a brief overview on the topic by briefly discussing the background to the study. This was followed by the problem statement, which provided some insight into the areas that have not yet been thoroughly researched on still need attention which this study aimed to address. The study objectives and the research questions addressed were also explained, followed by an explanation on the study's significance. The chapter concluded with the study's assumptions and limitations.

1.11 Summary of the study

The chapters that follow are set out as follows:

Chapter 2: Literature review: This section reviewed the literature on IR, starting with the theoretical literature, which focuses on principal theories in integrated reporting. The empirical literature comes next, covering the study findings of previous researchers who have worked in this field. This review also identified research gaps for future studies.

Chapter 3: Methodology: This section outlines the methodology utilised and its applicability to the research questions. It proceeds with an explanation of the techniques and methodologies employed to attain the study's outcomes. The discussion of the research design is followed by a description of the model and an explanation of the variables employed in the research. Data types, sources, analysis, and diagnostic tests are then explored.

Chapter 4: Data presentation and analysis: This section unveils the findings derived from the conducted tests and analysis. It addresses the study questions and provides a condensed overview of the findings. This section determines whether FP measured by ROA, EVA and FV measured by TQ changes as a result of integrated reporting.

Chapter 5: Summary, conclusion, and recommendations: This chapter summarises the study, makes recommendations for future research, and draws a general conclusion.

2 LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature pertaining to IR, commencing with a review of the theoretical literature centred on the primary theory of the study. The primary theory is explored in terms of what it entails, how related it is to the study topic, namely integrated reporting, FP, and FV. A review of the empirical literature on IR, its background and the findings of previous researchers who have looked at this study topic is also provided. Through this review, research gaps for future studies are identified and the justification for the current study explained.

2.2 Theoretical Literature

Stakeholder theory has recently gained popularity in other academic subjects, building on the success of the shareholder theory. O'Connell and Ward (2020) define the shareholder theory as a theory that posits that management's foremost goal is to optimize shareholder value. In contrary according to the stakeholder theory, businesses that consistently work to meet the requirements of the majority of their stakeholders are more likely to add value over time (Carels et al., 2013; Harrison & Wicks, 2013). This focus is on strategy and ethics and depicts an emphasis on integrated reporting.

2.2.1 Stakeholder Theory

Edward Freeman has been credited as the founder of the theory because it is thought that he popularised the idea back in 1984 (Freeman & Phillips, 2002; Jensen, 2002). Stakeholders are defined as "any group or individuals who can affect or is affected by the achievement of the organisation's objectives,"(Laplume et al., 2008). The theory places strong emphasis on organisational ethics and goals. The focus is therefore on balancing the interests of all stakeholders with the ultimate goal of gradually raising the firm's worth (Freeman & Phillips, 2002; Jensen, 2002). This means that a company's connection with its stakeholders is related to or reliant upon the performance and value of the company. Therefore, the emphasis of the theory is on managing those connections that may have an impact on the attainment of an organisation's goals.

2.2.2 Stakeholder Theory attributes

Smith (2016) highlighted three attributes or characteristics of stakeholder theory. The first characteristic is the emphasis on the need for businesses to report on information on a variety of stakeholders and not simply shareholders. The second characteristic is that once stakeholders are involved and engaged this promotes the creation of value for the firm. Thirdly, a competitive advantage is built for those companies that value and effectively work with their stakeholders. Thus, effective coordination, information sharing, stakeholder attraction and close connections with stakeholders can enhance joint value generation (Jones et al., 2018).

2.2.3 Integrated Reporting and Stakeholder Theory

Post 2007 to 2008 global financial crisis, corporations must engage with diverse stakeholders for sustainable success; these include suppliers, regulators, environmental groups, customers, NGOs, and investors (Smith, 2016). Stakeholders were categorised into two , namely primary stakeholders, which include suppliers, customers, investors, and employees, who directly impact a company's decisions; and secondary stakeholders, including local communities, business groups, media, governments, and social activists, who may indirectly affect decisions (Fauzi et al. 2007). According to Suttipun (2017), companies rely on their stakeholders. Therefore, an organisation’s success is dependent on its relationship with not only its capital providers but also all its stakeholders (Suttipun, 2017). Stakeholder groups have the right to obtain company information, regardless of use or influence (Gray et al., 1998). Stakeholders’ varying power requires companies to adapt operating and reporting behaviours so as to maintain these stakeholder relationships (Islam & Deegan, 2010). In order for companies to maintain stakeholder relationships, they need to adopt regular and better reporting methods which cater for the needs of all stakeholders (Suttipun, 2017). The demand for better reports that take into account the needs of a wider range of stakeholder groups or users has also resulted in the adoption of standards, KPIs, and metrics by companies to help them to track and disclose such data to the relevant parties (Eccles, 2011). Stakeholder theory is therefore connected to this market demand through the development of a quantitatively-based reporting framework which focuses on both financial and non-financial reporting (Smith, 2016).

Stakeholder theory explores the impact of stakeholders on managerial decisions and studies the way they are incorporated into business operations to improve goodwill and decision-

making (Smith, 2016). The emphasis of stakeholder theory on the production of value for all corporate stakeholders casts light on businesses' financial and non-financial activities (Dragu & Tiron-Tudor, 2013). The requirement of catering for the interests of a broader spectrum of stakeholders forces entities to do more. According to IIRC 2013, "the primary purpose of an integrated report is to explain to providers of capital how an organization creates value over time. It therefore contains relevant information, both financial and other." IR consequently enhances FP and FV by increasing transparency, meticulousness, and strategic thinking, potentially improving earnings per share, growth, and net income. Smith (2016) emphasised that given the fact that stakeholders are the intended audience for integrated reporting, stakeholder theory becomes the backdrop for this reporting phenomenon. This type of reporting aligns with the goal of integrated reporting as it combines sustainability, governance, and financial actions of the organisation into one report (Mukeredzi, 2019).

Figure 1 below depicts the relationship between stakeholder theory and integrated reporting.

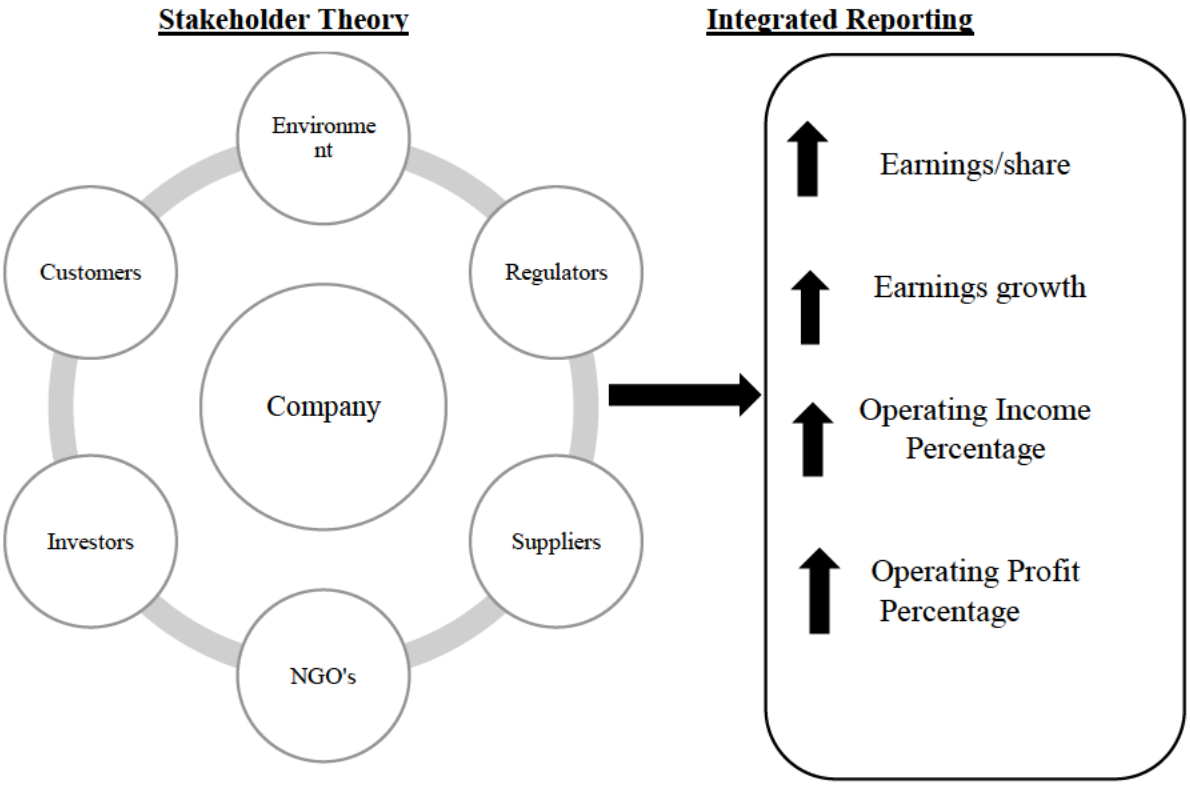

Figure 1: Stakeholder theory and integrated reporting
Adapted from (Smith, 2016)

The linkages between integrated reporting and stakeholder theory may result in improvements to earnings per share, year-over-year earnings growth, and net income as a percentage of revenue due to the increased transparency, rigor, and strategic thinking that accompany the development and dissemination of an integrated report; this research study, therefore, seeks to quantify these possibilities. Figure 1 graphically represents the linkages and connections between stakeholder theory and integrated reporting which this research study seeks to measure. Quantifying such a link and connection bridges the gap between academic theory and practitioner opportunities in line with a scholarly practitioner model (Smith, 2016).

By definition stakeholder theory contributes significantly to the development of IR (Smith, 2016). Integrated reporting was developed to meet the reporting requirements of a broader set of stakeholders. The demands of many stakeholders must therefore be taken into account in ongoing discussions, strategic planning and inclusive reporting so that businesses can cultivate good relationships with their stakeholders. This ultimately leads to the development of value creation for the business. Figure 1 depicts the typical business environment which

strongly relates to the idea of an integrated report where the organisation is at the focal point and is required to connect with a wide range of partners (Smith, 2016). In order for the companies to maintain good relations with their stakeholders, there is a need for continuous engagement with their various stakeholders, whose needs must be included in their strategic planning and inclusive reporting (Mukeredzi, 2019). This in turn results in value creation for the organisation, as depicted in Figure1. The stakeholder theory looks into how the wider range of stakeholders are incorporated into business operations and how they affect managerial decisions. Dawkins (2014) posits that improving corporate processes and fostering goodwill requires the involvement of external stakeholders.

Stakeholder theory will therefore be the basis upon which the study is anchored as it will help reveal whether there is any form of financial goodwill that companies are likely to benefit from as a result of meeting all their various stakeholder reporting needs. It is crucial as it will be used to determine whether integrated reports accurately reflect and present to stakeholders both the organisation's financial and its non-FP (Mukeredzi, 2019), and demonstrate how IR adoption affects a business's FP and FV.

2.3 Empirical Literature

2.3.1 History and Background

Establishment of integrated reporting is based on two distinct reporting concepts which can be traced back to the mid-1990s but were subsequently combined (Brabeck-Letmathe, 2011). The idea behind this was that organisations, in addition to reporting on financial information prepared according to the accounting standards, should also report on nonfinancial information which the shareholders might be interested in, such as intangible assets, human capital, customers, and inn ovation (Brabeck-Letmathe, 2011).

The following criticisms have been expressed around (traditional) annual financial reporting:

1. As a convex mirror of a company's performance and an imperfect predictor of future FP, it was unsatisfactory (Brabeck-Letmathe, 2011). Traditional reporting concentrated on historical data, which provides a constrained picture of a company’s overall health and future prospects.
2. Nonfinancial data can shed more light on the firm’s projected future FP (Brabeck-Letmathe, 2011).

3. In most businesses the book value is less than market value. To gain more insight into the business's other assets not disclosed on the statement of financial position, extra reporting might be used (Brabeck-Letmathe, 2011) .

An additional idea around this integration of information was that companies were obliged to report to other stakeholders as well, who are not shareholders, on their environmental, social and governance performance. These factors led to sustainability reporting.

In 1997 Elkington coined the term "triple bottom line", which describes a company's reporting on its environmental, social, and economic performance (Elkington, 1997). The single most important event that brought this idea to life was Massie's founding of the Global Reporting Initiative (GRI) in 1997 (Brown et al., 2009). The establishment of the GRI by Massie and White in 1997 was the single most significant event that made the concept of sustainability reporting a reality (Brown et al., 2009). The GRI was separated into a distinct organisation in 2001. Its mission is "to make sustainability reporting standard practice by providing guidance and support to organisations".

2.3.2 Sustainability reporting

Sustainability reporting was defined by GRI as "a report that conveys disclosures on an organisation's impacts, be they positive or negative, on the environment, society, and the economy". In doing so, sustainability reporting makes abstract issues tangible and concrete, thereby assisting in understanding and managing the effects of sustainability developments on the organisation's activities and strategy" (GRI, 2011).

The triple bottom line has three aspects, namely the social, environmental, and economic aspects. Elkington described the three aspects as: People, Planet and Profit (Sukoharsono, 2019). These 3 Ps are the main focus of sustainability reporting and they are there to explain what sustainability reporting is (Stenzel, 2010). Regardless of the adoption of sustainability reporting by companies, it was noted that there was still information asymmetry between nonfinancial and financial information.

The 2008 global financial crisis highlighted the necessity for information that gives stakeholders an integrated, comprehensive picture of an organisation's nonfinancial and

financial aspects (Affan, 2019). Ioana and Adriana (2013) support this view and argued that perceptions of the global economy have been altered by the financial crisis, and that this has resulted in many calls for a sustainable strategy to rebalance the economy**.** In a bid to address this information asymmetry, IIRC responded by creating the integrated reporting framework in 2011 (Affan, 2019).

2.3.3 The concept of integrated reporting

As defined by IIRC (2013), an integrated report is "a concise communication about how an organisation's strategy, governance, performance and prospects, in the context of its external environment, lead to creation of value over the short, medium and long term". IR is also defined as the use of technology and innovation to create concise reports that focus on the stewardship of natural, intellectual, manufactured, human and social capital. Additionally, it emphasises strategic goals, value creation, long-term vision, transparency, trust, flexibility, and integrated thinking (Ioana & Adriana, 2013). According to Eccles (2011), the major factors in integrated reporting are shareholder engagement, high value for sustainability, dedication to sustainable causes and the creation of a "sustainable approach". Stakeholders interested in how over time a business generates value will benefit from IR. These stakeholders include suppliers, customers, employees, local communities, legislators, policy makers and regulators (IIRC, 2013). In summary, integrated reporting provides an integration between a business's nonfinancial and financial information.

As noted by Robertson and Samy (2015), integrated reporting policy and practice have evolved comparatively more quickly than the countless prior corporate reporting projects that have not been successful in becoming standard practice. In a study by Gibassier et al. (2019) noted and categorised the various factors that contributed to companies' adopting integrated reporting quickly. These factors include the institutional national environment, and a country's economic, financial, labour and educational systems, as well as its cultural and legal systems. From a South African perspective, the main driver for adoption was compliance with the legal system. Steyn (2014) noted that in SA integrated reporting was mostly driven by compliance as it was required by law.

According to Eccles (2011), King III under Professor Mervyn King is credited for being the catalyst in the adoption of integrated reporting in SA. King III, published in 2010, stipulated the three integrated reporting principles and all listed companies on the JSE had to abide by

the principles of integrated reporting (Gibassier et al., 2019). The King III reporting principles were to be implemented on an “apply or explain” basis (Gibassier et al., 2019). This legal requirement resulted in the adoption of IR by majority of the JSE listed companies. Since its inception in 2017, King IV has mandated JSE-listed companies to "apply and explain" its principles (IoDSA, 2016). This means that JSE-listed companies are now expected to prepare and explain what is embedded in their integrated reports.

2.3.4 Effect and benefits of integrated reporting

An organisation's major report may be an integrated report that increases links between multiple reports and integrates into corporate reporting systems (M. Cheng, 2014). As alluded to by Mukeredzi (2019), an integrated report incorporates information or reports relating to financial statements, corporate communications, environmental and social implications, management commentary and governance. These different reports may impact the FP of the organisation on their own; however, the overall effects of IR on the FP and FV of listed mining businesses within South Africa will be this study’s focus. According to Robertson and Samy (2015), the development of IR policy and practice has been more rapid than that of several past corporate reporting initiatives that failed to become standard practice. This could be linked to the numerous benefits that corporations may have reaped from this standard practice. Various benefits of integrated reporting have been identified in different studies (Rensburg & Botha, 2014). In a study by Rensburg and Botha (2014), it was concluded that integrated reporting helps in the effective sharing of information with stakeholders and provides additional value. Surty et al. (2018), in their study on the benefits of IR for South African state-owned companies, noted that integrating nonfinancial and financial information results in the strengthening of stakeholder commitment and aids in risk and opportunity identification for efficient resource allocation. Eccles (2011) also identified benefits of integrated reporting and divided them into three categories, namely internal and external benefits and benefits related to controlling governmental risk. Internal benefits include enhanced stakeholder and shareholder participation, better internal resource allocation choices, and reduced reputational risk. External benefits include addressing the demands of investors with the aid of ESG information, inclusion in sustainability indices and ensuring that reliable nonfinancial information is provided about the company. Benefits related to controlling governmental risk include participating in framework and standard development, preparing for a potential wave of global legislation and responding to stock exchange enquiries.

Mixed results have, however, been obtained from the limited studies conducted on the internal financial benefits of IR (Barth et al., 2017; Matemane & Wentzel, 2019; Zhou et al., 2017; Mukeredzi, 2019). It has been asserted in the literature that businesses that have adopted integrated reporting may benefit from cheaper capital costs and overall enhanced FP. This area of study within the South African jurisdiction is still developing (Matemane & Wentzel, 2019), hence the motivation for this study.

2.3.5 Integrated reporting and financial performance relationship

An increasing corpus of empirical research has been done on the effects of IR. According to Matemane and Wentzel (2019), studies analysing the impact of integrated reporting have also explored the correlation between the level of forecast accuracy and adherence to the framework for integrated reporting. Previous research has looked at the relationship between IR standards and the types of potential shareholders (short-term or long-term) interested in the companies in question. Further investigation into the correlation between IR and FP metrics like ROA and EVA is currently gaining momentum (Barth et al., 2017).

According to Smith (2016), the marketplace now wants a clear and comprehensive picture of FP, encompassing reports on financial data, corporate governance information and social and environmental information. Mukeredzi (2019) says that IR provide companies with an opportunity to give a comprehensive view of their performance. This, therefore, necessitates a certain amount of comprehension on management and raises a question on how much they engage in integrated thinking (Mukeredzi, 2019).

A two-part study was conducted by Churet and Eccles (2014) in the USA to determine whether there is a correlation between FP, proficient handling of ESG challenges, and IR. The study’s primary objective was to confirm the relationship between IR, integrated thinking, and sustained value creation. Incorporating these issues into their communication strategy, according to the study's findings, allows firms to successfully manage the opportunities and dangers connected with social and environmental challenges. This demonstrates how effectively ESG issues can be managed and how IR encourages integrated thinking. The relationship between a company's value drivers and strategic goals can thus be better understood. In their study they made use of the return on invested capital as their proxy

for financial performance. ROIC was used in this study as they believed that it serves as an effective measure of financial performance as it encompasses both profit generation and capital utilization efficiency. The study results found no conclusive evidence that IR practices are correlated with companies achieving higher ROIC over the ten years period under study. At the same time there was no apparent disadvantage for these companies regarding their investments in and stated commitments to sustainability. An analysis was further performed per sector. Analysis revealed that integrated reporting correlated positively with financial performance in Healthcare and Information Technology sectors. While statistically significant only in healthcare, the relationship was consistent across both 10 year and two year ROIC averages. This indicated that IR positively influences FP in these two sectors, regardless of the timeframe considered (Churet & Eccles, 2014). Further research studies were therefore recommended, which explains the need for this study under a South African jurisdiction.

Unlike the study by Churet and Eccles (2014), Appiagyei et al. (2016) performed a comparable study in SA and Australia to measure IR quality and its link with company success in the form of FP. Australia continues to offer an optional IR programme, whereas SA makes it mandatory. In this study Australia was chosen on the basis of the stakeholders' demand for more sustainability disclosures as well as the need to confirm whether there are any differences in IR quality between a voluntary and mandated context. The objective of the study was to better inform Australian policy makers about how to regulate IR and its benefits. Earnings per share and sales growth were used as proxies for performance and it was noted that IR and profitability were more related in SA compared to Australia, where integrated reporting is voluntary. Consequently, it may be concluded that businesses in developing and rising economies, as well as those across various sectors, can profit from IR (Albetairi et al., 2018; Suttipun, 2017). The present study concentrates on listed mining companies in SA and it is therefore not comparative in nature.

The fundamental essence of any organisation lies within its business model, which makes use of the different capitals as either inputs or outputs through the various activities of the company (IIRC, 2013). The key function of the IR is therefore to provide a clear picture of how interconnected the capitals are and how value is generated over a period of time (IIRC, 2013). The organisation's capacity to generate sustainable value over the short, medium, and long term for both itself and its stakeholders is of increasing interest to stakeholders (IIRC,

2013). Suttipun (2017) conducted research on the effect of IR on the FP of companies listed in Thailand. Using statistical methods, the study examined the influence of six capitals on the FP of 150 selected listed companies. The six capitals include financial, human, natural, intellectual, manufactured and social and relationship. The study results showed that the following factors positively affected corporate FP: manufactured capital reporting and holding a corporate social responsibility award. This means that the effective use of company assets will result in improved profits. Environmental capital reporting (ECR) on the other hand was noted to negatively affect FP. The explanation for this could be that firms see reporting of environmental activities as a cost that reduces corporate performance. As a result, firms tend to supply as little of this information as possible to fulfil minimum stakeholder needs.

Wen and Yap Kiew Heong (2017) investigated the potential effect of IR implementation on the FP of 50 listed Malaysian companies from 2012 to 2015. A descriptive and quantitative method was used in the research. The content elements listed in the IR framework i.e. business model, organizational overview and external environment, governance, risk and opportunities, performance, strategy and resource allocation, basis of preparation and presentation and outlook were the independent variables while measures of FP, such as ROA and ROE, were identified as dependent variables. According to the investigation results, four content elements, namely governance, risks and opportunities, business model and performance, and business model disclosure were identified as having a major positive impact on a firm's FP. Higher governance disclosure improves information on integrity and ethics, giving stakeholders a thorough picture of the company's current governance position (Boonlua & Phankasem, 2016). According to research by Albetairi et al. (2018), the impact of the disclosing business model elements on FP can be explained by the fact that information on business models contributes to the future growth of a company. Investors seek precise information on business models as poor communication can lead to investment decisions that have a negative influence on a company's capital flow. Hence, detailed business model disclosure which is the foundation upon which IR is built upon is appreciated by investors and in turn results in a trade-off which has positive effects on the FP of a company. Disclosure of risk and opportunities gives a company competitive advantage and enhances profitability. Coordination of risk, control and compliance functions has a substantial effect on a company's FP, allowing for more effective resource allocation and improved

shareholder value. This highlights the importance of strategic risk management (Edge & Eyles, 2014).

Similar to the results of the study by Wen and Yap Kiew Heong (2017), in their study on trends in IR and FP of insurance companies in Bahrain, Albetairi et al. (2018) discovered that improved disclosure of the chosen business model, strategy and resource allocation yields a favourable impact on FP. On the other hand, FP was found to be negatively affected by the disclosure of risks and opportunities. The results of the two studies are somewhat contradictory in terms of the content elements that are favourably associated with FP. The later study looked at five insurance companies listed in Bahrain between 2012 and 2015. The current study considers the overall effect of IR disclosure on the FP of the sampled companies.

Mokabane and du Toit (2022) conducted a study to determine whether companies that create higher quality integrated reports have better financial results or whether managing stakeholders' views and boosting organisational legitimacy are the main advantages of IR. Their sample was based on top 100 SA listed companies as ranked by Ernst & Young from 2011 to 2020. Results from the study revealed that there is no connection between IR quality and FP. It was noted that when evaluating the effectiveness of IR, leading companies frequently exhibit lower market-to-book ratios and higher ROE values. Entities delivering high quality integrated reports typically have larger market cap compared to those that produce integrated reports of lower quality. This can be linked to the high cost associated with integrated reporting.

2.3.6 Integrated Reporting and Financial Performance at sector level

Compliance with the legal system was the key driver for the adoption of IR from a South African perspective (Matemane & Wentzel, 2019). According to Steyn (2014), in South Africa IR was primarily motivated by compliance because it was mandated by law. IR is therefore not universal across countries, despite becoming a worldwide practice (Matemane & Wentzel, 2019). These disparities are due to the heterogeneity of political, social, economic and environmental settings in different nations (Elzahar et al., 2015; Ioannou & Serafeim, 2015). Therefore, the results and effects of the adoption of IR are also influenced by these factors. Furthermore, sectorial disparities may also have an impact on the nature of

IR (Marx & Mohammadali-Haji). The reason is that the need for and extent of capital disclosures vary according to the sector concerned. Matemane and Wentzel (2019) supported this view by emphasising the need for sector-specific assessments. To the author's knowledge, few studies have looked at IR at sector level, particularly in South Africa (Carels et al., 2013; Matemane & Wentzel, 2019; Ngcobo, 2020).

Matemane and Wentzel (2019), looked at IR and the FP of listed South African banks; Carels et al. (2013), tried to determine how ESG disclosures have been impacted by corporate governance disclosures in mining companies. Matemane and Wentzel (2019) sought to establish whether there is a statistically significant relationship between FP and the quality of IR. The study's results affirmed a positive correlation between IR quality and earnings per share. However, no significant correlation was observed between IR quality and R ratio, return on assets or economic value added during the period under consideration.

Carels et al. (2013) investigated the impact on ESG disclosures of corporate governance disclosures in mining companies. However, most of the integrated reports were found to be repetitive and did not offer any insight into long-term sustainability. The outcome of the later study highlights the early adoption of IR, since companies frequently take some time to perfect their corporate reporting before benefiting from these reports. As this study considers a longer period post adoption, it will establish whether any financial benefits accumulate over time as a result of the adoption of IR.

2.3.7 Firm value and integrated reporting

A study by Lee and Yeo (2016) is one of the early studies that looked at the connection between FV and IR, which became the basis for subsequent studies (Barth et al., 2017; Wahl et al., 2020). Their study sought to explore the link between IR disclosures and FV. The sample comprised of 822 observations, and the companies were within the South African jurisdiction over a period of four years between 2010 to 2013. The study outcomes affirmed a favourable correlation between FV and this new reporting phenomenon.

IR encompasses the disclosure of both financial and nonfinancial information of a business. The question is therefore whether the nonfinancial information disclosure improves a firm's value in any way. The body of knowledge around this study area continues to evolve. Wahl et

al. (2020), in their study aimed to offer empirical evidence addressing how IR delivers value for shareholders and investors based on a voluntary environmental setup, looked at the link between optional IR disclosure and FV as well as accuracy of analyst earnings forecasts, building upon the study conducted by Lee and Yeo (2016). The study sample consisted of 167 companies spanning an 8-year period from 2011 to 2018, encompassing firms from Japan, the United Kingdom, and Spain across diverse industries such as pharmaceuticals, financial services, retail, and utilities. The study made use of panel data analysis as data u included observations from multiple cross-sectional companies over the specified 8-year time frame. The study findings suggested that voluntary IR has little influence on business value. It is possible that organisations that voluntarily adopt integrated reporting may already have reasonably high levels of transparency and that consequently integrated reporting disclosure has little additional effect. Firms that are practising a high degree of disclosure at the time when they adopt IR find that the incremental costs of adopting IR are not significant as compared to the costs incurred by firms that have been practising minimal disclosure. As IR involves more transparency around a firm's activities and an organisation's financial and nonfinancial activities are interlinked, when organisations that have been practising a high degree of disclosure start implementing IR, most of the information to be incorporated into an integrated report is already available. This also means that the information is also already available on the market. Hence the disclosure of the integrated reports does not make a significant reporting difference. Previous studies have found that the beneficial impact of IR on FV was observed in mandatory reporting settings (Barth et al., 2017; Lee & Yeo, 2016; Wahl et al., 2020).

In a bid to answer the question of how integrated reporting quality is related to company value, Barth et al. (2017) performed research within the South African jurisdiction where integrated reporting is a requirement for listed companies. Two pathways were identified through which integrated reporting quality may be related to company value. The first channel is where Integrated Reporting Quality (IRQ) leads to improved or better-quality information for outside stakeholders. The second one is improved integrated thinking, which improves decision-making internally. The results of the study showed a favourable correlation between integrated reporting quality and the FV proxies, which are liquidity and expected future cash flow. This is consistent with the real effects channel, that is integrated reporting quality enhances FV through the two previously identified, namely the internal and outward channels.

Integrated reporting offers a more coordinated and effective method of corporate reporting as it integrates many reporting strands and conveys all elements that significantly affect an entity's capacity to build value over time (Akpan et al., 2022). The study by Akpan et al. (2022), which set out to investigate how integrated reporting affects a company's worth, was based on a sample chosen from Nigeria's publicly traded manufacturing businesses between 2011 and 2020. The manufacturing capital disclosure index, the human capital disclosure index, and the social and relationship capital proxies were used as the independent variables in this research. Tobin's Q was designated as the dependent variable, while the year price index was the control variable. Secondary data were employed, and the ex-post factor research method was used. Study results showed that disclosing human capital information in the annual report considerably boosts the value of listed manufacturing businesses in Nigeria. These results led to the conclusion that only variable human capital disclosure significantly affects the value of the enterprise. The conclusion is aligned to those reached in the previous study by Suttipun (2017). Nigerian manufacturing companies were therefore advised to disclose all relevant data on human capital in their financial statements, as this tends to increase the firm's value and also increase shareholder wealth (Akpan et al., 2022). As integrated reporting combines disclosures on human capital and risk management, the current study seeks to provide insight into the effects of the adoption of IR on the FV of listed mining companies. Mining is a different industry from that reported on in the previous study, and South Africa is also a different jurisdiction. Another difference is that the current study will look at the IR pre-adoption period and the period after its adoption.

Nwoye et al. (2021) in their article "Integrated Reporting and Firm Value in Nigerian and South African Oil and Gas Sector" studied 18 oil and gas firms in South Africa and Nigeria between 2015 and 2018 employing Tobin's Q ratio as a proxy for corporate value, and IR classified into five capitals: human capital, intellectual capital, social or responsibility capital, natural capital, and financial capital. The study utilised the panel multiple regression approach to determine the potential impact of IR on the FV of oil and gas firms in Nigeria and South Africa, with the Hausman test being used to distinguish between fixed and random effects. The aim of the study was to provide insight on the different reporting environments as South Africa is mandatory and Nigeria is voluntary. The findings of the study indicated that IR has a positive impact on FV in both South Africa and Nigeria.

2.4 Summary

The current chapter discussed the theoretical and empirical literature upon which the study is anchored. A review was conducted on the different studies that were performed on the connection between IR and firm performance and value. The findings of these studies showed mixed results. Furthermore, most of the studies with the exception of two were based on the impact of IR on FP and FV at a sector level. None of the two studies covered the mining industry. In addition, only one study considered a longer preadoption period in their analysis in order to justify the study results. This highlights a research gap that the current study seeks to address.

The chapter that follows provides an overview of the current study's methodology followed.

3.METHODOLOGY

3.1 Introduction

The previous chapter provided the theoretical underpinning for this study as well as an empirical literature review based on previous studies. The description of the methodology used and its applicability to the research questions was the focus of this chapter. The structure reflects the procedures and approaches followed to reach the study's conclusions. The methodology description began with a discussion of the research design, followed by the data collection methods and instruments, encompassing data types, sources, and nature of the sample. The model specification used in addressing the study objectives was also explored, followed by an explanation and justification of the study variables that were employed in the research analysis, and an account of the diagnostic tests. Studies referred to in chapter 2 presented varied findings regarding the effect of IR on FP and a positive impact of integrated reporting on FV for firms listed in South Africa. Chapter 2 results highlighted that the majority of the studies performed mainly looked at the period post IR adoption. This study therefore aims to contribute to existing literature on whether any effect on FP and FV can be observed as a result of the adoption of IR. The sample was collected over a period of 15 years, that is from 2005 to 2019. The aim was to assess any significant effect on the FP and FV of mining companies that have adopted integrated reporting as a reporting framework in SA. The study attempted to compare the period before adoption with the results of these companies after the adoption of this reporting framework.

3.2 Research Paradigm

The study is aligns with the positivist paradigm. Positivism's ontological premise is that knowledge or reality is single and objective (Davies et al., 2002). Yasseen (2019) contended that reality is one and it is based on actual measurable and understandable data (Park et al., 2020). Interpretivism, on the other hand, is viewed as the opposite of positivism (Bell, 2011). The Interpretivist position is that reality as not one and single but rather subjective, based on how one interprets it. Positivism seeks to unearth and uncover truth and then provide accurate and evidence-based descriptions (Yasseen, 2019). Within the positivist paradigm the researcher is independent of the research and valid knowledge is that which can be measured and observed (Maxim, 1999; Park et al., 2020). Alharahsheh and Pius (2020) supported this view and emphasised that natural scientists who adhere to positivist philosophy place strong

emphasis on observable reality and generalisations, as well as on the value of unadulterated facts and data. Furthermore, to construct these generalisations, researchers look for causal links in data; they then use these generalisations to explain and support organisational behaviour using common principles (Alharahsheh & Pius, 2020).

This study adopts a positivist view as it makes use of statistical methods, graphs, and tables to interpret the extent to which dependent variables change in response to the results of independent variables (Maxim, 1999). Most numerical analytical methods are founded on primary or secondary data (Mukeredzi, 2019), and this study makes use of secondary data.

3.3 Data collection methods and instruments

Data from the target population were collected and sampled in order to test the study's hypotheses. The paragraphs below detail the different data collection methods and instruments used for this study.

Primary data are data obtained specifically for a certain research goal; such data are original data. The two major primary data collection methods are experiments and social surveys in the form of interviews (Heaton, 2008). Secondary data are data originally gathered for alternative objectives and subsequently used to answer a different research question. Data may be collected and archived by a number of institutions, such as university researchers and statistical institutions. Most secondary data are quantitative in nature (Heaton, 2008).

For this study, secondary data were employed to determine the impact of IR on the FP and FV of mining companies listed on JSE. Secondary data are readily available and were therefore adequate to address the study objectives. For this reason, this study made use of this data type only.

3.3.1 Types and sources of data

Bloomberg database, McGregor BFA database, now known as IRESS, and the selected companies' websites were the data sources for this study (Churet & Eccles, 2014; Tshipa, 2017). The aforementioned databases offer financial data for various businesses around the world; they supply data such as ratios, financial statements, and other company reports. In order to conduct this study and investigate the correlation between integrated reporting and the financial success and FV of mining companies, the researcher used Bloomberg and McGregor BFA (IRESS) databases to gather information on the different variables of these

listed mining companies (Mukeredzi, 2019; Tshipa, 2017). The two databases were used to collect the information relating to the ROA, EVA and Tobin's Q of the selected companies. Table 3.3.1 below provides a breakdown of the different variables that were employed in this study and their various data sources. Information relating to the integrated reporting variable was obtained from the official websites of each of the listed firms.

Table 1: Different variables and their data sources

Acronym	Nature of the variable	Full term	Data source
ROA	Dependent variable	Return on assets	Bloomberg
EVA	Dependent variable	Economic Value Added	McGregor BFA database & IRESS
TQ	Dependent variable	Tobin's Q	McGregor BFA database & IRESS
LEV	Control variable	Leverage	McGregor BFA database & IRESS
BS	Control variable	Board size	Bloomberg
SG	Control variable	Sales growth	Bloomberg
S	Control variable	Company size	Bloomberg
B	Control variable	Beta - company risk	Bloomberg
IR	Independent variable	Integrated reports	Individual company website

Source: Own compilation.

3.3.2 Research Population

Majid (2018) defines the research population as the "target population" that a study aims to address or study. For this particular study, JSE-listed companies served as the study population. As of July 2023, JSE-listed companies numbered approximately 286 according to the FTSE Russell Factsheet.

3.3.3 Research Sample

Sampling relates to a process of selecting a statistically representative subclass of the entire population (Majid, 2018). Thus, a sample should be representative of the entire population.

Non-probability and probability sampling designs are the two categories used in research. Probability sampling offers all elements within the population an equitable opportunity to be selected and there is randomness in this method (Creswell et al., 2008). This sampling method reduces sampling error to the minimum (Bell, 2011). Non-probability sampling, on the other hand, does not incorporate randomness, meaning that every unit in the population does not have an equal chance to be chosen (Bell, 2011).

An objective, non-probability sampling technique was employed in the investigation. This method enables the selection of data which provide rich information on the topic being researched or where a certain process is highly likely to take place (Creswell et al., 2008). The sample for this study was obtained from the list of JSE-listed companies for the selected period. These JSE listed companies are grouped according to sectors and as of July 2023 there were 10 sectors. These 10 sectors are a representation of the SA economy. The basic materials sector is one of the largest sectors and biggest contributors to the South African GDP (Cowling, 2023; Davies et al., 2002). Mining companies make up the majority of the companies within this sector. The mining industry was therefore specifically selected as the study sample. Mining companies in SA specialise in mining gold, diamonds, chrome, coal, platinum, titanium, and vanadium, amongst other minerals. As per the findings from the Minerals Council of South Africa's Facts and Figures 2022 report, the industry contributed enormously to the economy; 15 500 new jobs were created, R74 billion was contributed as taxes and around R14 billion was also paid in royalties.

Once a company is listed on the JSE it is obliged to adhere to the listing regulations. One of these regulations is the application of King IV, which mandates companies to adopt integrated reporting (Ngcobo, 2020). Therefore, the focus of the research was on JSE-listed mining companies preparing integrated reports. Fifty-six companies were listed under the basic goods sector as at July 2023 when the sample was selected. These were further purposively selected for companies falling under the mining industry and the selection process finally produced 35 operational mining companies.

As the JSE listing requirement mandates all listed companies to prepare integrated reports, integrated reports for each of the companies were sought on the company's websites and the JSE website. Some of the companies did not produce integrated reports and in most of these cases it was discovered that the JSE was not their only listing platform and main listing

board. Therefore, these companies were not included as part of the sample for this study. Despite the fact that some financial data were obtainable from the financial statements such as ratios, the companies were still excluded on the basis of the absence of integrated reports, the independent variable for the study.

An Excel spreadsheet was prepared where these companies were recorded and tracked for availability of data for all variables. The following criteria were used in selecting the sample:

- The company should have been listed for not less than seven years.
- Data for that company were supposed to be available for a period of not less than seven years.

Justification for the sample selection criteria is based on the fact that although integrated reporting was introduced in 2009 on an "apply or explain" basis, most mining companies only adopted this reporting framework in 2011. With the introduction of the IR Framework in 2013, this was therefore taken as the base year for the period after the adoption of IR. The study period will therefore be split between the period preceding adoption of IR (2005–2012) and the period after adoption (2013–2019). Therefore, for those companies that adopted integrated reporting before 2013, the dummy variable before 2013 was changed to zero to achieve consistency of the panel data.

From the list of 19 mining companies which had adopted integrated reporting per the sample, 9 of them were omitted from the sample, as they did not have data for the minimum of seven years. This means that there were data limitations for these companies as either integrated reporting information was only available for a period of less than seven years or other data relating to other variables was not available and therefore those companies were removed from the sample. Therefore, the final sample for testing objectives 1 and 2 consisted of 10 mining companies. The final sample was therefore 78 observations for the period before adoption (2005–2012) and 70 for the period after adoption (2013–2019) for FP and 78 observations for the period pre-adoption for FV and 70 observations for the period post adoption (2013–2019). The final sample is therefore included under Table 1 in the appendix.

3.4 Study variables and justification for variables

3.4.1 Independent Variables

The integrated report is used in this study as an independent variable consistent with other previous studies (Dhaliwal et al., 2011; Mukeredzi, 2019; Ngcobo, 2020; Zhou, 2021). All JSE listed companies are expected to prepare integrated reports in terms of the listing requirements. These reports contain both the financial and non-financial information relating to a company's environmental, social and governance activities for a particular year. IR is still a fairly new reporting phenomenon as in comparison to other corporate reporting frameworks, therefore, the availability of an integrated report was considered as an independent variable. Comparable to previous studies by Pavlopoulos et al. (2017); Sierra-García et al. (2015), in this study IR represents a dummy variable. In instances where a mining company prepared an integrated report the variable is shown as 1 and otherwise a zero is awarded.

3.4.2 Dependent Variables

3.4.2.1 Return on Assets

The study made use of both accounting-based and market-based measures as dependent variables. Accounting-based metrics are a readily accessible and commonly used means of evaluating a corporation's performance (Mukeredzi). ROA is therefore used in this study as a FP measure which is accounting based. Data relating to ROA were obtained from Bloomberg and INET databases for a period of 15 years for the selected sample. ROA evaluates an organisation's profitability concerning its assets utilization in profit generation. This metric is computed by dividing net income after taxes by total assets. Better FP is indicated by a higher ROA, which is comparable across businesses of various operational sizes (Hidayat et al., 2022). ROA informs users of financial statements on the effectiveness of management in utilising company assets to generate earnings (Batchimeg, 2017). Accounting information therefore reveals the truth about a company. In addition, Kyere and Ausloos (2021) highlighted that leverage, unusual expenses and other discretionary elements have no effect on ROA.

ROA as a performance measure has attracted criticism, as it is sometimes viewed as a historical indicator. Tshipa (2017) highlighted that ROA's conceptual disadvantages include the fact that it does not take cashflows and the effects of risk into account. The other criticism

of ROA is that the distinctions between environmental, industrial, and non-FP aspects in enterprises are not demonstrated by ROA (Tshipa, 2017). Lassala et al. (2017) also stressed that despite ROA being one of the better measures of performance, it can easily be manipulated because it is based on accounting. The weaknesses associated with this FP measure were reduced by the inclusion of control variables in the study, as discussed in section 3.5.3.

Integrated reporting is a result of a company embracing integrated, thinking which requires a company's strategy to be aligned with its mission, values, and stakeholder expectations. This link in strategic choices can result in a more efficient use of resources, and better management of risk, which is highly likely to positively affect FP. In addition, stakeholders are also more inclined to support those companies that are dedicated to sustainability and responsible governance. This may draw in more clients and investors and eventually boost ROA. Therefore, the study expects a favourable correlation between IR and FP as measured by ROA.

3.4.2.2 Economic Value Added

EVA as an economic measure was also used as a FP proxy as it takes risk into account, unlike ROA. For this study EVA as a market-based measure was utilised to confirm the correlation between IR and FP. The way that EVA integrates market, accounting, and economic elements is a crucial tool for assessing financial success (Mukeredzi, 2019). Stewart (2004) states that, "EVA is the single best measure of wealth creation on a contemporaneous basis and is almost 50% better than its closest accounting-based measures in explaining changes in shareholder wealth." As a result, it is considered a reliable factor that may be raised to boost capital contributors' value (Moloi & Iredele, 2020). EVA has recently been used in studies that aimed to measure the effect of IR on FP (Matemane & Wentzel, 2019; Mukeredzi, 2019). (Tshipa, 2017) also used EVA as a FP proxy in their study on the effect of corporate governance on a firm's FP. According to the studies of Pham et al. (2011) and Subedi and Farazmand (2020), EVA is based on the business size. Therefore, to account for the different company sizes EVA was therefore adjusted by Total Assets (TA).

A positive correlation between IR and EVA is expected from this study. Through the adoption of IR, companies are expected to benefit from integrated thinking, which is

expected to enhance the efficiency and effectiveness of the business's ability to create value. Annual data for EVA were obtained from the INET database.

*EVA = NOPAT – WACC * TC*

EVA's determinants are:

EVA= Economic Value Added

NOPAT= Net operating profit after tax

WACC=Weighted average cost of capital

TC = Total invested capital

3.4.2.3 Tobin's Q

TQ assesses the market's perception of a company's operational effectiveness and ability to generate robust financial results. Put simply, it contrasts the current market value of an asset with the replacement cost (Wahl et al., 2020). Aspects not quantified on the balance sheet are also included in the market value, for instance intangible assets such as unacquired goodwill.

It is calculated as a proportion of equity measured at market value divided by assets measured at book value (Fu et al., 2016). A higher TQ proportion demonstrates more impressive internal structural efficacy and provides a more accurate assessment of a business's market success (Fu et al., 2016). Where the TQ ratio is below 1 it indicates that the shares of an organisation are undervalued (Tshipa, 2017). Investors may therefore have less incentive to invest in that organisation as the costs of acquiring shares outweigh the benefits (Mukeredzi, 2019). A ratio above 1, on the other hand, is appealing to investors as the shares will be overvalued. As Tobin's Q takes other non-financial or quantifiable factors into account, this makes it an excellent proxy in this context given that IR provides such additional information and covers the vacuum left by traditional financial reporting (Girella et al., 2021). Barth et al. (2017) supported the view and stressed that integrated reporting disclosure is likely to improve a company's market value as investors realise the entire potential of a firm's future value creation. TQ has been used as a FV proxy in previous studies that also looked at the relationship between IR and FV (Barth et al., 2017; Lee & Yeo, 2016; Lin & Tsai, 2020; Moloi & Iredele, 2020).

Like other FV measures Tobin's Q also has been the subject of criticism. According to Tshipa (2017), it is costly in nature in terms of calculation time and data required. As a market value measure it reflects expectations of future profitability, but it is well known that

there are many macroeconomic factors that can influence it (Lassala et al. (2017). The other criticism of Tobin's Q is that the distinctions between environmental, industrial, and non-financial aspects in enterprises are not demonstrated by Tobin's Q (Mukeredzi, 2019).

Bloomberg and INET databases are the source for a business's Tobin's Q data.
According to Wahl et al. (2020), TQ's determinants are as follows:

$$\mathrm{TQ_{it}} = \frac{MV_{\mathrm{it}}}{\mathrm{TA_{it}}} \qquad \textit{Equation 1}$$

Where:
TQ = Tobin's Q
MV = Market capitalisation plus total liabilities at book value
TA = Total assets measured at book value
$_{i}$ = company
$_{t}$ = year

3.4.3 Control Variables

To lessen the bias caused by omitted variables, this study included a variety of control variables (Tshipa, 2017). The regression models therefore incorporated control variables for this study. Variables were chosen based on theoretical predictions and are comparable to those used in previous studies by Mukeredzi (2019), Ngcobo (2020), Tshipa (2017), Abogazia et al. (2022); Lang et al. (2012) and Lee & Yeo (2016). The control variables employed in the study are listed below:

- Risk, measured using beta (B), refers to the systematic risk of a security in comparison to the whole market risk. This variable has been taken into account in the model because it has been discovered that any uncertainties that are specific to a company have an impact on the profitability position of that company (Kalsie & Shrivastav, 2016).
- Leverage (LEV) is the ratio obtained by dividing a firm's total interest-bearing debt by its total equity. The model incorporates financial leverage so as to take the firm's capital structure into account (Tshipa, 2017). High debt is associated with a higher risk and therefore either reduces or improves a company's value, depending on the risk appetite of the investors as well as the state of the economy (Munawar, 2019).

- Sales growth (SG), according to Kalsie and Shrivastav (2016), companies with high sales growth create opportunities for investment and expansion and are probably linked to better business performance. Afinindy et al. (2021) claim that growth in sales is an indicator of the successful implementation of a company's strategy, which improves FV and profitability and also attracts investors.
- Board size (BS) denotes the number of members serving on the company board. In a study by Pucheta-Martínez and Gallego-Álvarez (2020) a favourable association between board size and firm performance was observed. In their study Moloi and Iredele (2020) regarded it as a control variable for FV. A smaller board size, according toYermack (1996), is related to better business value as smaller boards are considered to be more effective and efficient.
- Company size (S) refers to the size of a company and can be measured using various metrices. In this study company size was measured using total assets. Opeyemi (2019), delineates that some variables used as company size indicators were identified as having a significant effect on return on assets (a performance measure). Furthermore, corroborating studies have underscored its significant bearing on a firm's intrinsic value and its allure to an array of stakeholders and investors, thereby justifying its inclusion as a critical control variable (Abogazia et al., 2022).
- ROA was utilised as a proxy for profitability, as suggested by (Lee & Yeo, 2016). It is determined by dividing net income after tax by total assets. Profitability serves as a key driver for firm performance and overall FV.

3.5 Model Specification

The study utilised a panel data regression model in addressing the research objectives. This method has been widely used in other studies examining the relationship between independent and dependent variables (Dhaliwal et al., 2011; Mukeredzi, 2019; Soriya & Rastogi, 2023). As the study looked at same-sector companies over a period, panel linear regression was an appropriate model to address the research objective and questions (Bell, 2011). This study observed data from JSE publicly trading mining companies over a period, namely from 2005 to 2019. Regressing the multivariate equation allowed the study to accomplish its objectives. The model below enabled the researcher to answer the research objectives outlined in chapter 1.

Research objective 1

To investigate the effect of IR on the Firm Performance among JSE listed mining companies. The investigation of study objective 1 encompassed testing the following regression models:

$$ROA_{it} = \beta_0 + \beta_1 IR_{it} + \beta_2 LEV + \beta_3 SG + \beta_4 BS + \beta_5 Size + \beta_6 B + \varepsilon_{it} \quad \textit{Equation 2}$$

$$EVA_{it} = \beta_0 + \beta_1 IR_{it} + \beta_2 LEV + \beta_3 SG + \beta_4 BS + \beta_5 Size + \beta_6 B + \varepsilon_{it} \quad \textit{Equation 3}$$

Research objective 2

To determine the impact of IR on Firm Value among listed mining companies. The investigation of study objective 2 encompassed testing the following regression model:

$$TQ_{it} = \beta_0 + \beta_1 IR_{it} + \beta_2 LEV + \beta_3 SG + \beta_4 BS + \beta_5 Size + \beta_6 ROA + \beta_7 B + \varepsilon_{it} \quad \textit{Equation 4}$$

Where:

Acronym	***Detail***
IR	*Integrated Reporting – a dummy variable where 1 is awarded for preparing the integrated report and zero otherwise.*
LEV	*Leverage, as measured by long-term total debt that is interest bearing divided by total assets*
SG	*Sales growth, measured as the current period sales minus prior period sales as a percentage of prior period sales.*
BS	*Board size – measured as the total number of members sitting on the board.*
B	*Beta – measured as a the systematic risk of a security in comparison to the whole market.*
Size	*Company size – measured as the total assets of the company.*
EVA	*Economic Value Added – measured as return on capital employed divided by weighted average cost of capital multiplied by capital employed.*
ROA	*Return on Assets – measured as the net income after tax divided by total assets.*
TQ	*Tobin's Q – measured as market value divided by total assets*
it	*Refers to fixed individual-specific and time-invariant effects*

ROA, EVA and TQ were taken as the dependent factors and risk, leverage, sales growth, board size and company size were applied as control variables. The study used ROA and

EVA as FP indicators and TQ was regarded as a FV proxy for this study. The above variables are discussed in detail in section 3.5 below.

3.6 Estimation procedure and data preparation

The dataset on some of the variables collected was incomplete due to the fact that data were missing from the data sources. Lin and Tsai (2020) say that incompleteness in datasets can be the result of network issues, problems with the database, or incorrect data entry, amongst other reasons. According to the literature there are many ways in which to deal with incomplete datasets. However, for the purposes of this study missing value imputation (MVI) was the applicable method. This is a procedure that uses statistical methods to replace missing data (Lin & Tsai, 2020). Thus, all missing data were replaced by the mean of the variable concerned. The assumption for this approach is that variables have a predictive distribution (Kwak & Kim, 2017). Mean values were therefore calculated on Excel and allocated to the incomplete data sets.

Before running the dataset for descriptive statistics, the data were run to identify outliers. According to (Kwak & Kim, 2017), outliers relate to a dataset or an observation that differs significantly from the rest of the data. Outliers should be addressed in data analysis as they can distort results, which leads to incorrect conclusions and therefore impairs the effectiveness of statistical models. The value modification method was applied, which allows the values of outliers to be replaced with either the largest or the second smallest value in the observations excluding the outlier values (Kwak & Kim, 2017). In order to deal with effects of outliers in our dataset, EViews software was used to winsorise the data.

3.7 Descriptive Statistics

Descriptive statistics are a very important step in data analysis because they assist analysts and researchers in understanding the key aspects of a dataset in a summarised format (Mukeredzi, 2019). They make use of basic statistics in summarising large datasets (Gujarati, 2022). These are explained below:

- Mean – a very common statistical measure of central tendency and represents the mathematical average of the data. It is the centre of the data and is computed by dividing the sum of values by the sum of units.
- Variance – relates to how spread-out data points are from the mean.

- Standard deviation – indicates how spread out the data are from the mean (Gujarati, 2022). It, therefore, provides a better picture of the sample.
- Number of observations – provides the total number of values in a dataset and therefore serves as the size of the dataset.

The next step in the data analysis was to test the variables for the correlation coefficient. The correlation coefficient shows the link between variables, hence when data are correlated, when changes in one variable's magnitude correspond to changes in the magnitude of another variable (Schober et al., 2018). This relationship may be in the same direction or opposite direction, leading to positive or negative correlations, respectively. For this study, a Pearson's correlation was therefore utilised. The analysis operates under the following assumptions:

- The variables exhibit a linear relationship, allowing for characterisation of both the direction and strength of the relationship.
- The two variables being correlated follow a bivariate normal distribution.
- The variables should be independent of each other.
- For each pair of variables, one of the following results was expected: On a scale between -1 and 1, a zero, which is an indicator that there is no linear correlation or relationship between the variables. Thus, none of the variables is either decreasing or increasing.
- A result closer to 1 is an indicator of a positive correlation. In this case the increase in a variable results in a corresponding increase in another variable.
- A result closer to -1 signifies a negative relationship between variables, indicating an inverse movement in the variables. Thus, as one variable increases another decreases.

Statistical results for the study were analysed using panel data regression models. Panel data surveys the same cross-sectional units over time. In this study the focus was on integrated reports of 10 JSE-listed mining companies over a 15-year period for each company. In short, panel data includes space and time (Gujarati, 2022)**.** Values for one or more variables are gathered for numerous sample units simultaneously in cross-sectional data (Gujarati, 2022)**.**

In statistics to decide on the most suitable regression model there is need to consider the size of the data set, levels of correlation between the effects on the individual and other regressors, as well as the variation degree between the dependent and independent variables (Clark & Lizner, 2015).

The fixed effects model assumes that an individual unit (n) within a set of data has unique characteristics which do not change over time (Zulfikar & STp, 2018). In other words, while the intercept varies among the individual units, the intercept of each unit does not change over time, which is an indication that it is time-variant (Gujarati, 2022). The characteristics are captured by including dummy variables for each unit in the regression model (Zulfikar & STp, 2018). This, therefore, allows for the control of unobserved individual specific factors that might otherwise confuse analysis. The belief with this regression model is that individual differences may be addressed by using different intercepts. According to Zulfikar and STp (2018) the model can be presented as follows:

$$Y_{it} = a_i + BX_{it} + E_{it} \qquad \textit{Equation 5}$$

Where: i represents N and t represents T
N being the number of individual units and T being time periods.

Random effects panel regression, unlike the fixed effects model, assumes that the individual specific effects are random variables that follow a certain distribution (Zulfikar & STp, 2018). The model allows for individual-specific effects that are unobserved and which are not constant over time. Instead, the assumption is that they follow a kind of distribution across the population (Gujarati, 2022). The random effects model has the advantage of eliminating heteroscedasticity (Zulfikar & STp, 2018), and accommodates variables whose values do not change across time (Torres-Reyna, 2007). Therefore, Torres-Reyna (2007), posits that in instances where the differences in entities are likely to influence the dependent variables, the random effects model should be employed. The model can be presented as follows:

$$Y_{it} = a + BX_{it} + E_{it} \qquad \textit{Equation 6}$$

Where:
i represents 1,2,3…., N and
t represents 1,2,3……., T
N represents number of individual units;
T represents time periods;

u_i represents the individual residual, which is the random feature of unit observation the $_i$th remains constant at all times;

E_{it} represents the total residual, where the residual is a mix of cross- section and time series data

A statistical test therefore can be utilized to determine the most suitable regression model.

The Hausman Test was performed using the EViews software to determine the most suitable model, comparing the random effects model with the fixed effects model. This test was necessary as the response variables (firm performance and value) may be impacted by variables that are time-invariant (Gujarati, 2022), such as leverage, beta, board size etc. Several panel data regression models exist; however, for the current study, the focus was on the random and fixed panel data regression models. It is imperative to note that the wrong model selection will result in wrong results.

According to Wooldridge (2019) in scientific research, the null hypothesis, typically represented as H zero, posits the absence of the effect under investigation. This implies that both sets of estimates remain congruent, albeit with varying degrees of efficiency. Conversely, the alternative hypothesis asserts a statistically significant association between the variables under scrutiny. Thus, the null hypothesis suggests the lack of a statistical correlation between said variables. Within statistical discourse, diverse hypothesis commonly emerge. When null hypothesis prevails, acceptance of the random effects regression model follows suit, whilst the opposite allows for the fixed regression model.

3.8 Validity and reliability of data

The definition of reliability is "consistency of a measure of a concept" and validity is "whether a concept really measures that concept" (Bell, 2011). Secondary data were collected from statements published and integrated reports accessed from company websites to enhance reliability. McGregor BFA, IRESS and Bloomberg databases were also used as data sources. As reliability tests, Wald Chi2 and R-squared were conducted (Mukeredzi, 2019), and the outcomes were described in chapter 4.

By selecting relevant/proper statistical methods in the testing hypothesis and answering the research questions, validity was ensured. In this study, three types of analyses were carried out. These included descriptive analysis, correlation matrix and regression analysis.

3.9 Diagnostic tests

There are a number of statistical weaknesses related to panel data regression models which, if not fixed, could lead to false conclusions. The following diagnostic tests were performed to assess the reliability and validity of the panel data regression models:

3.9.1 Normality

To draw statistical inferences from a regression model, a normality test has to be performed which ensures that error residuals are normally distributed. Normality was tested using the Shapiro-Wilk Test (Marais, 2016). This test is appropriate for a sample size of between three and two thousand. When interpreting the test results, a probability greater than 5% indicates normal distribution of the variables. A probability of less than 5% indicates that there is no normal distribution. According to Marais (2016), this test was identified as one of the most powerful amongst the other tests used to test normality, namely the Anderson-Darling, Lilliefors and Kolmogorov-Smirnov Tests.

3.9.2 Multicollinearity

A multicollinearity regression model is the result of significantly correlated multiple variables. This could be due to faulty model definition and the wrong usage of dummy variables (Mukeredzi, 2019). There are a number of methods in the literature that can be used to identify and address the presence of multicollinearity in a model. This study followed the Pearson correlation matrix to identify the presence of multicollinearity, similar to the approach adopted in studies by (Mukeredzi, 2019; Shrestha, 2020; Tshipa, 2017; Wang & Sarkis, 2017). Multicollinearity may result in misleading or skewed results when not addressed. Shrestha (2020) indicated that the presence of multicollinearity raises the standard errors of each coefficient in the model, altering the outcome of the analysis. Because of multicollinearity, several of the relevant variables under investigation are statistically insignificant.

3.9.3 Heteroskedasticity

Heteroskedasticity arises when the standard deviations of a predicted variable are inconsistent across various values of an independent variable or in relation to earlier time periods (Gujarati, 2022). According to Marais (2016), it indicates that the model has a high level of unpredictability. Where the error variable's variance is constant, this is referred to as homoskedasticity. A modified Wald Test will be utilised to test for heteroscedasticity as in previous studies (Marais, 2016; Mukeredzi, 2019). The test results for this test are interpreted as follows: a probability of greater than 5% represents no heteroscedasticity and a probability less than 5% represents heteroscedasticity. The detailed results are disclosed in chapter 4. Following the studies by Marais (2016); Mukeredzi (2019), the issue of heteroscedasticity was solved using the robust estimator of variance.

3.9.4 Serial Correlation

Serial correlation, also referred to as autocorrelation, according to (Gujarati, 2022), refer to the correlation of the same variable across two different time intervals. Marais (2016) defines serial correlation as a scenario where disturbances are connected throughout time. The correlation was tested using the robust estimator of variances test. This test was appropriate because it is based on fewer assumptions than other tests, which makes it more robust (Marais, 2016). Tanner-Smith et al. (2016) state that it does necessitate the knowledge of the underlying covariance structure, amount, effect, and size which makes it applicable in a wide range of situations. The presence of autocorrelation leads to consistent but inefficient coefficient estimations, as well as skewed standard deviations (Marais, 2016). The test results for this test are interpreted as follows: a probability of greater than 5% represents no serial correlation and a probability of less than 5% represents serial correlation. The presence of serial correlation leads to consistent but inefficient coefficient estimations, as well as skewed standard deviations.

3.10 Data presentation and analysis plan

The findings and analysis of the gathered data will be presented in chapter 4. The EViews software was used for the data tests, statistical tests and for running the regression model.

3.11 Ethical Considerations

When human participants are involved in research and analysis, ethical considerations are crucial. The study data and testing foundation are based on publicly available secondary sources; and therefore, the study does not require human involvement. As secondary data were obtained from publicly accessible websites this eliminates any ethical issues regarding data collection. Because the information used in the quantitative analysis will not entail any human involvement, ethical concerns that accompany human interaction will not emerge in this study. For the purposes of this investigation, an ethical exemption certificate was therefore obtained.

3.12 Summary

This chapter highlighted the methodology used and its applicability in addressing the research questions and objectives. It commenced with a discourse on the research design, followed by an elucidation of the data collection methods, sources and sample. The models were developed with reference to previous literature and aimed to address the research objectives. Justification for the choice of variables employed in the models was also explained. The data analysis and diagnostic tests performed were also briefly described. The next chapter contains an overview of the study results derived from the analysis and tests performed.

4. PRESENTATION AND RESULTS ANALYSIS

4.1 Introduction

The objective of this study is to confirm the impact of integrated reporting on FP and FV of JSE-listed mining companies. Chapter 1 of this study focused on the introduction and the main reason for performing the study. The study background, study objective and the research gap were covered in that chapter. Chapter 2 focused on the empirical and theoretical literature which helped in identifying the research gap. Chapter 3, the previous chapter, elaborated on the methodology employed in the current study.

The current chapter focuses on the study results based on the analysis and tests performed. Test results will be presented according to the three models that were developed in chapter 3. The results on the descriptive statistics will come first, correlation matrix results will follow, diagnostic test results will come next and lastly the regression analysis results will follow. The results are presented with reference to the various models and finally the chapter summary will be provided.

4.2 Model 1

The first model was meant to investigate the effect of IR on the FP of JSE-listed mining companies using ROA, and to address the first research question:

- What is the effect of IR on the FP of JSE listed mining companies?

4.2.1 Descriptive Statistics Test

A summary of the descriptive statistics test outcomes for data collected, including data on the dependent variables, control variables and independent variables for model 1, is provided in Table 2 below. The descriptive statistical results provide a general understanding of the variables basic characteristics.

Table 2: Descriptive statistical results

Statistics

		beta	board_size	EVA	ir	lev	rev_grow	roa	total_assets
N	Valid	148	148	148	148	148	148	148	148
	Missing	0	0	0	0	0	0	0	0
Mean		.796926	11.240	-.000124548	.57	1.0420146	11.3683764	5.3143760	2.07487E+10
Std. Error of Mean		.0497892	.1459	.0000240124	.041	.04159458	1.28215724	.66975386	1547570445
Median		.920000	11.000	-.000075459	1.00	1.1100000	8.4718500	4.6592500	1.18892E+10
Mode		-.2901[a]	12.0	-.000124912	1	1.34548	-11.19182[a]	-6.47617[a]	2147311910[a]
Std. Deviation		.6057119	1.7744	.0002921230	.497	.50601991	15.59811607	8.14790737	1.88270E+10
Variance		.367	3.149	.000	.247	.256	243.301	66.388	3.545E+20
Skewness		-.361	-.077	-1.286	-.276	.151	.249	.371	.869
Std. Error of Skewness		.199	.199	.199	.199	.199	.199	.199	.199
Kurtosis		-.978	-1.002	3.322	-1.951	1.743	-1.072	-.812	-.551
Std. Error of Kurtosis		.396	.396	.396	.396	.396	.396	.396	.396
Minimum		-.2901	8.3	-.001231124	0	.08600	-11.19182	-6.47617	2147311910
Maximum		1.6261	14.0	.0008742792	1	2.98000	37.34766	19.98834	5.92557E+10

a. Multiple modes exist. The smallest value is shown

***Note**: EVA: Economic Value Added; IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth; ROA: Return on Assets. **Source**: Author's own compilation and analysis.*

The table provides the descriptive statistical outcomes of the sample utilised to examine the effect of integrated reporting on firm performance. The sample as highlighted in the previous chapter consists of 10 listed mining companies in South Africa spanning a 15-year period from 2005 to 2019. The total count of observations for all variables as depicted in Table 2 is 148 for the period of 15 years. Integrated reporting for this study was used as a dummy variable. Hence the maximum of 1 and minimum of 0 as the presence of the integrated report was treated as a 1 and the absence thereof as a 0. This approach aligns with previous studies by (Pavlopoulos et al., 2017; Sierra-García et al. 2015; Sierra et al., 2013).

Previous studies that used ROA as a proxy for FP (Lee & Yeo, 2016; Mukeredzi, 2019; Tshipa, 2017) obtained mean values of 8,5%, 6,8% and 11,32% respectively but in contrast the current study's ROA mean value is 5,3%. Although the current results are slightly lower than those of previous studies, the positive mean value is an indicator that companies that are listed are creating value continuously for their shareholders.

4.2.2 Correlation Coefficient Test

As previously highlighted in section 3.7, the correlation coefficient shows the relationship between variables. In line with previous studies, a result close to positive 1 is an indicator of

a positive linear relationship or correlation between variables and any result closer to negative 1 indicates a negative relationship. A correlation of 0,78 and above is considered too high (Gujarati, 2022). (Acock, 2008) identified the significance of the correlation results as 1% indicating a weak relationship and 5% a strong one. Table 3 presents the results for ROA and other variables for the correlation tests performed.

Table 3: Pearson Correlation Coefficient Matrix

	BETA	BOARD_SIZE	EVA	IR	LEV	REV_GROW	ROA	TOTAL_ASSETS
BETA	1.000000							
BOARD SIZE	0.247665	1.000000						
EVA	0.286506	0.101944	1.000000					
IR	-0.159353	0.078291	-0.140697	1.000000				
LEV	0.086254	0.159761	0.114971	-0.003824	1.000000			
REV_GROW	0.112658	-0.048547	0.204488	-0.273864	0.0792140	1.000000		
ROA	0.208875	-0.051618	0.516755	-0.377123	0.002974	0.374932	1.000000	
TOTAL_ASSETS	0.425786	0.600559	0.140607	0.209612	0.062256	-0.107186	-0.083664	1.000000

Note: *EVA: Economic Value Added; IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth; ROA: Return on Assets.* ***Source****: Author's own compilation and analysis.*

The correlation coefficient results as presented in Table 3 shows that ROA and EVA have the second highest correlation significance. The two are both proxies for FP. Companies that effectively utilise their assets are most likely to achieve higher earnings. This in turn increases the returns generated for the owners or shareholders of the company, which translates into an increase in EVA. These results are linked to the results of Mukeredzi (2019), who performed a comparable study in South Africa using a sample based on the top JSE listed companies from different sectors, Tshipa (2017), whose study sought to determine how corporate governance affected the financial results of JSE-listed companies and Kangarloei et al. (2012), whose study aimed to determine whether there is any relationship between ROA and EVA. All three studies revealed a strong positive correlation between the two variables. Therefore, an increase in one variable corresponds to an increase on the other variable, and vice versa.

The findings indicate a negative correlation between ROA and board size of -0,051618 which suggests that a bigger board size results in reduced return on assets. The highest correlation significance exists between total assets and board size of 0,60559. This is consistent with previous studies and publications by (Kalsie & Shrivastav, 2016; Nazir et al., 2009). This

means that as the firm increases in size the board size also increases and vice versa. These results are, however, not consistent with the results of the study by Cheng (2014), whose findings supported the notion that larger boards tend to make more concessions in order to reach a consensus, which therefore makes their judgements less radical so that they end up contributing less to the performance of the company.

4.2.3 **Diagnostic Test Results**

Diagnostic test results are presented in this section, followed by the regression results. The diagnostic test results are presented in the following order: normality test results, multicollinearity, heteroskedasticity and serial correlation.

4.2.4 Normality Test Results

This test as highlighted in section 3.9.1 ensures that error residuals are normally distributed. The test was performed in SPSS using the Shapiro-Wilk test as the sample size lies between 3 and 2000. A significance level of 5% was used to interpret the results in line with the guidelines of Guru (2016). The test results are presented in Table 4 below.

Table 4: Normality test results using Shapiro-Wilk Test

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	ir	Statistic	df	Sig.	Statistic	df	Sig.
beta	0	.100	64	.178	.943	64	.005
	1	.096	84	.054	.923	84	<,001
board_size	0	.143	64	.002	.946	64	.007
	1	.143	84	<,001	.912	84	<,001
EVA	0	.188	64	<,001	.866	64	<,001
	1	.260	84	<,001	.784	84	<,001
lev	0	.161	64	<,001	.937	64	.003
	1	.160	84	<,001	.897	84	<,001
rev_grow	0	.112	64	.045	.897	64	<,001
	1	.088	84	.156	.953	84	.004
roa	0	.148	64	.001	.916	64	<,001
	1	.093	84	.068	.946	84	.002
total_assets	0	.228	64	<,001	.820	64	<,001
	1	.190	84	<,001	.850	84	<,001

Note: EVA: Economic Value Added; IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth; ROA: Return on Assets ***Source****: Author's own compilation and analysis.*

Based on the findings presented in Table 4, the significance level for majority of the variables is less than 0,05, with the exception of beta and board size. The first dependent ROA has a probability value of 0,01, which is less than 0,05. This suggests that there is not enough evidence to confirm the normal distribution of the data. The null hypothesis is therefore rejected on this basis. This follows previous studies (Marais, 2016; Mukeredzi, 2019; Ngcobo, 2020), where the null hypothesis was rejected on the basis of insufficient evidence to confirm the normality of the data. A regression analysis method less sensitive to outliers and therefore validations of assumptions will be used in line with the study by (Ngcobo, 2020), so as to reduce the non-normality effect.

4.2.5 Multicollinearity

The multicollinearity test was performed on the first model with the aim of determining whether any of the variables may be correlated with each other. The Pearson correlation matrix was used to assess multicollinearity of the variables. Table 5 presents the results on multicollinearity. A linear relationship among the variables is regarded as multicollinear. The VIF (variance inflation factor) was used to determine the level of multicollinearity. A VIF less than 10 indicates the absence of severe multicollinearity in the model, whereas a VIF above 10 indicates severe multicollinearity (Myers & Myers, 1990). If not addressed, the problem of multicollinearity may result in misleading or skewed results. Shrestha (2020) emphasised that the presence of multicollinearity boosts standard errors of each coefficient in the model, and therefore changes the outcome of the analysis. Table 5 below presents the multicollinearity results for model 1.

Table 5: Multicollinearity test results

	Coefficient	Uncentered	Centered
Variable	**Variance**	**VIF**	**VIF**
C	20.64951	58.39251	NA
IR	1.728963	2.774922	1.199966
BETA	1.309060	3.699893	1.348947
LEV	1.445325	5.477178	1.039451
BOARD_SIZE	0.182056	66.64918	1.609969
REV_GROW	0.001616	1.695320	1.104582
TOTAL_ASSETS	1.99E-21	4.413338	1.985469

Note: EVA: Economic Value Added; IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth Source: Author's compilation and analysis.

The multicollinearity findings, as presented in Table 5, suggest the absence of multicollinearity between the variables as the centred VIF is between 1 and 2, which is less than 10. These results are aligned with the study by Mukeredzi (2019), who assessed the multicollinearity of relatively the same variables.

4.2.6 Heteroskedasticity

The model was tested for heteroskedasticity, which tests whether the standard deviations of predicted variables remain consistent across various values of an independent variable or in relation to earlier time periods (Gujarati, 2022). The Modified Wald Test was applied to test for heteroskedasticity. According to Keller and Warrack (2003) a probability greater than 5% represents no heteroskedasticity and a probability below 5% indicates the presence of heteroskedasticity. Table 6 summarises the results.

Table 6: Heteroskedasticity test results

Wald Test:			
Test statistic	**Value**	**Df**	**Probability**
F-statistic	47.10056	(8, 140)	0.0000
Chi-square	376.8045	8	0.0000

Source: Author's own compilation and analysis.

As shown in Table 6, the probability value is below 0,05, leading to the rejection of the null hypothesis of homoscedasticity. This signifies the presence of heteroskedasticity and indicates suggesting that the variance of the error is not constant across observations. The robust estimator of variance, also known as the sandwich estimator of variance, will be applied in the regression analysis so as to deal with the issue and effects of heteroskedasticity (Phillips & Sul, 2007; Torres-Reyna, 2007).

4.2.7 Serial Correlation

In this study, Breusch-Godfrey Serial Correlation LM Test was employed to examine the presence of serial correlation. The presence of serial correlation leads to consistent but inefficient coefficient estimations, as well as skewed standard deviations. The test results were interpreted as a probability greater than 5% indicating no serial correlation and a probability value below 5% as a sign of serial correlation (Gujarati, 2022). Table 7 presents a summary of test findings.

Table 7: Serial correlation test results

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	8.813186	Prob. F (2,138)	0.0002
Obs*R-squared	16.76260	Prob. Chi-Square (2)	0.0002

Source: Author's own compilation and analysis.

The results from Table 7 reveal the existence of serial correlation, given that the p-value is below 5%. Therefore, the null hypothesis is rejected due to the significance of the p-value.

The problem of autocorrelation was therefore corrected in EViews by using the Breusch-Godfrey Serial Correlation Test. The Test results are presented below, in Table 8

Table 8: Autocorrelation test results

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	*3.063120*	*Prob. F (2,136)*	*0.0500*
*Obs*R-squared*	*6.336320*	*Prob. Chi-Square (2)*	*0.0421*

Source: *Author's own compilation and analysis.*

Table 8 highlights the corrected results; the problem of autocorrelation has been resolved.

4.2.8 Hausman Test

EViews provides a variety of tests that could be used in selecting an appropriate or suitable regression model to use in a study. The Hausman Test was therefore selected and performed to determine suitability between the fixed effects and the random effects model. A probability below 5% signifies that the null hypothesis should be rejected and a probability above 5% implies accepting the null hypothesis. According to Torres-Reyna (2007), the null hypothesis means that the random effects model is more suitable than the fixed effects model. Table 9 below presents the detailed Hausman Test results.

Table 9: Hausman test results

Test period random effects				
Test summary		**Chi-Sq. statistic**	**Chi-Sq. d.f.**	**Prob.**
Period random		4.999259	7	0.6601

Source: *Author's own compilation and analysis.*

The test results show a probability of 0,66, which is above 0,05. Therefore, the null hypothesis is not rejected, affirming that the random effects model is deemed appropriate and suitable to test the model. According to Wooldridge (2019), datasets that are unbalanced should be analysed using the random effects model. This is therefore consistent with the test results obtained under Table 9.

4.2.9 Regression Analysis Model 1

Objective 1 of this study was to investigate the effect of IR on the FP of JSE-listed mining companies. In order to answer and address this objective, a panel regression was employed to test the effect of the independent variables and the dependent variable's FP as measured by ROA. The findings of the random effect regression are outlined below in Table 10.

Table 10: Regression Analysis Results: Model 1

Method: Panel EGLS (cross-session random effects)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	5.433699	4.943202	1.099227	0.2735
IR	-4.227995	1.215721	-3.377769	0.0007
BETA	0.681291	1.208702	0.563655	0.5739
BOARD_SIZE	0.213995	0.434573	0.492426	0.6232
LEV	-0.320381	1.120350	-0.285965	0.7753
REV_GROW	0.121924	0.036441	3.345792	0.0011
TOTAL_ASSETS	-8.08E-11	5.80E-11	-1.394902	0.1652
R-squared	0.235324			
Adjusted R-squared	0.202784			

Note: IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth; Source: Author's own compilation and analysis.

The results in Table 10 relates to the regression analysis ran using the random effects model. This model was run through the EViews software and specifically using the Swamy and Arona estimator of component variances. The ROA is noted as the dependent variable and the IR is the independent variables, with the remaining variables designated as control variables.

The coefficient value indicates a negative relationship between ROA and IR. The coefficient results are consistent with the correlation results, as there was also a negative correlation between the two variables. This relationship is quite significant given the probability value of 0,0007. The observed p-value, falling below the predetermined significance level of 0,05, leads to the rejection of the null hypothesis. The negative correlation indicates that integrated reporting has reduced firm performance. Mukeredzi (2019) study results also echo the current findings regarding the direction of correlation, however, differ in terms of the significance level as their test found an insignificant relationship between ROA and ESG which was the

proxy for IR. In another study by Conway (2019), assessing the effect of IR quality and FP, the results likewise demonstrated an unfavourable correlation between IR quality and FP.

Based on the test results, the only other control variable that has a notable impact on the dependent variable is revenue growth with a p-value of 0,0011. Mukeredzi, (2019) also found an insignificant influence on the rest of the other variables like board size, beta, leverage and total assets. Furthermore, the results indicate that the model has a 20,27% fit, meaning that the explanatory power of the variables is above 10% and is therefore considered somewhat significant. Although significant, these results are contrary to the study expectations.

4.3 Model 2

The second model was aimed to investigate the effect of IR on the FP of mining companies listed on the JSE using EVA as a metric. This model addresses the first research question:

- What is the effect of integrated reporting on the FP of JSE listed mining companies?

4.3.1 Descriptive Statistics

The descriptive statistics results for study objective 1 are outlined under Table 2. The results show a negative mean for EVA of -0,000125. There is a huge gap between the maximum EVA of 0,000874 and the minimum of -0,00123. These negative minimum results are consistent with the results obtained by Subedi and Farazmand (2020), although that study was based on firms in China. Negative EVA median and mean values suggests that majority of the mining companies in South Africa are producing negative value from the funds invested in them.

4.3.2 Correlation Matrix

Correlation coefficient results for all the variables employed to address study objective 1 were presented in Table 4.2.2 The only correlation coefficient for this study considered high is the correlation between EVA and ROA, with a correlation coefficient of 0,516755. This result is below 0,8, and as a correlation of 0,8 and above is regarded as significant (Gujarati 2022), it is high and but not significant. This strong positive correlation is evidence that companies are indeed increasing company value through an increase in profitability.

A negative correlation of -0.140697 was observed between EVA and IR. As the correlation is close to 0 this shows a weak correlation between the two variables. These results are inconsistent with the study expectations as the expectation was that as the companies introduced integrated reporting their FP as measured by EVA would increase. The results, however, align with the conclusions drawn by Matemane and Wentzel (2019) with regards to the direction of the relationship, who also found a negative correlation between IR and EVA.

4.3.3 Diagnostic Test Results

The diagnostic test results for model 2 will be presented under this section. The test results will be presented in the following order: normality test results, multicollinearity, heteroskedasticity and serial correlation.

4.3.4 Normality test results

The normality test was performed in SPSS utilising the Shapiro-Wilk Test, given that the sample size was between 3 and 2000. A significance level of 5% was used to interpret the results. A significance level below 5% entails rejection of the null hypothesis, while above 5% implies acceptance of the null hypothesis. The outcomes of the Normality test results are provided in Table 4 above.

The results in Table 4 show that the null hypothesis is rejected as the p-value is 0,001, below the 5% level. This proves that there is not enough evidence to confirm the normal distribution of the data. Therefore, the null hypothesis is rejected on this basis. This follows previous studies by Marais (2016); Mukeredzi (2019); Ngcobo (2020), where the null hypothesis was rejected due to insufficient evidence to confirm the normality of the data. A regression analysis method that is less sensitive to outliers and validations of assumptions will be used in line with the study by Ngcobo (2020), so as to reduce the non-normality effect.

4.3.5 Multicollinearity

The multicollinearity test was performed in line with the tests performed for model 1. The same basis of interpretation for model 1 was applied. Where the Centred VIF is less than 10 this indicates the absence of multicollinearity and any result above 10 represents the presence of multicollinearity. Model 2 results are presented below in Table 11:

Table 11: Multicollinearity test results

	Coefficient	Uncentered	Centered
Variable	**Variance**	**VIF**	**VIF**
C	3.07E-08	58.39251	NA
IR	2.57E-09	2.774922	1.199966
BETA	1.95E-09	3.699893	1.348947
BOARD_SIZE	2.71E-10	66.64918	1.609969
LEV	2.15E-09	5.477178	1.039451
REV_GROW	2.40E-12	1.695320	1.104582
TOTAL_ASSETS	2.96E-30	4.413338	1.985469

Source: *Author's own compilation and analysis.*

Multicollinearity results as highlighted in Table11 indicate that there is no multicollinearity between the variables as the centred VIF is between 1 and 1.985, which is less than 10. Therefore, there is no problem of multicollinearity in the model. Similar results were obtained in Mukeredzi (2019) study, which assessed the multicollinearity of almost the same variables in a related study.

4.3.6 Heteroskedasticity

Model 2 was tested for heteroskedasticity using the Wald Test. A probability value greater than 5% indicates homoscedasticity and below a value 5% indicates the presence of heteroskedasticity. Table 12 below presents the results on heteroskedasticity for model 2.

Table 12: Heteroskedasticity Wald Test results

Wald Test:			
Test Statistic	**Value**	**df**	**Probability**
F-statistic	3.379781	(6,141)	0.0038
Chi-square	20.27869	6	0.0025

Source*: Author's own compilation and analysis.*

According to the findings illustrated in Table 12, the probability value is 0.0025, falling below the 5% threshold, therefore the null hypothesis has to be rejected. The model is therefore heteroskedastic. This suggests that the variance of the residuals is not constant and varies with the levels of independent variables. In order to cope with the issue and impacts of heteroskedasticity in the regression analysis, the "robust estimator of variance" will be employed (Phillips & Sul, 2007; Torres-Reyna, 2007).

4.3.7 Serial Correlation

The Breusch-Godfrey serial correlation LM Test was used to examine for serial correlation in model 2. A probability greater than 5% represents no serial correlation and one below 5% indicates serial correlation. The outcomes of the test are detailed below in Table 13:

Table 13: Serial correlation test results

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	12.52924	Prob. F(2,139)	0.0000
Obs*R-squared	22.60569	rob. Chi-Square(2)	0.0000

Source*: Author's own compilation and analysis.*

The test results indicate that the model exhibits serial correlation, with results below 0,05. In order to address this problem, the Breusch-Godfrey serial correlation test was run in EViews software. Corrected test results are presented below in Table 14.

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Breusch-Godfrey Serial Correlation LM Test:				
Null hypothesis: No serial correlation at up to 2 lags				
			Before	**After**
F-statistic	5.234117	Prob. F(2,138)	0.0000	0.0064
Obs*R-squared	10.43522	Prob. Chi-Square(2)	0.0000	0.0054

Source*: Author's own compilation and analysis.*

Following the execution of the serial correlation test, the outcomes depicted in Table 14 indicate that the issue of serial correlation still exists, given that the probability value after autocorrelation is still below 0,05. Panel data analysis techniques, such as fixed effects model or random effects model, can mitigate serial correlation by capturing unobserved heterogeneity across entities (Gujarati, 2022). The study will employ panel data analysis techniques to address and mitigate the effects of serial correlation.

4.3.8 Hausman Test Results

To determine the appropriate method between random and fixed methods for the regression analysis for model 2 the Hausman test was performed. The test results are presented below in Table 15.

Table 11: Hausman test results

Test cross-section random effects				
Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random		63.211868	6	0.0000

***Source**: Author's own compilation and analysis.*

The test results suggest rejecting the null hypothesis, given that the probability value falls below 5%. Consequently, the dataset for model 2 should be analysed using the fixed effects method.

4.3.9 Main regression results

The findings of the regression analysis for model 2 are presented below in Table 16 below.

Table 12: Fixed Effects Model test results

Method: Panel Least Squares				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.000265	0.000214	-1.240748	0.2169
IR	-5.26E-05	4.80E-05	-1.096933	0.2747
BETA	-3.07E-05	4.75E-05	-0.645475	0.5197
BOARD_SIZE	1.48E-05	1.79E-05	0.827274	0.4096
LEV	4.22E-05	4.30E-05	0.983023	0.3274
REV_GROW	1.40E-06	1.36E-06	1.023381	0.3080
TOTAL_ASSETS	-1.50E-15	3.04E-15	-0.495698	0.6209
R-squared	0.413128			
Adjusted R-squared	0.346438			

Note: EVA: Economic Value Added; IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth; ***Source****: Author's own compilation and analysis.*

The regression results in Table 16 relate to the fixed effects model employed in the analysis. This model was run in EViews with the aim of confirming the effect of IR on the FP of listed mining companies with EVA serving as the proxy for performance.

The findings reveal a negative association between EVA and IR, as depicted by the negative coefficient value of -5.26. This negative correlation does not hold significance, given the p-value of 0.2747, which is way above 0,05. As the p-value 0.2747 is greater than o.05, the null hypothesis is therefore not rejected, as this indicates that there is not enough evidence to conclude that the coefficient is significantly different from zero.

The results also reveal that there is an insignificant impact on the rest of the control variables, namely BETA, board size, leverage, revenue growth and total assets. As depicted in the table, this model's goodness of fit is moderate as the r-squared value is at 0.413128. The adjusted r-squared value is also at 0.3464, which is significant given that the explanatory power is above 10%.

Furthermore, the results are contrary with regards to the direction of the relationship to results of the studies by Mukeredzi (2019) and Atan et al. (2016), who noted an insignificant positive correlation between EVA and IR. From these two studies it was concluded that the introduction of IR does not result in value being added to the company. In contrast to the current study, Mukeredzi (2019) examined companies from different industries listed on the

JSE, while Atan et al. (2016) focused on a public non-financial company in Asia that prepared and published integrated reports on a voluntary basis.

Therefore, there is no impact on the financial performance of mining companies as a result of the adoption of integrated reporting. These results however, contradict the expected study results. The insignificant impact was linked to a limited timeframe when it comes to the adoption of IR (Atan et al., 2016), Mukeredzi (2019) on the other hand highlighted that the insignificant impact may be associated with the high costs associated with integrated reporting. A possible reason for the insignificant negative relationship may be because of the failure by mining companies in South Africa to capitalise on the synergies brought about by integration.

4.4 Model 3

The third and last model for this study was run in order to investigate the impact of IR on the FV of JSE-listed mining companies using TQ. This model addresses the second research question:

- What is the impact of integrated reporting on FV of JSE-listed mining companies?

4.4.1 Descriptive statistics tests

Descriptive statistics tests were conducted as part of achieving the second study objective. Test outcomes are displayed in Table 17 below.

Table 13: Descriptive statistics

	BETA	BOARD_SIZE	IR	LEV	REV_GROW	ROA	TOTAL_ASSETS	TQ
Mean	0.796926	11.20946	0.567568	1.042015	11.36838	5.314376	2.07E+10	1.407747
Median	0.920000	11.00000	1.000000	1.110000	8.471850	4.659250	1.19E+10	1.275900
Maximum	1.626100	14.00000	1.000000	2.980000	37.34766	19.98834	5.93E+10	5.270000
Minimum	-0.290100	8.000000	0.000000	0.086000	-11.19182	-6.476170	2.15E+09	0.370000
Std. Dev.	0.605712	1.826686	0.497096	0.506020	15.59812	8.147907	1.88E+10	0.862347
Skewness	-0.357711	-0.164153	-0.272772	0.149529	0.246001	0.366864	0.859777	2.138969
Kurtosis	2.014534	2.088025	1.074405	4.644761	1.924069	2.175149	2.427494	8.805901
Jarque-Bera	9.144995	5.793479	24.70081	17.23383	8.631443	7.515530	20.25523	320.7236
Probability	0.010332	0.055203	0.000004	0.000181	0.013357	0.023336	0.000040	0.000000
Sum	117.9450	1659.000	84.00000	154.2182	1682.520	786.5277	3.07E+12	208.3465
Sum Sq. Dev.	53.93238	490.5068	36.32432	37.64025	35765.28	9759.094	5.21E+22	109.3154
Observations	148	148	148	148	148	148	148	148

***Source**: Author's own compilation and analysis.*

The descriptive statistics results presented in Table 17 for model 3 reveal a positive TQ mean value. In the current study TQ measures FV, consistent with prior research line with previous studies (Lee & Yeo, 2016; Barth et al., 2017). The mean value of TQ exceeding 1, as indicated by test results, suggests that these companies' current market value is higher than their total assets value. This result of above 1, echoes findings from previous studies conducted within South Africa. Lee and Yeo (2016) and Barth et al. (2017), reported a Tobin's Q mean values of 2.73 and 1.81, respectively. These results are an indicator that South African listed firms are increasing in value on average over the tested timeframes.

4.4.2 Correlation Coefficient

The correlation coefficient tests were run for model 3 and the test as alluded to in chapter 3 is meant to test whether any of the variables are correlated. As with the previous two models, results close to +1 are an indicator of a positive linear relationship. In line with previous studies, a result close to positive 1 is an indicator of a positive linear relationship or correlation between variables and any result closer to -1 signifies a negative relationship between variables. The test results for model 3 are displayed in Table 18 below.

Table 14: Correlation coefficient test results

Correlation Probability	BETA	BOARD_SIZE	IR	LEV	REV_GROW	ROA	TOTAL_ASSETS	TQ
BETA	1.000000							
BOARD_SIZE	0.248661	1.000000						
IR	-0.159353	0.070462	1.000000					
LEV	0.086254	0.156854	-0.003825	1.000000				
REV_GROW	0.112658	-0.050217	-0.273865	0.079214	1.000000			
ROA	0.208875	-0.058317	-0.377123	0.002974	0.374932	1.000000		
TOTAL_ASSETS	0.425787	0.597746	0.209612	0.062256	-0.107187	-0.083665	1.000000	
TQ	0.143192	0.020587	-0.311385	-0.044195	0.136705	0.498053	0.007123	1.000000

***Note**: IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth; ROA: Return on Assets TQ: Tobin's Q. **Source**: Author's own compilation and analysis.*

Based on the test results shown in Table 18 above, there exists a negative correlation between TQ and leverage (-0,04419), as well as TQ and IR (-0,31138). This means that as TQ increases these two variables, namely leverage and IR, decrease. In addition, there is also a positive correlation between TQ and beta (0,1419), TQ and board size (0,02058), TQ and revenue growth (0,1367), and TQ and return on assets (0,49805). The highest correlation is

between TQ and ROA, which suggests that profitable firms are also higher-value firms. This is consistent with the findings of the research conducted by (Abogazia et al., 2022), although their study focused on companies in Egypt, unlike the current study, which is based on South African JSE-listed companies. Although these results show negative and positive correlations, none of the correlations is considered significant as they are not above +/- 0,8 and 0,9, values which are considered significant and harmful (Farrar & Glauber, 1967). The rest of the correlations are therefore regarded as weak.

4.4.3 Diagnostic Test Results

Diagnostic test results for model 3 will be presented under this section. These results will be presented in the same order as for the previous two models that is normality, multicollinearity, heteroskedasticity and serial correlation.

4.4.4 Normality

Like the previous two models, this test is meant was meant to assess whether there is a normal distribution of data for model 3. SPSS was used to carry out this test. Test results were interpreted in terms of a significance level of 5%, where a probability value of less than 5% leads to rejecting the null hypothesis while a significance level above 5% results in the acceptance of the null hypothesis. Normality test results for this model are displayed in Table 19 below.

Table 15: Normality test results

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
tq	.151	148	<,001	.800	148	<,001
roa	.080	148	.021	.938	148	<,001
ir	.375	148	<,001	.630	148	<,001
lev	.161	148	<,001	.909	148	<,001
rev_grow	.096	148	.002	.934	148	<,001
total_assets	.198	148	<,001	.840	148	<,001
beta	.086	148	.010	.934	148	<,001
board_size	.140	148	<,001	.935	148	<,001

***Note**: IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth; ROA: Return on Assets TQ: Tobin's Q.*
Author's own compilation and analysis.

The normality values for all the variables for this model are below 5%, as presented in Table 19. The null hypothesis is therefore rejected on this premise, suggesting that data does not follow a normal distribution. These results follow the results of the previous two models. In line with the study by Ngcobo (2020), a regression analysis method that is less sensitive to outliers and validations of assumptions was used.

4.4.5 Multicollinearity

A multicollinearity test was also run for model 3 and in line with previous tests collinearity test results where VIF values below 10 represent no severe multicollinearity and results where the VIF is above 10 are evidence of severe multicollinearity (Myers & Myers, 1990). Multicollinearity in this model was evaluated using the "Pearson correlation matrix", with the outcomes outlined in Table 20 below.

Table 16: Multicollinearity test results

Variable	Coefficient variance	Uncentred VIF	Centred VIF
C	0.212768	55.95419	NA
IR	0.020020	2.988228	1.292207
BETA	0.014459	3.800454	1.385610
BOARD_SIZE	0.001839	62.38237	1.603132
LEV	0.015538	5.475860	1.039201
REV_GROW	1.90E-05	1.854359	1.208204
ROA	7.63E-05	1.890065	1.323289
TOTAL_ASSETS	2.14E-23	4.404795	1.981625

***Note:** IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth Source: TQ: Tobin's Q. Source**:** Author's compilation and analysis.*

From the presented test results, it is evident that the model does not exhibit multicollinearity issues, as indicated by the centred VIF ranging between 1,039 and 1,981 for all the variables, which are below 10. These findings are consistent with the results of the preceding two models and with the outcomes of the study by Abogazia et al. (2022) where the maximum VIF was 1,759.

4.4.6 Heteroskedasticity

Model 3 was also tested for heteroskedasticity, and the Modified Wald Test was used to run this test. The null hypothesis is accepted at a p-value greater than 5% and this shows that variables are homoscedastic. A p-value less than 5% results in the null hypothesis being rejected and is evidence of the problem of heteroskedasticity. The tests results are presented below in Table 21.

Table 17: Heteroskedasticity test results

Wald Test:			
Test Statistic	**Value**	**Df**	**Probability**
F-statistic	71.92611	(8, 140)	0.0000
Chi-square	575.4089	8	0.0000

Source: Author's own compilation and analysis.

According to the test results as provided in Table 21 above, the probability value is 0,00 and is less than 5. Consequently, the null hypothesis is rejected, signifying a heteroskedasticity problem in the model. To deal with the effects of heteroskedasticity, the "robust estimator of variance", was utilised (Phillips & Sul, 2007; Torres-Reyna, 2007).

4.4.7 Serial correlation

To test model 3 for serial correlation, the Breusch-Godfrey Serial Correlation LM Test was employed. A probability of above 5% represents no serial correlation and one below 5% suggests serial correlation. The test results are outlined in Table 22 below.

Table 18: Serial Correlation test results

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	34.82358	Prob. F (2,138)	0.0000
Obs*R-squared	49.64084	Prob. Chi-Square (2)	0.0000

Author's own compilation and analysis

Test results in Table 22 suggest the rejection of the null hypothesis due to p value falling below 5%. Autocorrelation was therefore run in EViews using the Breusch-Godfrey Serial Correlation LM Test. This follows the study by Ngcobo (2020), where the model was autocorrelated and therefore further tests had to be performed, although in their study they applied the STATA Soft Test, which is a different autocorrelation correction method to the one used in the current study. Results for the serial correlation correction are presented below.

Table 19: Autocorrelation test results

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	3.465081	Prob. F (2,136)	0.0341
Obs*R-squared	7.127494	Prob. Chi-Square (2)	0.0283

Source: Author's own compilation and analysis.

The results depicted above indicate that the model exhibits serial correlation despite autocorrelation test being conducted as the p value is still below 0,05. Panel data analysis techniques, such as fixed effects model or random effects model, can mitigate serial correlation by capturing unobserved heterogeneity across entities (Gujarati, 2022)

4.4.8 Hausman Test

To facilitate the selection of the most suitable regression model, specifically between fixed and random effects models, a Hausman Test was performed in EViews. The interpretation of

the test outcomes followed are consistent with the previous two models. The test results are outlined in Table 24 below.

Table 20: Hausman test results

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	14.624930	7	0.0411

Author's own compilation and analysis.

As presented in Table 24, the probability value for the Hausman Test is 0,0411, meaning that it is below 5%, and therefore the null hypothesis is rejected. Thus, a fixed-effects model is deemed suitable for the regression analysis.

4.4.9 Main Regression Test

The regression analysis for model 3 was run on EViews using the fixed-effect model. Main regression outcomes are outlined below in Table 25

Table 21: Fixed effects regression test results

Method: Panel Least Squares				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	2.079622	0.561429	3.704157	0.0003
IR	-0.124432	0.130616	-0.952656	0.3425
BETA	0.048800	0.125918	0.387555	0.6990
BOARD_SIZE	-0.033368	0.046481	-0.717892	0.4741
LEV	-0.069125	0.114082	-0.605925	0.5456
REV_GROW	-0.000972	0.003752	-0.259078	0.7960
ROA	0.039257	0.008516	4.609804	0.0000
TOTAL_ASSETS	-1.89E-11	8.21E-12	-2.300220	0.0230
R-squared	0.530846			
Adjusted R-squared	0.473545			

Note: IR: Integrated Report; LEV: Leverage; REV_GROW: Revenue Growth Source: TQ: Tobin's Q; Author's own compilation and analysis.

The third and last study objective aimed to validate the impact of IR on the FV of JSE-listed mining companies. To address this objective comprehensively, a panel regression was performed. The random effects regression outcomes are outlined above in Table 26. The

regression outcomes as presented highlight the impact of IR on FV using TQ as the proxy for FV. The coefficient outcomes reveal a negative correlation between TQ and IR, with a coefficient value of -0,1244. This relationship is, however, statistically insignificant as the probability value is 0,3425, which is above 0,05. This means that there is no relationship between the two variables.

The only other control variables that TQ has a significant negative relationship with is firm size (total assets) as its probability value is 0,0230, respectively, and below 5% and a correlation of -1,89. The results also indicate a negative correlation between TQ and other control variables including board size, leverage, revenue growth and firm size. None of these relationships is statistically significant. This is consistent with the study by Wahl et. Al (2020). These results, therefore, suggest that as the firm's size in terms of assets increases, its value tends to decrease. Conversely, while a higher leverage appears to correspond with lower FV, this association lacks significance.

These results are aligned with the results of Nurkumalasari et al. (2019), whose study was based on companies in Asia for the period between 2015 and 2017. In their study they noted that there was no association between IR and FV. There are, however, different views on this study as the current results also contradict the results of the studies by Abogazia et al. (2022) and Lee and Yeo (2016), whose test results revealed a positive and significant association. The study by Abogaziaba et al. (2022) was based on companies listed in Egypt encompassing 50 listed companies across all industries. The difference may also have been due to the fact that Egyptian listed companies apply IR on a voluntary basis. Another study by Wahl et al. (2020) also noted an insignificant or trivial favourable association between IR and FV. Their study was based on international listed companies that apply IR on a voluntary basis.

53% of the regression outcome is accounted for by the study's independent variable TQ. The remaining 47%, which are other variables not included in the model, explain the rest of the outcome.

4.5 Summary

This chapter focused on the study results based on the analysis and tests performed. The test results were presented in terms of the three models. The models were used with the objective

of answering either of the two research questions. Descriptive statistics results were presented in the following order: correlation matrix results, diagnostic test results, and lastly the regression analysis results for each model. Some diagnostic problems were identified and presented, and corrective measures were identified where necessary. Results for each test performed were compared with previous research related to the study. Study results will therefore be summarised in the following chapter and conclusions will be drawn from the results. Recommendations for further research will also be provided as drawn from the study's results and conclusions.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The objective of this study was to ascertain whether there are any quantitative benefits for organizations that adopt IR. For the purposes of this study the benefits were split in terms of FP and FV.

As chapter 4 provided an analysis of the study results of the sampled dataset, this chapter aims to summarise the results presented in chapter 4 as well as provide conclusions on the questions that were raised in chapter 1. Recommendations for further research will also be made on the basis of the study's results and conclusions.

5.2 Study Summary

IR has brought about change in the reporting environment with the consolidation of both financial and non-financial information of a company into one report. In contemporary corporate practices, organisations are increasingly adopting frameworks that showcase accountability to stakeholders, the environment, society, and the global economy. Literatures highlights numerous advantages associated with this reporting framework, particularly IR. However, as there is still a lag in terms of information required on the quantitative benefits of IR for the adopting firms, this study sought to investigate the effect of IR on the FP and FV of mining companies that have embraced it. The theoretical underpinning for this study was the stakeholder theory as it goes beyond the needs of the ordinary shareholders in a business's decision making.

In order to address the research questions and achieve the study objectives, a panel regression method was applied. The study followed a positivist paradigm and utilised secondary data. Data were collected for a sample of 10 mining companies for the period from 2005 to 2019. These data were analysed using SPSS and EViews software. The analysis was based on the three regression models developed to meet the study objectives. Results of the study were presented in terms of these regression models. The summary of findings obtained through the analysis in chapter 4 will be discussed in the following sections:

5.2.1 Model 1: Effect of IR on financial performance using ROA

Model 1 examined the effect of IR on the Firm Performance of JSE-listed mining companies using ROA. This model sought to address the first research question: "What *is the effect of IR*

on the financial performance of JSE listed mining companies?" To obtain the regression results, a random effects model was run on EViews software.

Regression results for this model reveal a notable negative correlation between IR and ROA. These results imply an inverse relationship between IR and ROA, that is the introduction or adoption of IR causes a decline in ROA. Therefore, these results are an indication that the adoption of IR has resulted in lower profits for listed mining companies as measured by ROA. This raises the question: do the costs of implementing IR outweigh its monetary benefits? These results may be an indication that these companies may be failing to capitalise on the benefits that arise from synergies created by integration.

5.2.2 Model 2: Effect of IR on FP using EVA

Model 2 investigated the effect of IR on the FP of JSE-listed mining companies, employing EVA. While addressing the first research question, this model utilised a different proxy for FP. "*What is the effect of IR on the financial performance of JSE-listed mining companies?"* To obtain the regression results, a fixed effects model was run on the EViews software.

The results suggest the existence of an insignificant negative relationship between EVA and IR, evident from the negative coefficient value (-5.26) and a p-value below 0,05 (0.2747). Consequently, the null hypothesis was not rejected, indicating that there is not enough evidence to conclude that the coefficient is significantly different from zero. The results imply that while there is a negative association between the IR and EVA, the relationship is not statistically significant. Therefore, these results may be an indication that mining companies in South Africa are not effectively leveraging the benefits from the synergies created by integration.

5.2.3 Model 3: Impact of IR on FV using TQ

Model 3 was designed to investigate the impact of IR on the FV of mining companies listed on the JSE using TQ. The second research question is addressed by this model: *"What is the impact of IR on firm value of JSE-listed mining companies?"* Following the Hausman Test results, a fixed-effects model was run on the EViews software.

The test outcomes reveal that there is a statistically insignificant negative relationship between TQ and IR. The coefficient value was negative (-0,1244) and the p-value exceeded 0,05 (0,3425). These results suggest that the adoption of IR does not result in improved firm value. The reason for these results may to some extent be the result of the nature of the industry. Due to its impact on the environment and on social conditions, the mining industry has been under heavy scrutiny even before the introduction of IR. As a result, these companies may have long invested in comprehensive disclosures and therefore the introduction of IR may not make much of an impact on the value of these companies. On the other hand, this may be a highlight of the failure by mining companies in South Africa to capitalise on the benefits that are brought about by integration.

5.3 Summary

The current study's objectives were to investigate the correlation between IR and Financial Performance as well as IR and Firm Value of JSE-listed mining companies. IR implementation necessitates significant financial investment and time commitment from companies. This has given rise to much debate on whether there are any quantitative benefits that accrue to the implementing company. Most companies are interested in this debate, more especially given that most countries adopt IR on a voluntary basis. As mining companies play a pivotal role in the SA economy in terms of wealth creation as well as employment creation, this study sought to focus on this particular sector of JSE-listed companies. Based on the presented findings, the following conclusions are drawn:

- There exists a negative association between IR and FP. IR adoption has a negative effect on the FP of the listed mining companies. There seems to be a negative trade-off in terms of the quantitative benefits associated with IR adoption. This indicates that more is being spent financially and there are no quantitative returns in terms of profits.
- Regarding the second objective, there is an insignificant negative effect of IR on FV, which equates to there being no relationship between two variables. There is no improvement in the value of companies as a result of the adoption of IR. Therefore, the results indicate that IR adoption has had no effect on the value of companies mining companies.

Overall, the study's outcomes suggest that there are no quantitative benefits internally associated with the adoption of IR. Companies that have adopted IR have not yet recovered from the huge investment made financially from IR adoption.

5.4 Recommendations

The current study focused on JSE-listed mining companies that apply IR on a mandatory basis and therefore the conclusions drawn cannot be taken as conclusive. The study could therefore be expanded by including other unlisted mining companies that have adopted IR on a voluntary basis so as to produce more compelling results. Additionally, as the current study focused on a limited number of mining companies, a larger sample would yield more compelling results.

Future studies could also build on the current study and expand by taking IR scores into account so as to confirm whether there are any variations in results for those mining companies that produce quality integrated reports and vice versa. In addition, future studies could also make us of other firm performance and firm value measures besides the ones utilised in this study.

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APPENDICES

Appendix 1: List of mining companies

Mining Companies Listed on JSE as at July 2023	
Name	**Other name**
African Rainbow Minerals	
Alphamin Resources Corporation	
Anglo American Platinum Ltd	
Anglo American PLC	
Anglogold Ashanti	
Arcelor Mittal South Africa Limited	
BHP Group Limited	
Chrometco Limited	
DRDGOLD Limited	
Eastern Platinum Limited	
Europa Metals Limited	
Exxaro Resources Limited	Kumba Iron Ore
Gemfields Group Limited	
Glencore PLC	
Gold Fields Limited	
Harmony Gold Mining Company	
Impala Platinum Holdings Limited	
Jubilee Metals PLC	
Kibo Energy PLC	
Kore Potash PLC	
MC Mining Limited	
Merafe Resources Limited	
Northam Platinum Limited	
Omnia Holdings Limited	
Orion Minerals Limited	
Pan African Resources PLC	
Randgold and Exploration Company	

Mining Companies Listed on JSE as at July 2023	
Name	**Other name**
Sable Exploration and Mining Limited	
Sibanye Still Water Limited	
South32 Limited	
Southern Palladium Limited	
Tharisa PLC	
Thungela Resources Limited	
Wescoal /	Salungano Group
Wesizwe Platinum Limited	

Appendix 2: Final sample of listed mining companies

Mining Companies Listed on JSE as at July 2023

Name	Other name
Anglo gold Ashanti	
Arcelor Metal South Africa Limited	
Exxaro Resources Limited	Kumba Iron Ore
Gold Fields Limited	
Harmony Gold Mining Company	
Impala Platinum Holdings Limited	
Merafe Resources Limited	
Northam Platinum Limited	
Omnia Holdings Limited	
Pan African Resources PLC	

Appendix 3: Ethical Clearance

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

27 July 2023

Ms Nyasha Dlamini (223138993)
School Of Acc Economics&Fin
Westville

Dear Ms Nyasha Dlamini,

Original application number: 00022186
Project title: Integrated reporting and financial performance of mining companies listed on the JSE: Evidence from South Africa

Exemption from Ethics Review

In response to your application received on 20 July 2023, your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW.**

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:
Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,

[redacted]

Prof Josue Mbonigaba
Academic Leader Research
School Of Acc Economics&Fin

Appendix 4: Editor's Report

AA Mills (Sandra)

Translation and Editing Services

2024/01/26

This is to certify that I, Alexandra Anne Mills, a qualified and highly experienced academic editor and translator, have edited the dissertation titled "**Integrated reporting and financial performance and firm value of mining companies listed on the JSE: Evidence from South Africa"** by Nyasha Dlamini.

I can certify that it is free of language errors provided that the changes I have recommended have been introduced. I further certify that the assistance I provided was confined to language editing; the academic content is the student's own.

A.A. Mills

Mobile: 082 4586281

Email: sandra.anne.mills@gmail.com