GREEN SUPPLY CHAIN MANAGEMENT AND ENTERPRISE PERFORMANCE IN THE SOUTH AFRICAN MINING INDUSTRY

Research report

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DECLARATION

I declare that **GREEN SUPPLY CHAIN MANAGEMENT AND ENTERPRISE PERFORMANCE IN THE SOUTH AFRICAN MINING INDUSTRY** is my own work and that all sources cited or quoted have been indicated and aknowledged by means of complete references.

I further declare that this work has not been submitted previously, or any part thereof, for examination at the University of South Africa for another qualification or at any other higher learning institution.

…… …04 October 2019……

Signature Date

Mr Abednigo Mkhetheni Ngcobo

(LEAD RESEARCHER)

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ABSTRACT

In the past decade, sustainability issues have emerged as an important area of consideration in business. The mining industry in South Africa has not been spared from this debate since it is one of the major contributors to the environmental challenges that South Africa and other sub-Saharan countries are facing. The purpose of this study is to explore green supply chain management (GSCM) practices and their relationship with enterprise performance in the South African mining industry. More specifically, this research explores the effect of GSCM practices and other organisational factors on enterprise performance in mining companies that operate in Rustenburg in North West Province.

This study adopted a research model relating GSCM practice and enterprise performance through three organisational variables (employee job satisfaction, operational efficiency, and relational efficiency) as moderators. Statistical analyses were based on the data collected through survey questionnaires from two South African platinum mining companies in supply chain management departments. Reliability and validity of the research model were tested by the widely accepted statistical tools. To test the hypotheses relating GSCM practice implementation and enterprise performance, correlational analysis and multi-regression models were used.

The most anticipated finding of the study was a direct link between GSCM practice implementation and enterprise performance. Indeed, statistical significance was found between the variables. Furthermore, there were significant direct relationships that were found between GSCM practice implementation and enterprise performance through three mediating variables of employee job satisfaction, operational efficiency and relational efficiency. This result indicates that enterprise performance will be improved when GSCM enhances employee job satisfaction, operational efficiency and operational efficiency.

Keywords: Green Supply Chain Management, Enterprise Performance, Employee Job Satisfaction, Operational Efficiency, Relational Efficiency, Republic of South Africa.

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CHAPTER 1
INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

The mining industry is a vital cluster within the South African economy and has been for over a century. This makes it essential for data on the industry to be freely available for stakeholders to understand how the industry is performing. In 2017 the projected estimate according to the Chamber of Mines of South Africa (the custodians of the South African mining industry) contributed almost 7% of the gross domestic product. In other words, the direct contribution of mining to GDP was R312 billion in 2017 (Chamber of Mines, 2017). Although the industry has lost almost 30 000 jobs since 2014, employment is estimated to have increased by 1.6% to 464 667 during 2017, which can be attributed partially to the growth experienced in the industry. Furthermore, the mining industry has a considerable number of companies and generates substantial revenue. Top players represent the highest revenue in the industry and have noteworthy influence within the mining sector. Regarding the market outlook, the South African metals and mining industry is forecast to have a value of USD42,395.4 million, an increase of 10.6% between 2016 and 2018 (Marketline, 2018).

Mining operations are the strategic and essential industrial activities which rely on the extraction, transportation and use of non-renewable natural resources, causing several interactions with the environment (Barve & Muduli, 2013). Years of unregulated mining and mineral processing activities such as drilling, blasting, crushing and other associated activities have not come without any environmental costs. Furthermore, Barve and Muduli (2013) suggest that the impact of mining activities on pollution of air, water, land, soil quality, vegetation including forest ecosystems, and on human health and habitation have become a matter of grave concern. There are a considerable number of challenges that are faced by the mining industry throughout the globe. Lately, environmental sustainability is one of those challenges driving firms to develop internal green activities (Jacob, Gordhan & Ramatlhodi, 2016). The South African mining industry suffered a massive blow due to poor policy decision-making by the ruling party. The dismissing of the finance minister

of South Africa (RSA) by the former president Jacob Zuma in the year 2017 led to the country's creditworthiness downgrade to a level just above the junk status by credit rating agencies such as Moody's Investors Service and Standard and Poor (Jacob et al., 2016).

Environmental issues from the extractive industries and especially mining are prevalent and harmful. An effective way to manage these pernicious environmental problems is through organisational practices that include the broader supply chain management. Green supply chain practices and their role in mining industry strategy and operations have not been comprehensively addressed (Kusi-Sarpong et al., 2015). According to Shafique, Asghar and Rahman (2017), balancing between environmental and economic performance and getting the boost in organisations. The protection of the environment has become an important concern to most customers and regulatory authorities in every country, which explains why environmental protection has become the bone of contention of organisations. Green supply chain management (GSCM) is fully-fledged and covers the stages of the product lifecycle that especially focus on green purchasing, green manufacturing, green logistics, investment recovery and cooperation with customers. Through the implementation of GSCM practices, organisations can achieve superior performance focusing on environmental, social, economic and operational performance (Albort-Morant, Leal-Millan & Cepeda-Carrion (2016).

Going green in the past decade has been a never-ending debate among different industries (Albort-Morant et al., 2016). The mining industry is not spared from this debate as the main contributors to the environmental challenges that RSA and other sub-Saharan countries are facing. The practice of GSCM has been considered by the manufacturers as a feasible option to reduce the environmental impact of operations while simultaneously improving their operational performance (Vanalle, Ganga, Godihno & Lucato, 2017). Institutional pressure is one of the most critical factors that have encouraged companies to implement GSCM practices. GSCM aims to maximise overall environmental profit by adopting a life cycle approach through product design, material selection, manufacturing, and sales and recovery, and therefore helps the firm to realise its sustainable development and improvement (Shi et al., 2012). According to Hossein et al. (2016), applying green supply chain practices rather than traditional ones can help organisations to develop win-win strategies which assist them

in attaining profit and market share objectives by lowering the environmental risks and impacts while raising their environmental efficiency.

1.2 PROBLEM STATEMENT

Recently, the South African mining industry has been beset by problems in industrial relations which have persistently reduced competitiveness and deterred foreign investment (Marketline, 2018). The industry shrunk in 2016 despite the recovery in commodity prices. As alluded to earlier, a problem which has held back the mining industry in RSA during recent years has been that of industrial relations. Recently, compensation packages were agreed with complainants following the 2012 shooting of 34 miners involved in a wildcat strike (Marketline, 2018). In May 2016, a South African High Court ruled that people who contracted silicosis and tuberculosis as a result of unsafe conditions at mines could join together in a class-action lawsuit against mining companies for compensation. The resurgence of mining-related diseases implies that mining companies will face increased regulatory activity, new and tighter dust limits, operational changes and increased corporate liability (Marketline, 2018). Therefore, this study presupposes that improving on GSCM practices will lead to superior enterprise performance in the mining industry, which is a solution to the challenges that the industry faces currently.

Most extant empirical literature only focuses on subsets of GSCM constructs. Most studies are probably unable to offer a comprehensive view of GSCM research, thus reducing the value for practitioners and scholars to some extent (Fang & Zhang, 2018). A considerable number of studies on GSCM in the mining industry have been conducted among the developing countries, especially in South American countries as well as Asian countries in the past few decades. In the South African mining context, as one of the developing countries and one of the leading mineral resources producers, it is surprising that not many such studies have been conducted. This provides an impetus to conduct the current research to determine how the implementation of GSCM can lead to an improved business performance in various spheres of operations within the mining industry in RSA.

1.3 AIM OF THE STUDY

This study aims to investigate the connection between GSCM and enterprise performance in the South African mining industry.

1.4 RESEARCH OBJECTIVES

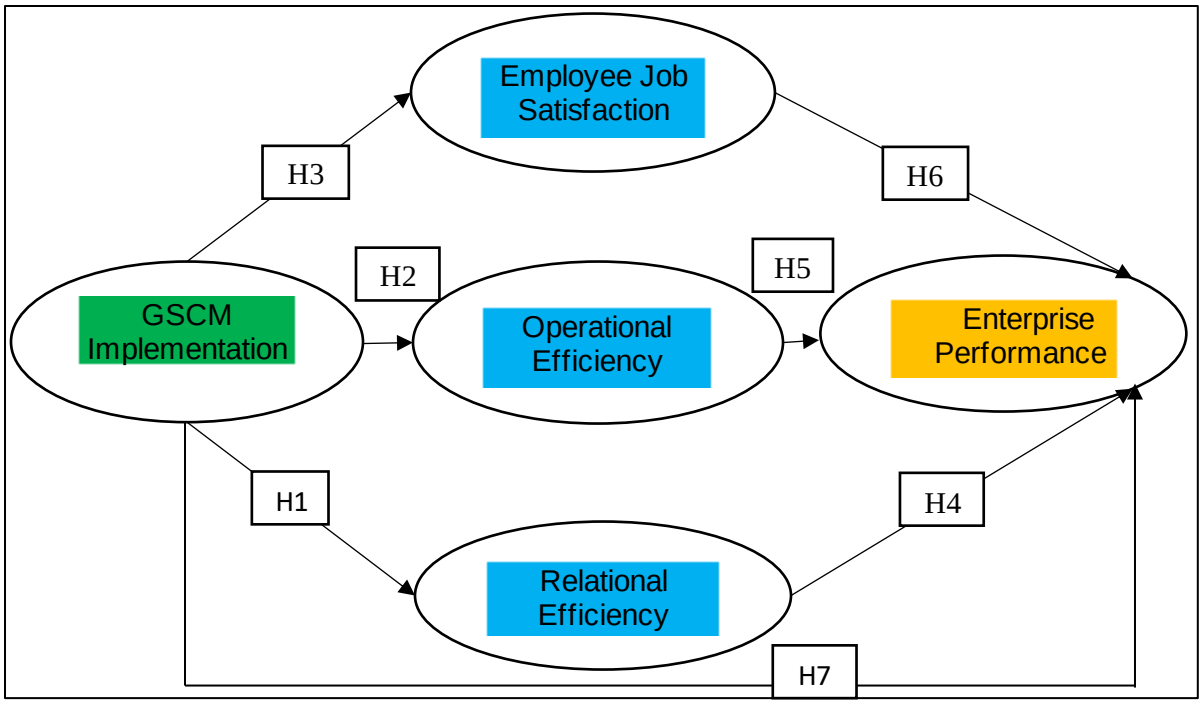
The following objectives have been formulated for this study:

- to determine the influence of GSCM on enterprise performance in the South African mining industry;
- to establish the influence of GSCM on relational efficiency in the South African mining industry;
- to examine the influence of GSCM on operational efficiency in the South African mining industry; and
- to determine the influence of GSCM on employee job satisfaction in the South African mining industry.

1.5 CONCEPTUAL MODEL AND HYPOTHESES

Figure 1.1 outlines the theoretical model that guides this research. It shows that implementation of GSCM practices through relational efficiency, operational efficiency, and employee job satisfaction has a positive influence on enterprise performance.

Figure 1.1: Conceptual Model



Source: Adapted from Lee, Kim and Choi (2012)

The study will test the following hypotheses:

H1: There is a positive relationship between GSCM and relational efficiency in the South African mining industry.

H2: There is a positive relationship between GSCM and operational efficiency in the South African mining industry.

H3: There is a positive relationship between GSCM and employee job satisfaction in the South African mining industry.

H4: There is a positive relationship between relational efficiency and enterprise performance in the South African mining industry.

H5: There is a positive relationship between operational efficiency and enterprise performance in the South African mining industry.

H6: There is a positive relationship between employee job satisfaction and enterprise performance in the South African mining industry.

H7: There is a positive relationship between GSCM and enterprise performance in the South African mining industry.

1.6 PRELIMINARY LITERATURE REVIEW

When researchers embark on a study the first aim should be to find out what has been done so far in that field of study. They should start with a review of the existing scholarship or available body of knowledge to see how other scholars have investigated the research problem that the researchers are interested in (Bui, 2009). A good literature review is comprehensive, critical and contextualised. It means that it will provide the reader with a theoretical base, a survey of published works that pertain to the researcher's investigation, and an analysis of that work (Hofstee, 2006). According to Cooper, Seiford and Zhu (2011), the literature review may also explain the need for the proposed work to appraise the shortcomings or information gaps in secondary data sources. This section provides a summarised review of the literature on GSCM, relational efficiency, operational efficiency, employee job satisfaction and enterprise performance.

1.6.1 Green Supply Chain Management

GSCM is defined as the integration of environmental thinking into the supply chain management (SCM), including product design, material sourcing and selection, manufacturing processes, delivery of the final product after its useful life (Khairani, 2012). GSCM aims at confining the wastes and also recognises the disproportionate environmental impact of the supply chain processes within the industrial system hence help to conserve the energy and prevent the dissipation of dangerous materials into the environment (Dashore & Sohani, 2013). GSCM plays a vital role in the improvement and implementation of a firm's competitive advantage (Govindan et al., 2014). According to Kusi-Sarpong et al. (2016), GSCM can aid in evaluating global and systematic environmental footprint reduction. Finally, GSCM is an important strategic objective for businesses that seek to realise the multiple benefits from such practices, including cost savings, stronger brand recognition and competitor differentiation (Roehrich, Hoejmose & Overland, 2017).

1.6.2 Relational Efficiency

Relational efficiency is the ability of supplying firms to increase transparency and openness in the business process working jointly with the buyers so that suppliers can build trust and credibility in the relationship with buyers (Lee, Kim & Choi, 2012). Higher levels of inter-organisational trust in supply chains help establish integrated

goals and plan smoothly, improve product quality, and create higher customer value. Kim and Rhee (2012) further suggest that joint efforts between manufacturers and suppliers in various areas, such as developing cleaner technology, ecological product/process design, and integrated information systems between the two parties create the best results. Corporate customers demand higher levels of environmental performance from their suppliers. The more the buying firms and suppliers make collaborative efforts in controlling and managing environmental quality, the higher the levels of trust, credibility, and relationship effectiveness between partners (Kim, 2010).

1.6.3 Operational Efficiency

Operational efficiency is the ability to supply firms to reduce costs and cycle time, improve product quality, and create higher customer value (Lee et al., 2012). According to Fang and Zang (2018), operational performance refers to an enterprise's capabilities to produce and transport products to its customers promptly and efficiently. Melnyk, Sroufe and Calantone (2003) discovered a significant impact of an environmental management system on operational performance, such as quality, costs, flexibility as well as delivery efficiency.

1.6.4 Employee Job Satisfaction

Employee job satisfaction is the feeling that employees have on their jobs related to the relationship with their supervisors and working environment, which could lead to better performance outcomes (Lee et al., 2012). It is a measure of the degree of employee pleasure that leads to better task performance. According to Kim (2010), an innovative spirit in the organisational culture and group-oriented teamwork in the culture show a positive impact on job satisfaction of the employees. Furthermore, Kim (2010) found that job attitude, including job satisfaction and organisational commitment, is a definite precursor of employees' corporate behaviour and performance using meta-analysis.

1.6.5 Enterprise Performance

Enterprise performance is defined as the summation of economic performance, environmental performance, operational performance and social performance within a business organisation (Geng, Mansouri & Aktas, 2017). Enterprise performance is the financial and non-financial performance of the organisation as a result of the

implementation of GSCM practices as well as improvement in operational/relational efficiency and employee job satisfaction (Lee et al., 2012).

1.7 SIGNIFICANCE OF THE STUDY

The advent of globalisation and the collapse of the ozone layer, which then caused climatic changes across the world, have resulted in pressure on organisations to improve their environmental, economic and social performance. The significance of this study is that it will provide information to managers and employees in the mining industry about the understanding of GSCM and its impact on the image of the organisation. The mining industry can utilise this information to improve the enterprise performance of individual businesses. The study will also provide GSCM practitioners with adequate knowledge that would enable them to reconfigure their processes and strategies.

1.8 RESEARCH METHODOLOGY

The research methodology is the essential substance and detail of the study. This is where the researcher explains, in detail, the particular use of the research design. The researcher should describe exactly how to apply it. At the end of this section, the reader should be convinced that both data collection and the form of analysis used are appropriate to the research objective, and they should be able to go out and do a similar study (Hofstee, 2006). The primary purpose of research methodology is to explain the nature and process of research to enable readers to conduct their research to find answers to their specific research problems (Welman, Kruger & Mitchell, 2005).

1.8.1 Research Approach and Design

The quantitative approach is intimately connected to positivist and post-positivist philosophy and involves the collection of data and its transmission into numerical models that can be assessed and manipulated to reach conclusions about a data set (Guldenmund, 2007). It is more of an objective approach than subjective. Quantitative research is based on positivism, therefore measuring social constructs objectively with the aim of testing research objectives based on the statistical analysis of a set of theoretical variables. In organisational climate research, quantitative measurements have been the predominant assessment approach (Guldenmund, 2007).

The most appropriate research approach for this study is considered to be quantitative since it assists in satisfying the objectives of the study through measurements and statistical analysis. During the investigation, the sample will consist of people who enable the researcher to remain detached from the study to enhance accuracy, systematisation, repeatability, comparability, convenience, large scales, unobtrusiveness, and cost-effectiveness.

1.8.1.1 Research Design

The research design provides the overall structure for the procedures the researcher follows, the data the researcher collects, and the data analysis the researcher conducts (Leedy & Ormrod, 2015). In other words, a research design is a framework that guides the researcher in the process of data collection and analysis. The framework includes surveys, experimental designs, correlational designs, descriptive designs and meta-analytic. This study will be conducted using a survey design. According to Mouton (2011), survey studies are usually quantitative in nature and aim to provide a broad overview of a representative of a large population. The survey design will be applied to elicit information from a limited number of individuals who are presumed to have the information the study is seeking, who are able and willing to communicate, and who are intended to be representative of a larger group (Hofstee, 2006).

1.8.1.2 Research Strategy

The present study will be conducted using a cross-sectional strategy. Cross-sectional studies are more natural and more expedient to perform than longitudinal studies because the researcher can collect the required data at a single time (Leedy & Ormrod, 2015). The cross-sectional design is a particular case of criterion-groups design. In the cross-sectional design the criterion groups typically comprise different age groups (such as Technikon, university or organisational year groups) known as cohorts (Welman et al., 2005). Finally, cross-sectional studies are carried out once and represent a snapshot of one point in time (Cooper et al., 2011).

1.8.2 Sampling Design

The sampling design will involve the identification of the target population, selecting a sampling approach and technique.

1.8.2.1 Target Population

According to Keller (2018), the target population is a population about which the researcher wants to draw inferences. Wegner (2013) further defines target population as the collection of all possible data values that exist for the random variable in the study. The target population for the study will comprise managers and professional employees in the entire supply chain department of Lonmin in Rustenburg. Shared services is a mining firm that delivers value in the support services field; it further performs specific internal services for Lonmin, such as payroll, accounts payable, and travel. These services tactically equip a business with a flexible tool for improving processes, generating profits and reducing costs (Suri, 2016).

1.8.2.2 Sampling Approach

The sample will be selected using non-probability sampling. In non-probability sampling, the researcher has no way of predicting or guaranteeing that each element of the population will be represented in the sample. Furthermore, some members of the population have little or no chance of being sampled (Leedy & Ormrod, 2015). The examples of non-probability sampling include accidental or incidental samples, quota samples, purposive samples, snowball samples, self-selection samples, and convenience samples (Welman et al., 2005).

1.8.2.3 Sampling Technique

A purposive sampling technique will be used in this study. Researchers rely on their experience, ingenuity and or previous research findings to deliberately obtain units of analysis in such a manner that the sample they draw may be regarded as being representative of the relevant population (Welman et al., 2005). According to Bui (2009), in purposive sampling, the researcher selects individuals who are considered representative because they meet specific criteria for the study.

1.8.3 Data Collection Procedures

The basic idea of collecting data in any research study is to gather information to address the questions being asked (Creswell, 2014). Data in this study will be collected through a survey questionnaire.

The questionnaire of this study will be divided into six sections. Section A will source information about the demographic profiles of respondents at Lonmin. The respondents will be required to indicate their gender, age, department, and tenure. Measurement scales to be used in the study will be adapted from previous studies. Section B will focus on GSCM implementation within the organisation. Section C will elicit information on relational efficiency. As mentioned previously, relational efficiency is the ability of supplying firms to increase transparency and openness in the business process working jointly with buyers so that suppliers can build trust and credibility in the relationship with buyers (Zacharia, Nix & Lusch, 2009).

In other words, relational efficiency means that two or more parties are involved in teamwork, whether in production or services resulting in more output. Section D will elicit information on operational efficiency. A firm can gain more trust and credibility from a collaborating counterpart when it proves its excellence in its operations, and the relationship effectiveness will be enhanced when the partner firm continuously accomplishes success in their joint efforts (Zacharia et al., 2009). Section E will elicit information from employee job satisfaction. In the broadest sense, job satisfaction is a general attitude a person has or holds towards his or her job (Zacharia et al., 2009). In Section F, the enterprise performance will be measured using four questions adapted from Zhu et al. (2008) and Zacharia et al. (2009).

1.9 DATA ANALYSIS

A combination of descriptive and inferential statistics will be used to analyse the collected data. Descriptive statistics will be applied in analysing the demographic profile of respondents while inferential statistics will be used to check the proposed relationships by testing the proposed hypotheses. In the data analyses, the Statistical packages for the Social Sciences (SPSS) and the Analysis of Moment Structures (AMOS) statistical software will be used in the data analysis. Hypotheses will be tested using the structural equation modelling procedure.

1.10 RELIABILITY, VALIDITY AND MODEL FIT

Reliability is defined as how closely the same constructs in a research instrument replicate similar results (Tavakol & Dennick, 2011). In this study, reliability will be measured using the Cronbach's coefficient Alpha, Composite Reliability and the Average Variance Extracted. The thresholds to be used include 0.7 for the Cronbach's

Alpha and the Composite Reliability and 0.4 for the Average Variance Extracted (Fraering & Minor, 2006). The study will test for content and construct validity. To test for content validity, the questionnaire will be reviewed by a panel who are experts in supply chain management. To test for construct validity, factor loadings and correlation values will be used. The accepted cut-off values will be 0.5 for factor loadings and 0.8 for correlation values.

A confirmatory factor analysis will be conducted to check for model fit. The study will check for the Goodness of Fit Index (GFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), and Random Measure of Standard Error Approximation (RMSEA) Comparative Fit Index (CFI), to establish whether the collected data supports the hypothesised model.

1.11 ETHICAL CONSIDERATIONS

Ethical behaviour in GSCM within the South African context has been a great cause for concern in public and the private sectors. Informed consent means that participants are fully aware of the nature of research and still choose to participate (Langdridge, & Hagger-Johnson, 2013). When conducting research, according to Van Zyl (2014), although researchers should be excited and enthusiastic about their work, the most important thing to remember is that people are serving as participants in the research. Therefore, these individuals must be treated so that their dignity is maintained in spite of the study or the outcomes.

In general, researching with people requires informed consent. An informed consent document is a form that describes the nature of the research project, as well as the kind of one's participation in it (Leedy & Ormrod, 2015). Regarding voluntary participation, Bui (2009) maintains that voluntary informed consent exists when a person can give permission and receives sufficient and accurate information about the study to make informed decision to participate. Another component of ethical considerations is anonymity, whic,h according to Mouton (2011), refers to the principle that the identity of an individual is kept secret. He further defines confidentiality as the information gathered from the subject. Therefore, these considerations, namely informed consent, voluntary participation, respondent anonymity and confidentiality will be followed in this research.

1.12 CHAPTER CLASSIFICATION

This research will culminate in a comprehensive mini-dissertation, which will be divided into the following chapters.

1.12.1 Chapter 1: Introduction and Background to the Study

This chapter will discuss the introduction as well as the background of the study. It will also provide the problem statement and outline the objectives of the research which guide the study. Other issues discussed in this chapter will include the formulation of the hypothesis statements, a preliminary literature review and research methodology aspects of the study, such as research design, sampling design, sampling approach, data collection procedures and ethical considerations.

1.12.2 Chapter 2: Literature Review on Research Constructs and Mining Industry in RSA

Chapter two will provide the literature review on the research constructs, such as GSCM implementation and their effects on relational efficiency, operational efficiency, employee job satisfaction and enterprise performance. This chapter will also focus on issues which include the definition of GSCM, the contribution of GSCM, and challenges that are faced by the South African mining industry when implementing the GSCM. The chapter will broaden the scope by focusing on both international and South African contexts to provide an appropriate comparison.

1.12.3 Chapter 3: Research Methodology

This chapter will discuss the research methodology that will be followed during the research. It will further reveal the sampling design that will be used in selecting the research sample. It will also deliberate more on the research instrument that will be employed in collecting the data before outlining the methods to be used in the analysis and presentation of data.

1.12.4 Chapter 5: Data Presentation, Analysis and Interpretation

Chapter five will present the results of the study based on the statistical analysis employed. The chapter will also discuss the interpretation of the results and outline the implication of these results. The discussion will be buttressed by previous literature which either supports or refutes the results of the study.

1.12.5 Chapter 6: Conclusions and Recommendations

Chapter six will state the conclusions drawn from the results based on the objectives of the study. It will further put forward recommendations on using GSCM to improve enterprise performance through relational efficiency, operational efficiency, and employee job satisfaction. The chapter will also highlight suggestions for future research and the limitations of the study.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses literature on GSCM and enterprise performance in the mining industry. Since the research at hand is essentially about GSCM, it is necessary to get an in-depth understanding of GSCM from the perspective of previous literature as a part of the overall study. A wide range of sources from local and international literature are used as they reflect on several variables that are affected by the GSCM implementation in the mining industry. At an initial stage, the chapter focuses on the history of mining and recent development in the mining industry in RSA. Subsequently, the chapter focuses on the challenges that the SA mining industry is facing. It will also explain the importance of the mining industry to the South African economy. The subsequent section of the chapter then goes into the definitions of GSCM, the factors influencing the GSCM, the importance and benefits of GSCM, and the outcomes of the GSCM and discussing how GSCM relates with relational efficiency, operational efficiency and job satisfaction.

The chapter also covers, from the literature point of view, the definition of relational efficiency, factors influencing relational efficiency, the importance and benefits of relational efficiency, and the relationship between relational efficiency and enterprise performance. Employee job satisfaction and operational efficiency are defined, the factors that influence them, their importance and benefits as well as their relationship with enterprise performance. Finally, the chapter will define enterprise performance, its importance and benefits as well as its measurement against other constructs.

2.2 DEVELOPMENTS IN THE MINING INDUSTRY IN RSA

This section discusses the developments in the mining industry in the RSA. The topics covered include the history of the mining industry, recent developments and challenges that the South African mining industry faces, and the importance of the mining industry to the South African economy.

2.2.1 History of the South African Mining Industry

The Institute for Health Metrics and Evaluation (2017) suggests that South Africa is endowed with abundant natural resources. It is the world's largest producer and exporter of gold, chromium and platinum, 90% of the world's global platinum mineral resources are estimated to be in the Bushveld Complex. Mogotsi (2004) asserts that the country has the deepest mines in the world, such as Tautone (Western Deep Levels, 1shaft), Savuka and Mponeng (Western Deep Levels, shaft 3) that will work down to 4500m in the coming years. These mines also have the harshest conditions for hard rock mining, where temperatures of up to 45° (113 °F) need to be reduced using massive refrigeration plants. In RSA, as illustrated in Table 2.1, the sector has generated significant benefits to the economy and society, from increased output, revenues, investment, exports and foreign exchange, local economic development, training opportunities and technologies (Montmasson-Clair, 2016).

Table 2.1: Mining sector contribution to the South African economy in 2013

INDICATOR	VALUE / PERCENTAGE
Nominal direct contribution to GDP	R279.7 billion (8.3%)
Direct and indirect contribution to GDP	Around 17% (2012)
Contribution to total investment	12.2%
Contribution to private sector investment	19.4%
Contribution to total merchandise exports	R279.5 billion (30.5%)
Contribution to direct employment	510 099
Remuneration paid to employees in mining	R100 812 million

Sources: Chamber of Mines (2012) and Chamber of Mines (2013)

2.2.2 Recent Developments and Current Situation

According to Nikerson, Geipel and Jame (2017), the government of RSA in 2013 outlined its National Development Plan which aims to eliminate poverty and reduce income inequality in the country by the year 2030 with a particular focus on creating gender equality and more opportunities for youth. Neingo and Tholana (2016) also mentioned that the recent commodity price volatility has severely impacted on the

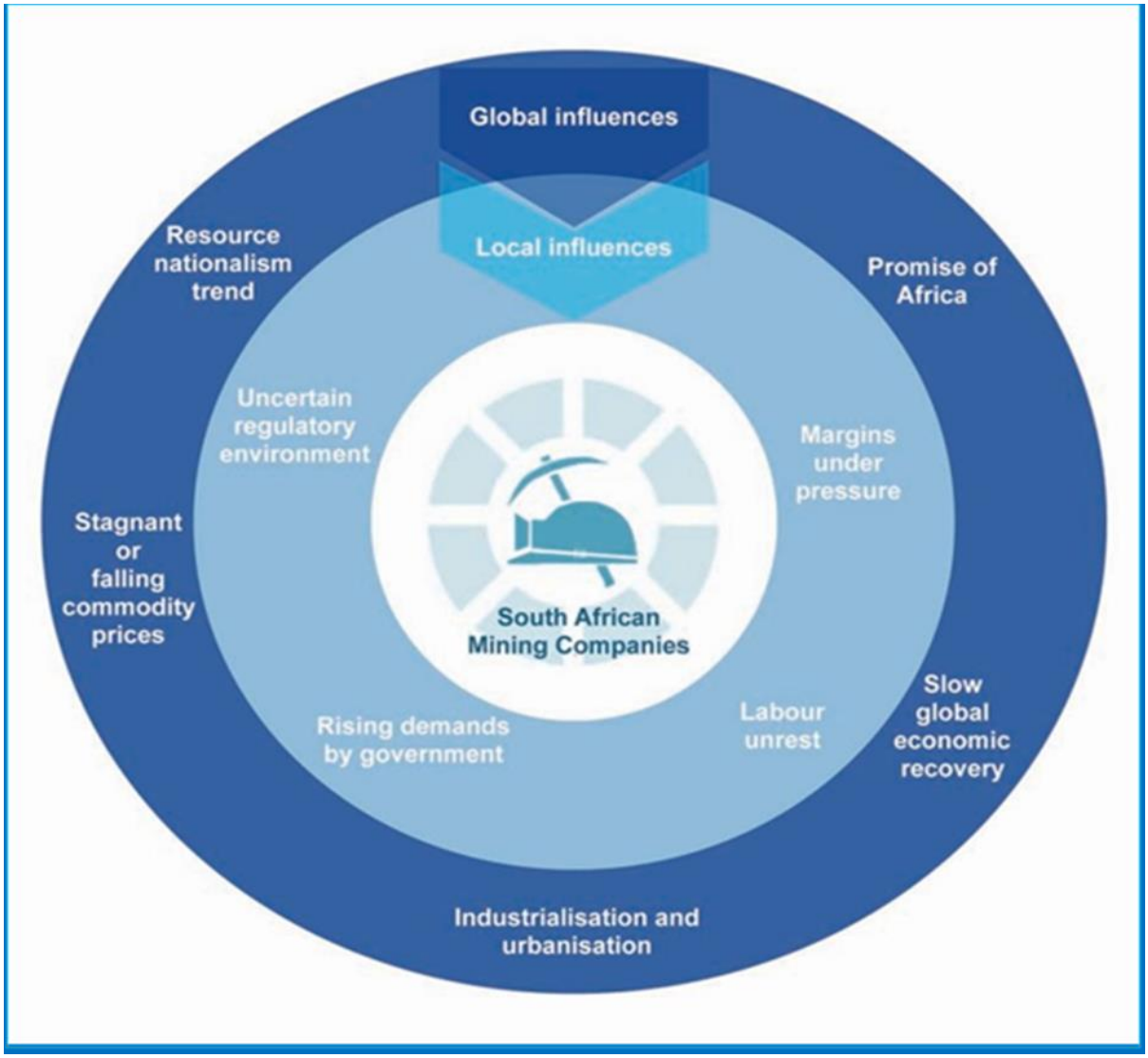
mining industry owing to declining economic growth in China. The increasing electricity cost has recently been compounded by the current erratic supply, which further threatens the productivity and viability of the energy-intensive gold mining sector.

Declining ore grades at current depths also mean that mining companies have to mine deeper to reach new deposits, significantly increasing the cost of extraction. In addition to the current decline in demand, mining companies face further challenges to profitability in the form of unfavourable commodity prices and tougher mining conditions (Delloite, 2014). Recent conflicts in the South African mining sector tend to be explained entirely in rational choice theory. In 2014, the RSA experienced its longest and costliest strike, a five-month-long stoppage in the platinum industry, which resulted in the economy contracting 0.6 per cent. According to Botha and Cronjé (2015), new mining legislation aims to rectify previous inequalities and disadvantages in the mining sector and specifically provides for the inclusion of women in core mining activities.

2.2.3 Challenges of the Mining Industry in RSA

Mining companies globally as well as in RSA, face significant challenges, putting the industry at crossroads. Local mining companies with significant local assets manage unique South African operational complexities while still operating in the context of global pressures (Delloite, 2014). Similarly, PWC (2014) also asserts that the South African mining industry continued to face a myriad of challenges as a result of subdued commodity prices and a growing cost base despite positive efforts to reduce costs and focus on profitable production. In addition, socio-economic pressures in the country and labour challenges have put pressure on mines' operating environment. Montmasson-Clair (2016) added that the RSA's mining value chains face significant supply-side challenges to adapt to the new social and environmental paradigms introduced by the transition to a green economy. According to Delloit (2015), globally, mining companies are facing a series of economic, financial and operational challenges. South African mining companies must also account for uniquely local issues with profound operational implications. Some of the pressing issues are shown in Figure 2.1

Figure 2.1: Global and local influences on mining companies in RSA operations



***Sources**:* Deloitte (2015)

Neingo and Tholana (2016) also agree that despite the historical contribution of the South African gold mining sector to both the global and national economy, it is faced with various technical, economic, social, and operational challenges that are seeing the country slowly losing its competitiveness in the global gold mining industry. Finally, PWC SA (2017) mentioned that on 15 June 2017, the Minister of Mineral Resources, Musebenzi Zwane, rocked the South African mining industry by launching the third revision of the Mining Charter with implementation effective from the date of the announcement. After the announcement, mining share prices went down, and the Chamber of Mines reacted with an urgent interdict on its implementation on the grounds that there had been a lack of consultation.

2.2.4 Importance of the Mining Industry to the SA Economy

The discovery in 1886 of the Witwatersrand gold fields in RSA was arguably the most important of all these famous nineteenth-century discoveries. The gold mines of the RSA have supplied an increasingly large proportion of the world's newly mined gold (Richardson & Van Helten, 2018). The South African mining industry is one of the prominent contributors to the economy of the country. According to the Chamber of Mines (2017), the mining industry is an important component of the South African economy and has been for over 100 years. Furthermore, Mogotsi (2004) states that mining in RSA directly contributed to the establishment of the Johannesburg Stock Exchange in the late 19th century and still accounts for a significant fraction of its market capitalisation. In 2014 the mining sector contributed R18 billion to the South African fiscus, and a total of 495 568 people were employed in the mining sector in 2014. The multiplier effect is that each person employed in the mining sector has up to nine indirect dependants.

2.3 GREEN SUPPLY CHAIN MANAGEMENT

This section discusses the definitions of GSCM and factors influencing GSCM, including, laws and regulations, environmental advocacy groups, competition and customer's preference. It further discusses the importance and benefits and lastly, the outcomes of the GSCM.

2.3.1 Definitions of GSCM

According to Tippayawong et al. (2016), the concept of green supply was first introduced by Michigan University in 1996 with the purpose of a theoretical manufacturing supply chain. GSCM consists of green design, clean production, and recycling technology to minimise the consumption of resources and energy and environmental impacts. GSCM's definitions have ranged from green purchasing to integrated supply chains flowing from supplier, to manufacturer, to customer and reverse logistics, which is "closing the loop" as defined by supply chain management literature (Zhu & Sarkis, 2004). Furthermore, Srivastava (2007) defines GSCM as an integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumer as well as end-of-life management of the product after its useful life. According to Ahi and Searcy (2013), many definitions exist in GSCM

literature. GSCM has its roots in both environmental management and supply chain management literature.

Adding the 'green' component to supply chain management involves addressing the influence and relationships between supply chain management and the natural environment (Srivastava, 2007). According to Rao and Holt, (2005), it is generally perceived that GSCM promotes efficiency and synergy among business partners and their lead corporations, and helps to enhance environmental performance, minimise waste and achieve cost savings. Seuring and Müller (2008) further define GSCM as "the management of material, information and capital flows as well as cooperation among companies" of the environmental issues that are "derived from customer stakeholder requirements". Furthermore, Wong et al. (2015) define GSCM as a systematic and integrated approach that can help companies to develop win-win strategies resulting in profit and market share objectives achievement and environmental efficiency.

2.3.2 Factors Influencing GSCM

This section analyses literature concerning the factors influencing GSCM in the mining industry. As mentioned by Muduli et al. (2013), recent expansions in production and consumption levels have increased supply chain activities and, as a consequence, have intensified environmental degradation. A compliance approach, driven by laws and regulations, environmental advocacy groups, fierce competition, and the shift of consumer's preference towards green products and processes, has forced companies to restructure their supply chain strategies. These factors vary among different organisations and different industries. The following section briefly discusses all these factors and how they influence the GSCM.

2.3.2.1 Laws and Regulations

The increasing importance of environmental concerns throughout the globe has forced regulatory and other government bodies to formulate stricter regulations (Henriques & Sadosky, 2016). Legislation authorities and political parties in every country are putting pressure on organisations to move towards GSCM to protect their environment. Every country has developed some rules and regulations for organisations to formulate their environmental policies according to these rules (Li et al., 2017). A study conducted by Walker, Di Sisto and McBain (2008) suggests that central government, as well as state

government policies and schemes, are proven to be one of the major factors for organisations to start up with green initiatives. In China, according to Zhu and Sarkis (2006), the government has changed its policies from a focus on resource subsidies to levying taxes for some resources such as coal and natural gas. However, investment recovery has received much less attention in China compared to more developed countries such as the U.S. and Germany, primarily due to waste management policies and lack of recycling systems and infrastructure.

2.3.2.2 Environmental Advocacy Groups (NGO)

GSCM consists of internal environmental management, external GSCM practices, investment recovery and eco-design (Zhu & Sarkis, 2004). Past studies show that top management support and commitment have contributed significantly to the success of any environmental practices (Mudgal et al., 2010). Furthermore, Kaur et al. (2018) suggest that top management within an environmentally proactive organisation has the responsibility to cultivate a strong culture that offers its employees freedom regarding environmental improvement decisions without excessive management intervention.

2.3.2.3 Competition

A competitiveness factor has been observed to improve GSCM practices more than governmental regulations or the organisation's wish to save the planet (Yusuf et al., 2013). According to Henriques and Sadosky (2016), several authors identified competition as a driver for GSCM practices. Competitors, as potential environmental technology leaders, may be able to set industry norms and or legal mandates and have the ability to drive environmental innovation. Frameworks for attaining competitive advantage through the managerial principles of customer satisfaction, employee empowerment, quality cost systems, lean manufacturing, continuous improvement and productivity enhancement have been developed. Daily and Huang (2001), suggest that environmental issues are becoming a source of competitiveness and it is apparent that many leading South-East Asian companies realise that having a green supply chain adds a competitive dimension. A proactive environmental strategy can help a firm gain competitive advantage through the development of supply management capabilities (Ferguson & Toktay, 2006).

2.3.2.4 Customers' Preference

The literature points to several interesting issues regarding customers as a driving force for GSCM practices (Walker et al., 2008). Similarly, Vachon and Klassen (2006), state that the GSCM literature has examined the importance of working across the supply chain with both customers and suppliers on environmental initiatives, which has been shown to lead to improve firm performance. According to Zhu et al. (2008), customers using environmental criteria in supplier selection drive global firms to pursue environmental supply chain strategies in order to be qualified suppliers for foreign customers. Mangla, Kumar and Barua (2014) also assert that the customer may play a vital and influential role in greening the supply chains. In addition, Perotti et al. (2013) suggest that cooperation with customers reflects a firm's focus on working with customers to better understand environmental-related problems and issues from the downstream point of view.

2.3.3 Importance and Benefits of GSCM

GSCM has emerged as an important new archetype for companies to achieve profit and market share objectives by lowering their environmental risks and impacts while raising their ecological efficiency (Hoek, 1999). Also, Govindan et al. (2015) assert that GSCM is one such idea that takes environmental elements into consideration when managing the supply chain, enabling industries to enhance their economic, as well as ecological performance and so, is seen by many as a promising organising concept. Furthermore, Zhu et al. (2007) conclude that GSCM has become an emerging environmental practice for manufacturers to improve the environmental image and gain economic profit. Chin et al. (2015) assert that the overall benefits of GSCM are environmental sustainability and financial performance. Furthermore, Lee *et al*. (2012) also agree that the benefits of GSCM include operational and relational efficiency, enhanced corporate image, environmental sustainability and financial performance.

2.3.4 The Outcomes of GSCM

Job satisfaction is a measure of the degree of employee pleasure that leads to better task performance (Edwards et al., 2008). Harrison, Newman and Roth (2006) assert that job attitude, including job satisfaction and organisational commitment, is a strong precursor of employee' organisational behaviour and performance based on meta-

analysis. According to Lee et al. (2012), it is expected that all personnel in the production lines would feel safer and be more satisfied with their operations and the working environment when unsafe toxic materials are removed from the production process. Their study results reflect a positive relationship between the company climate and productivity, which is mediated by the workers' job satisfaction.

Operational efficiency is the ability of supplying firms to reduce cost and cycle time, improve product quality, and create great customer value (Zacharia et al., 2009). According to Lee (2011), the main benefit for firms that successfully implement and utilise GSCM practices is the development of internal operations that assist in improving decision-making processes for cleaner production. In their conclusion, Zacharia et al. (2009) assert that firms can gain more trust and credibility from collaborating a counterpart if it proves its excellence in its operations, and the relationship effectiveness will be enhanced when the partner firms continuously accomplish success in their joint efforts.

On the relational efficiency and GSCM practices, Lee et al. (2012) claim that many of the problems existed in the original supply chain would remain in the global supply chain and those unresolved issues involving product quality, inventory control, and buyer-supplier trust could be amplified by new risk factors such as distance, language, and cultural differences besides supply chain disruptions by unforeseen natural disasters. A study conducted by Ryu, So and Koo (2009) suggest that inter-organisational trust in supply chains should be a "prerequisite" to the success of inter-organisational collaboration. Fawcett, Magnan and Williams (2016) argue that it is evident that a well-established, long-term relationship between buyer and supplier firms helps suppliers improve their performance.

2.4 RELATIONAL EFFICIENCY

This section discusses the definitions of relational efficiency, factors influencing, the importance and benefits of relational efficiency. It further discusses the relationship between relational efficiency and enterprise performance.

2.4.1 Definitions

Lee et al. (2012) define relational efficiency as the ability of supplying firms to increase transparency and operations in the business process working jointly with buyers so

that suppliers can build trust and credibility in the relationship with buyers. Zacharia et al. (2009) also explain that collaboration has become a critical component for the smooth functioning of an efficient supply chain.

The greater interconnectedness of global commerce, the rise in outsourcing and the ascendance of highly specialised organisations have led to the need for supply chain managers to collaborate with other firms that have complementary skills and capabilities According to Dyer and Singh (2012), the relational view theory suggests the competitive advantage of a firm is depended on the network of relationships in which the firm is embedded.

2.4.2 Factors Influencing relational efficiency

Again, Zacharia et al. (2009) further suggest that the influence of improved communication flow on relationship effectiveness suggest the more intense the collaboration, or the more open the information exchange, the more likely firms will develop the ability and willingness to work together, resulting in greater commitment and solidarity between the firms. They further suggest that collaboration between firms affects not only operational outcomes but also relational outcomes such as trust, credibility and effectiveness of the relationship, as emphasised by relational view theory. Besides, Monczka et al. (1998), state that trust has been identified as an important part of organisational relationships. Stoel and Park (2002) also suggest that the influence of improved communication flow on relationship effectiveness suggests the more intense the collaboration, or the more open the information exchange, the more likely firms will develop the ability and willingness to work together, resulting in greater commitment and solidarity between the firms.

2.4.3 Importance and Benefits of relational efficiency

According to Bradbury and Lichtenstein (2000), relationships and interactions should be an important focus of attention in organisational scholarship. There are distinct benefits to a relational world view, and the authors believe that relationality resolves fundamental tensions in organisations, allowing for more integrated research. The role of trust in building relationships is fast gaining ground in the theory and practice of purchase and supply and the formation of partnerships and business (Ishihara, 2017).

In the resource dependence perspective, buying firms manage to secure the flow of inputs to their organisations by forming stable, long-lasting relationships with international suppliers (Kaufmann & Carter, 2006). Similarly, Tachizawa, Gimenez and Sierra (2015) confirm that the resource dependency theory suggests that firms in the supply chain should collaborate as they depend on each other to obtain long-term gains in performance.

2.4.4 The relationship between relational efficiency and enterprise performance

In their hypothesis statements, Zacharia et al. (2009) assert that enterprise performance can also be affected by improving relational outcomes. Relationships with supply chain partners become more effective and productive such that business performance may be enhanced. Furthermore, Matsuno and Mentzer (2003) emphasise that pursuing collaborations between buyers and suppliers is an important supply chain collaboration. It is likely to impact business performance through improved organisational performance, better asset utilisation, stronger competitive position, and improved profits.

2.5 OPERATIONAL EFFICIENCY

This section discusses the definitions of operational efficiency, factors influencing its importance as well as its benefits. The last portion of this section discusses the relationship between operational efficiency and enterprise performance.

2.5.1 Definitions

Operational efficiency is the ability of supplying firms to reduce costs and cycle time, improve product quality and create greater customer value (Rusinko, 2007). Furthermore, Siklósi et al. (2009) assert that operational efficiency represents the life cycle, cost-effective mix of preventive, predictive, and reliability centred maintenance technologies, coupled with equipment calibration, tracking, and computerised maintenance management capabilities all targeting reliability, safety, occupant comfort, and system efficiency.

Similarly, Koufteros, Vonderembse and Doll (2002) add that the operational outcomes that firms typically focus on in a supply chain collaboration are a combination of reduced costs, improved quality, reduced cycle time, improved service or value

delivered to customers. Fang and Zhang (2018a) assert that operational performance refers to an enterprise's capabilities to produce and transport products to its customers promptly and efficiently. Operational efficiency indicates how the business manages its income and uses them to generate profits. It can also be defined as the ability of a business to distribute goods or provide services to its clients at a low cost but with the high quality of its products and services (Weston & Brigham, 1992).

2.5.2 Factors Influencing operational efficiency

Green et al. (2012) suggest that the cost-saving nature of environmental performance should lead to improved economic performance, which both should yield improved operational efficiency. According to Younis, Sundarakani and Vel (2016), reverse logistics plays a key role in enhancing the organisation's operational efficiency. In their study, Lee et al. (2013) found that GSCM practices can increase operational efficiency, which allows organisations to save on items such as scrap rate, delivery time, and inventory levels and enhance operational performance. Furthermore, Schreck (2011) theorised that improved corporate social and environmental performance (CSP) might improve profitability through increased operational efficiency and consumer or employee satisfaction, in line with slack resource theory.

Qrunfleh and Tarafdar (2014), in their hypothesis, assume that the Information Systems (IS) for efficiency strategy improves internal and inter-organisational operational efficiencies through applications that enable day-to-day coordination internally among the firm's departments, and externally with customers and suppliers. Brane et al. (2017), in their annual report, highlighted that personal development on their employees not only increased their skills and job satisfaction but also improved the company's operational efficiency. On the contrary, Zhu and Cote (2004) believe that to meet with challenges such as energy conservation and pollution abatement, enterprises have tried to green their supply chains, that is, to create networks of suppliers to purchase environmentally superior products or to build common approaches to waste reduction and operational efficiencies. Nevertheless, Iakovou, Vlachos and Xanthopoulos (2010) assert that disruptions including machine breakdowns, supply shortages, worker unavailability may lead to deviations from strategic and operational plans and that may severely affect a company's performance and operational efficiency.

2.5.3 Importance and Benefits of operational efficiency

In their abstract, Garcia et al. (2016), assert that the need for continuous safety improvements and increased operational efficiency is driving the mining industry through a transition toward automated operations. Operational efficiency commitment to environmental friendliness has an important role in determining firm performance based on market value. In their introduction, Voulgaris and Lemonakis (2014), suggest that operational efficiency as a strategy has become key to improving a firm's performance and competing for ability, reducing the production cost, and increasing the firm value in the future.

2.5.4 The relationship between operational efficiency and enterprise performance

In the current environment, mining organisations are under increased pressure to improve operational efficiency, reduce cost, increase agility and ensure that their finance function supports business decision-making (Boegman et al., 2015). Every unit of an organisation should develop its own mechanism to operate efficiently and achieve the best degree of efficiency in its performance (Siklósi et al., 2009).

2.6 EMPLOYEE JOB SATISFACTION

This section discusses the definitions of employee job satisfaction, factors influencing, importance and benefits of employee job satisfaction, and the relationship between employee job satisfaction and enterprise performance.

2.6.1 Definitions

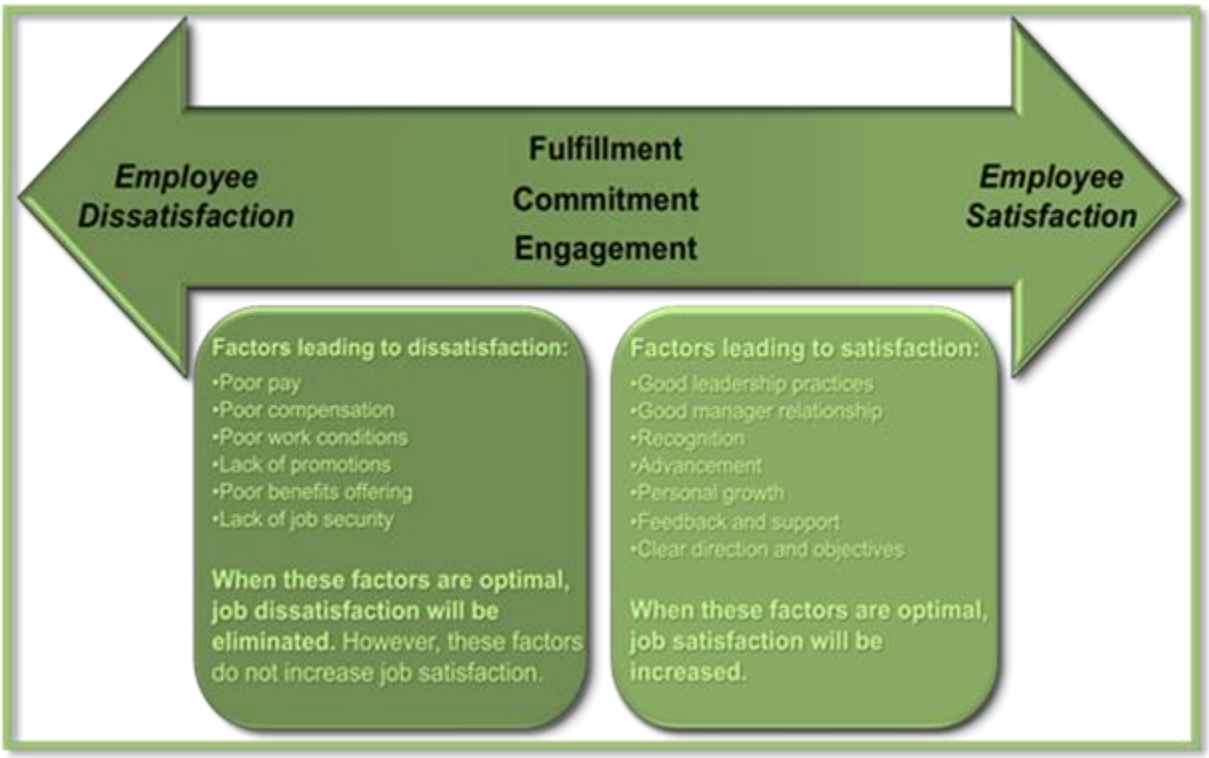
According to Cusumano et al. (2008), job satisfaction is the feeling that employees have on their jobs related to the relationship with their supervisors and working environment, which could lead to better performance outcomes. Dartey-baah and Harlley (2010) define job satisfaction as a psychological concept that refers to related attitudes and characteristics such as pay and reward, policies, leadership behaviours, management styles and co-workers. In addition, Van Katwyk et al. (2000) define job satisfaction as how people feel about their jobs and different aspects of their jobs is the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs. In their introduction, Hulin and Judge (2003) define job satisfaction as an evaluative

judgment about the degree of pleasure an employee derives from his or her job that consists of both affective and cognitive components.

Furthermore, Rose (2001) explained job satisfaction as a bi-dimensional concept consisting of intrinsic and extrinsic satisfaction dimensions, where the intrinsic sources of satisfaction depend on the individual characteristics of the person such as the ability to use initiative and relations with supervisors. The extrinsic sources of satisfaction, on the other hand, are situational and depend on the environment such as pay, promotion, or job security.

However, Weiss (2002) defined job satisfaction as "a positive (or negative) evaluative judgement one makes about one's job or job situation". He further asserts that job satisfaction is an affective state and indicates the overall level of satisfaction that an employee has towards his or her job situation. Buitendach (2005) defines job satisfaction as the expression of employees about their job and the expectations from the job that is a desired outcome of employees for their involvement in the organisation. An example of a job satisfaction model is provided in Figure 2.2.

Figure 2.2: Job satisfaction model



Source: Field (2008)

2.6.2 Factors Influencing Job Satisfaction

According to Van Der Walt and De Klerk (2014), job satisfaction is influenced by an individual's disposition to be happy regardless of the work situation, and by what an employee brings to the organisation, such as personality traits. On the other hand, Van der Walt et al. (2016) assert that researchers started to view job satisfaction as a two-dimensional construct, and categorised the above work dimensions into intrinsic job satisfaction dimension and extrinsic job satisfaction dimensions. The level of job satisfaction is affected by intrinsic and extrinsic motivating factors, the quality of supervision, social relationships with the workgroup and the degree to which individuals succeed or fail in their work. Furthermore, Mullins (2005) indicated that the structure of the organisation, the organisational culture and the internal politics that pertains the organisation are the factors within and outside an organisation that affects the extent to which employees of an organisation are satisfied. In addition, Van der Walt et al. (2016), suggest that job satisfaction is influenced by both personality factors and the environment.

2.6.3 Importance and Benefits of Job Satisfaction

According to Smith and Hoy (1992), job satisfaction could lead to cost reduction by reducing absences, errors and turnovers, which leads to greater productivity and economic and industrial growth which is a major driver of most organisations. Also, Daryanto (2014) believed that the importance of job satisfaction is to motivate organisational members to engage in a kind of behaviour that facilitate them in accomplishing the effective performance and productivity with their work.

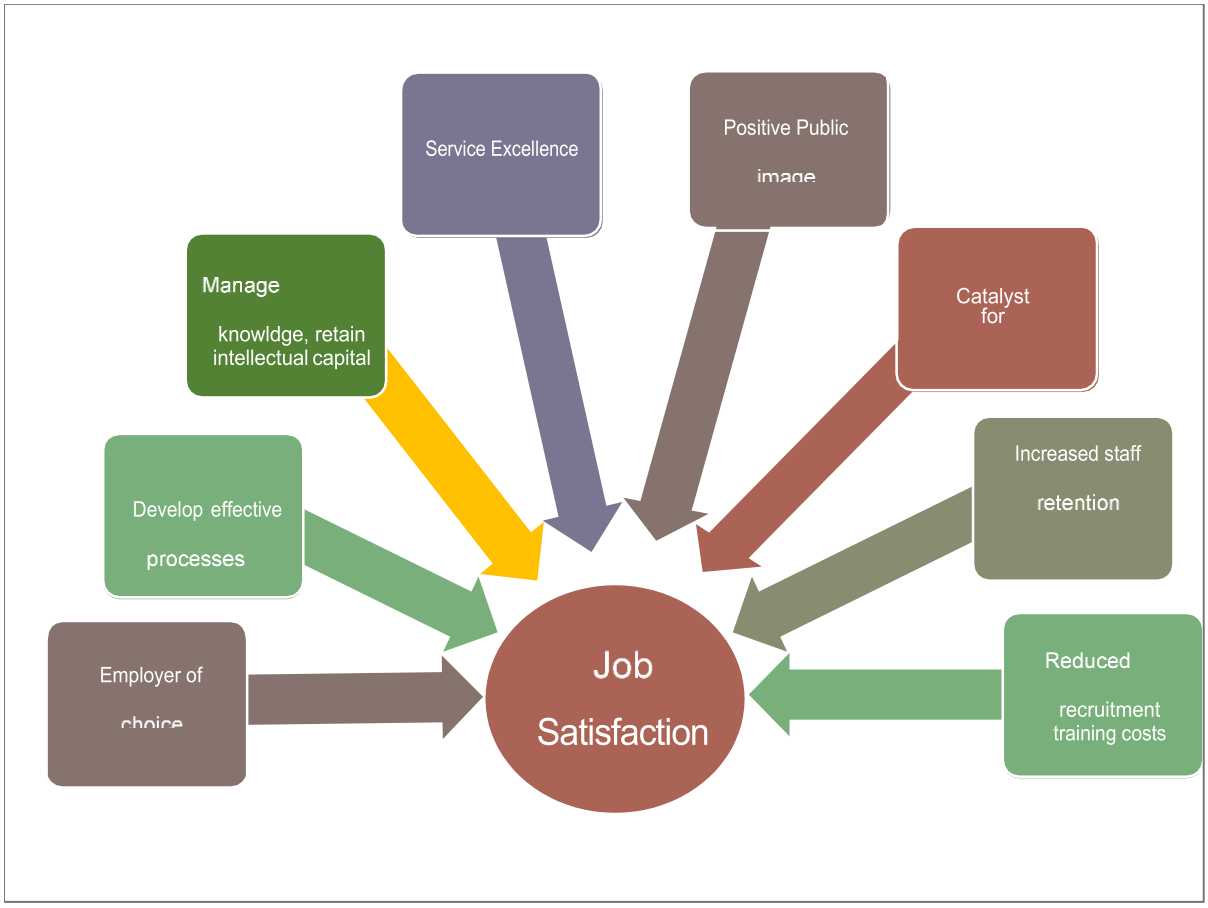
In their conclusion, Dartey-baah and Harlley (2010) also added the importance for organisations to put monitoring systems to assess the needs of employees at all levels in order to develop programmes for staff development and to appreciate employee perceptions about the conditions under which they work. This can help organisations to stay competitive in an area where it is believed that satisfied employees are more likely to be more committed to organisational goals.

Masvaure, Ruggunan and Maharaj (2014), concluded that it is important for the managers in the company to have an in-depth understanding of their employees, especially regarding employee welfare. Furthermore, Van der Walt et al. (2016) in their

findings, mentioned that employees that find their work interesting are likely to be more satisfied and motivated than employees that do not enjoy their jobs.

For that reason, it is important that gold mining companies ensure that engineers and artisans are rewarded and remunerated adequately, and that good relations exist between these employees and their supervisors and co-workers, to prevent these employees from being "poached" by international mining companies, thereby exacerbating the current skills shortages in these occupational categories. The importance and benefits of employee job satisfaction is shown in Figure 2.3.

Figure 2.3: The importance and benefits of employee job satisfaction



Source: *Personal Best HR (2013)*

2.6.4 The relationship between job satisfaction and enterprise performance

Armstrong and Taylor (2014) insist that most organisations are concerned with what should be done to achieve sustained high levels of performance through people. This can be achieved by giving close attention to how individuals can best be motivated

through such means as incentives, rewards and importantly, the work they do and the organisational context within which they carry it out, which cannot be understated. According to Bhattacharyya (2007), the motivation of employees in the workplace still remains one of the sensitive subjects that determine the level of input that employees will put in the organisation to commit to good performance. In their problem statement Kuranchie-Mensah and Amponsah-Tawiah (2016) mentioned that mining sector workers are most often than not specialised individuals who gain knowledge from an academic institution that provides information on mining, so individuals with expertise in the mining sector hardly leave the sector to a non-mining institution or industry. As a result, management's response to organisational effectiveness and performance is mostly defined within the organisation. Lee et al. (2012) suggest, in their mediation effects,that even though there may be many other factors that affect an organisation's business performance, in the context of supply collaboration these empirical tests are important. Previous studies also present that there is a link between business performance and employee job satisfaction.

2.7 ENTERPRISE PERFORMANCE

The following section discusses the definitions of the enterprise performance, factors influencing the enterprise performance, importance and benefits of the enterprise performance, and finally, the measurement of enterprise performance.

2.7.1 Definitions

Zhu et al. (2007) described enterprise performance in relation to the three main categories, each of them encompassing several dimensions, i.e. environmental performance (e.g. reduction of emissions), economic performance (e.g. increase revenue), and operational performance (e.g. productivity increase). They further classified enterprise performance into four dimensions, namely, environmental, positive economic, negative economic and operational. Zacharia et al. (2009) defined enterprise performance as financial or non-financial performance of the organisation as the result of the implementation of GSCM practices as well as improvement in operational, relational efficiency and employee job satisfaction. Similarly, Green et al. (2012) assert that organisational performance indicates the marketing and financial performance of the firm as compared to the industry average. Mitra and Datta (2014) also state that there are different dimensions for measuring firm performance, such as

environmental, operational, organisational, financial, economic, marketing and competitive.

2.7.2 Factors Influencing enterprise performance

From a strategic fit perspective, supply chain alignment results in fits among objectives, structures and processes within and between different functions and members in a supply chain, which lead to better business performance (Tamas & Tamas, 2000). Also, Godsell et al. (2015) assert that the development of a congruent business strategy to deliver shareholder value whereby product, marketing and supply chain functions work together, is the state of alignment that leads to superior performance. According to Spekman, Kamau and Spear (1999), purchasing decisions have a potentially great impact on the firm's end product and overall business performance. In their abstract Abdul, Khan and Qianli (2017) further state that the managers of the manufacturing firms should not only implement eco-design in their supply chain but also concentrate on proper monitoring and implementation of green information systems to increase their firm performance. However, Godsell et al. (2015), in their findings, suggest that Sales and Operations (S&OP) is the single most important process to enable a business to optimise its profitability.

2.7.3 Importance and Benefits of enterprise performance

The implementation of GSCM practices will enable organisations to bear institutional pressures, which enable them to get a competitive advantage through corporate social responsibility of environmental protection (Shafique, Asghar & Rahman, 2017). At the same time, organisations will encourage green innovations to enhance organisational performance. Moreover, Youn et al. (2013) also pointed out that environmental SCM practices have some special impacts on environmental and business performance. According to Zhu and Sarkis (2004), economic performance is typically the most important driver for enterprises that wish to implement environmental management practices.

2.7.4 Measurement of enterprise performance

Chang (2006) defines business process management (BPM) as a process-oriented organisational approach use to design, analyse and improve business processes to more effectively manage and improve organisational performance. Moreover, Bull and

Bull (2015), also suggest that information technology and systems (ITS) is a key enabler for adoption and implementation of environmentally sustainable supply chain practices in mining and other industries. Mines use ITS such as enterprise resources planning (ERP) systems to integrate all operational processes and suppliers and to aggregate organisational information for performance measurement and managerial decision making. Again, Gutowski et al. (2005), assert that a study of environmental management and environmental performance described environmental performance at the firm level as a measurement of how successful a firm is in reducing its negative impact on the natural environment.

2.8 CONCLUSION

This chapter aimed to conduct an in-depth literature review on GSCM practices and the enterprise performance in the South African mining industry. The first section of the chapter takes a close look at the history, recent developments, current situation, challenges, and importance of the mining industry in the South African economy.

The second section scrutinises the nature of the concept, the factors influencing, the importance and benefits, and the outcomes of the GSCM. The literature emphasised the complexity of the concept GSCM and the existence of numerous definitions of the concept. The third section looks closely at relational efficiency, its definition, the factors influencing it, the importance and benefits of relational efficiency. It then looks at the relationship between relational efficiency and enterprise performance.

The fourth section of the chapter looks at the definition, the factors influencing, the importance and benefits, and the relationship between operational efficiency and enterprise performance. The fifth section defines employee job satisfaction, the factors influencing, the importance and benefits, and the relationship between employee job satisfaction and enterprise performance.

The sixth and final section scrutinises the enterprise performance, its definition, the factors influencing, the importance and benefits, and the measurement of the enterprise performance. Overall, it can be said that the South African mining industry needs to put stringent measures to ensure that GSCM practices are in place for environmental preservation while maximising profits. In the next chapter, the research methodology employed is discussed.

CHAPTER 3
RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

This chapter discusses the research methodology used to investigate the impact of GSCM practices on enterprise performance and the South African mining industry. It presents the target of interest, the way of which data were collected, analysed and interpreted to be able to draw meaningful conclusions with regard to the study. The headings highlighted in this chapter include the research philosophy, research approach, research design, data collection instrument, data analysis methods and techniques, ethical consideration and conclusion.

3.2 RESEARCH PHILOSOPHY

According to Thorpe, Lowe and Easterby-Smith (2002), there are three reasons why an understanding of philosophical issues is very useful. Firstly, because it can help to clarify research designs. Secondly, acknowledgement of philosophy can help the researcher to recognise which designs will work and which will not. Thirdly, knowledge of philosophy can help the researcher identify, and even create, designs that may be outside his or her past experience. The authors further suggest how to adapt research designs according to the constraints of different subject or knowledge structures. They also add that arguments, criticisms and debates are central to the progress of philosophy. In addition, Blumberg, Cooper and Schindler (2014) assert that research philosophy refers to how research should be conducted.

3.2.1 Positivism

Positivism is an approach to social research which seeks to apply the natural science model of research to investigations of the social world. It is based on the assumption that there are patterns and regularities, causes and consequences in the social world, just as there are in the natural world (Denscombe, 2010). According to De Vos, Strydom and Fouche (2011), positivism entails a belief that only those phenomena that are observable, in the sense of being amenable to the senses, can validly be warranted as knowledge.

3.2.2 Interpretivism

This paradigm is also called the phenomenological approach, that this is an approach that aims to understand people (Babbie & Mouton, 2001). In this paradigm, the researcher often uses participant observation and field research, which are techniques where many hours and days are spent in direct contact with participants (De Vos et al., 2011). In this study, the researcher seeks to understand the perceptions of the respondents in implementing GSCM practices in the mining industry in RSA.

3.2.3 Realism

Traditional realists start with the position that the world is concrete and external, and that science can only progress through observations that have a direct correspondence to the phenomena being investigated (Thorpe et al., 2002). This study's focus is on the implementation of GSCM practices in the South African mining industry in trying to minimise the negative impact that it has on the environment.

3.2.4 Pragmatism

Denscombe (2010) defines pragmatism is an approach that takes the research problem as its fundamental concern and assesses the value of research strategies and methods in terms of how well they work at dealing with that problem. It is associated with the mixed methods approach and stresses that it is not a matter of whether quantitative research is better than qualitative research or vice versa, but a matter of which is more effective in relation to the research problem.

This study was based on the positivist approach. This is because it is based on the assumption that there are causes and effects in the mining work environment where the introduction of GSCM practices may or may not have a certain effect on enterprise performance.

3.3 RESEARCH APPROACH

According to Creswell (2014), research approaches are plans and the procedures for research that spans the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. The author further states that this plan involves several decisions, which need not to be taken in the order in which they make sense to the author and the order of their presentation. There are three approaches to research: qualitative approach, quantitative approach, and mixed methods.

This study was based on the quantitative approach since there is a need to specify the sample size, the measurement instruments to be utilised, and the procedures in a more detailed approach.

3.4 RESEARCH DESIGN

A research design is a master plan that specifies the methods and procedures for collecting and analysing the needed information. A research design provides a framework or a plan of action for the research. Similarly, Welman et al. (2005) also suggest that a research design is a plan according to which the researcher obtains research participants and collects information from them. Furthermore, Leedy and Ormrod (2015) state that research design provides the overall structure for the procedures the researcher follows, the data the researcher collects, and the data analysis the researcher conducts.

3.4.1 Observation Study

Observation study is a type of quantitative research in which a particular aspect of behaviour is observed systematically and with as much objectivity as possible (Leedy & Ormrod, 2015). Observational studies gather a wide variety of information about behaviour (Zikmund et al., 2010).

3.4.2 Correlational Research

Leedy and Ormrod (2015), assert that a correlational study examines the extent to which differences in one characteristic or variable are related to differences in one or more other characteristics. De Vos et al. (2011), suggest that correlational research is often useful as a first step to explanatory research, or is conducted when explanatory research is not feasible. It is not focused on the cause-effect relationship between variables, but the importance of the relationship.

3.4.3 Developmental Designs

This research model developed owing to the need of professions such as social work for technology, like in engineering, medicine and all other fields dealing with applied and practical matters (De Vos et al., 2011). This model is further explained by Leedy and Ormrod (2015) in that it uses one of two developmental designs, either a cross-sectional study or a longitudinal study.

This study adopts the cross-sectional design, through a survey of a self-administered questionnaire that is used as the method of data collection, when employees from several different age-groups are sampled.

3.4.4 Survey Research

This study followed a survey research design. Survey research involves acquiring information about one or more groups of people or their characteristics, opinions, attitudes, or previous experiences, by asking them questions and tabulating their answers (Leedy & Ormrod, 2015). According to Mouton (2011), surveys are studies that are usually quantitative in nature and which aim to provide a broad overview of a representative sample of a large population.

For the purpose of data collection for this study, a survey questionnaire was used to obtain data needed for statistical testing. The survey questionnaire was sent to managers and staff members of the supply chain management department of Impala Platinum Holding and Sibanye Platinum Holding. Questionnaires were sent to the staff who were comfortable to respond via emails and others were printed and physically submitted to the respondents who were comfortable to use hard copies.

Respondents were given a period of two weeks to complete the questionnaire. A confidentiality agreement accompanied each questionnaire in order to facilitate the data collection. All the respondents of the survey were asked the same questions in the same way.

3.5 SAMPLING DESIGN

According to Leedy and Ormrod (2015), different sampling designs may be more or less appropriate in different situations. They considered eight approaches to sampling, which fall into two major categories: probability sampling and non-probability sampling. Bui (2009) asserts that sampling refers to the process of selecting participants for a study, and the sampling plan will vary depending on the research question and design of the study.

3.5.1 Population

Leedy and Ormrod (2015) define population generally as a homogeneous group of individual units. Kirton (2011) defines a population as a group of items that might be

part of a study. Welman et al. (2005) further explain that population encompasses that total collection of all units of analysis about which the researcher wishes to make specific conclusions.

This study targeted managers and staff of the supply chain department at Sibanye Platinum Holdings and Impala Platinum Holdings in Rustenburg, RSA, who formed the unit of analysis. This population enabled the generalisation of the entire population of the mining industry.

3.5.2 Parameters of Interest

According to Leedy and Ormrod (2015), a parameter is a characteristic or quality of a population that in concept, is a constant; however, its value is variable. With the context of quantitative data analysis, a parameter is a particular characteristic, e.g. mean or standard deviation, of the entire population about which a conclusion must be drawn. In this study, the sample mean and the standard deviation is utilised to measure the opinions of the respondents.

3.5.3 Sampling Frame

Welman et al. (2005) defines a sampling frame as a complete list in which each unit of analysis is mentioned only once. The sampling frame is also called the working population (Zikmund et al., 2010). There was no sampling frame in this study due to difficulties in obtaining a single list of all mining companies operating in Rustenburg.

3.5.4 Sample Size

Bui (2009) defines the sample size as the group of participants in a study which is a group that the researcher collects data from. Welman et al. (2005) further explain that when determining the sample size there are four factors that should be kept in mind: firstly, the size of the population; secondly, the variance or heterogeneity of the variable; thirdly, the relative homogeneity of each stratum of a highly heterogeneous population; fourthly, that the units of analysis from which the researcher eventually obtains usable data may be far fewer than those originally drawn. The sample size in this study was determined using the historical reference technique. Benchmarking was conducted using previous studies, namely, Lee et al. (2012) as an anchor article. These studies used samples ranging between 233 and 353; hence the sample size of n=104 respondents was considered to be adequate in this study.

3.6 APPROACH TO SAMPLING

There are two approaches to the selection of samples. The researcher can either choose probability sampling as the basis for selecting their sample from the research population or use non-probability sampling (Denscombe, 2010). Probability sampling relies on the use of random sampling. It is known as probability sampling because it is based on statistical theory relating to the normal distribution of events. On the other hand, non-probability approaches to sampling do not operate on the principle of random selection to the sample and are used when researchers find it difficult or undesirable to choose their sample on the basis of pure chance.

In this study, respondents were selected using the non-probability purposive sampling approach. Leedy and Ormrod (2015) define purposive sampling as a sampling of people or other units for a particular purpose. A combination of voting districts may be chosen, which, in past elections, have been quite helpful in predicting the final outcomes. They further warn that researchers should always provide a rationale explaining why they selected their particular sample of participants. Purposive sampling was used to ensure that only those people that served the purposes of this study were included in the study.

3.7 DATA SOURCES

Data for statistical analysis is available from many different sources. Data sources are typically classified as internal or external and primary or secondary (Wegner, 2013). Primary data were collected from managers and staff members of supply chain departments of Sibanye Platinum Holdings and Impala Platinum Holdings through a self-administered survey questionnaire that was distributed personally by the researcher. The managers and staff were chosen because of their knowledge of supply chain management and the positions they hold could greatly influence the decision-making process.

3.8 DATA COLLECTION INSTRUMENT

The primary mode of data collection was a self-administered survey questionnaire. This allowed managers and staff of the two mining companies to respond to questions at their convenience and anonymity. This study used a two-section questionnaire. Section A provided information on the demographic characteristics of individual

respondents. Section B consisted of questions related to GSCM practices. There were five questions on GSCM adapted from a study conducted by Zhu et al. (2008). The questions in Section B were presented in the five-point Likert-type anchored by 1- strongly disagree to 5- strongly agree.

What about questions on the other variables used in the study? The questionnaire included several other sections.

3.9 DATA ANALYSIS METHODS AND TECHNIQUES

Data description is a typical first step in any data analysis project. It provides a useful examination of data even when the ultimate concern of the investigation is inferential in nature.

3.9.1 Statistical Analysis

Statistics is divided into two sections or functions, the descriptive and inferential statistics. The descriptive statistics is about gathering, summarising, and presenting data in an informative way using graphs, tables, measures of central tendency and measures of dispersion. Inferential statistics allow the researcher to draw inferences about a large population from relatively small samples (Leedy & Ormrod, 2015).

With regard to this study, data collected from Section A, which sought to elicit the demographic details of the respondents, used descriptive statistics for analysis. Section B, which sought to test hypothesis was analysed using inferential statistics, namely, regression analysis and correlation analysis. The statistical analysis was performed using Statistical Package for Social Sciences (SPSS version 25.0).

3.9.2 Reliability

Reliability is concerned with the findings of the research and relates to the credibility of the findings (Welman et al., 2005). Moreover, Leedy and Ormrod (2015) define reliability as the consistency with which a measuring instrument yields a certain, consistent result when the entity being measured hasn't changed. In this study, the reliability was ascertained through the use of internal consistency reliability, as measured using the Cronbach alpha coefficient. Denscombe (2010) further asserts that reliability refers to whether a research instrument is neutral in its effects and consistent across multiple occasions of its use. The results of the reliability tests are

indicated in Table 5.7, which shows that all measurement scales used in this study were internally consistent.

3.9.3 Validity

According to Denscombe (2010), validity refers to the accuracy and precision of the data. It also concerns appropriateness of the data in terms of the research question being investigated. Similarly, Leedy and Ormrod (2015) suggest that the validity of a measurement instrument is the extent to which the instrument measures what it is intended to measure. The validity of a measurement instrument can take several different forms such as face validity, content validity, criterion validity and construct validity.

Leedy and Ormrod (2015) define face validity as the extent to which, on the surface, an instrument looks like it measures a particular characteristic. In this study, face validity was established through a review of questionnaire by the research supervisor to maximise the accuracy of the responses. Construct validity refers to the degree that a measure covers the domain of interest (Zikmund et al., 2010). Construct validity was measured using correlation analysis. The results of the correlation analysis (c.f. Section 4, Table 5.9) show positive associations between the research constructs, which confirms that construct validity was satisfactory in this study.

3.10 ETHICAL CONSIDERATIONS

Whenever human beings or other creatures with the potential to think, feel, and experience physical or psychological distress are the focus of the investigation, researchers must look closely at the ethical implications of what they are proposing to do (Leedy & Ormrod, 2015). Denscombe (2010) also adds that there are distinct ethical problems for action research; that although the research centres on the activity of the practitioner, it is almost inevitable that the activity of colleagues will also come under the microscope at some stage or other as their activity interlinks with that of the practitioner who investigates the research. This study aimed to ensure that the rights and welfare of all participants are well preserved and protected through achieving a balance between the low research risk associated with this study and benefits.

3.10.1 Protection of Respondents

Leedy and Ormrod (2015), suggest that researchers should not expose research participants, whether they are human beings or non-human animals, to unnecessary physical or psychological harm. In this study, the research participants were not exposed to unnecessary physical or psychological harm. The risk associated with participating in the study was not greater than the normal risks of day-to-day living. Respondents were not exposed to stress conditions or embarrassment that could have led to the loss of their self-esteem.

3.10.2 Voluntariness

Welman et al. (2005) state that the researcher should obtain the necessary permission from the respondents after they were thoroughly informed about the purpose of the interview and the investigation. In this study, an informed consent form was distributed to all respondents clarifying the voluntary nature of participation as well as the right to withdraw at any given time.

3.10.3 Respondents' Privacy

Any research study involving human beings must respect participants' right to privacy. Under no circumstances should a researcher report, either oral or written, be presented in such a way that other people become aware of how a particular participant has responded or behaved, unless, of course, the participant has specifically granted permission in writing for that to happen (Leedy & Ormrod, 2015). The identity of the respondents in this study was confidential and no disclosed on all data collected in order to protect them. The access to collect information was limited to the researcher. Neither the identity of the research participants has been included in the report findings, nor his or her performance.

3.10.4 Honesty with Professional Colleagues

According to Leedy and Ormrod (2015), researchers must report their findings in a complete and honest fashion, without misrepresenting what they could have done. In this study, findings were written in a complete and honest fashion without distortion of what has been undertaken. The researcher has not intentionally misled others about the nature of the findings.

3.11 CHAPTER SUMMARY

This chapter presents the research design and methodology. It begins by highlighting the importance of the research philosophy, a way of thinking which shows the direction and logic this study, namely through the most important philosophical approaches such as positivism, interpretivism, realism and pragmatism. The study adopted the positivist approach as it is rooted in all quantitative research.

This chapter also discussed the research design and indicated that the survey design was followed in this study. On the sampling design, the chapter elaborates on the population, the parameters of interest, the sample frame and the sample size.

It also adopted a non-probability purposive sampling approach. Finally, the chapter discusses the data sources, data collection instrument, data analysis, reliability and validity of the measurement instrument. The next chapter presents the results of the study.

CHAPTER 4
DATA ANALYSIS AND INTERPRETATION OF THE RESULTS

4.1 INTRODUCTION

The previous chapter, as mentioned, gives an in-depth description of what the research methodology entails. The main purpose of the current chapter is to analyse the data collected during the survey and provide interpretation of the results. The data analysed in this chapter were collected from SCM professionals, managers and staff of the two well-known mining companies in Rustenburg, North West province. It begins by indicating the response rate and provides demographic details of the respondents. Thereafter, the chapter discusses the reliabilities of the scales of measurement followed by the application of mean scores to show the perceptions of the respondents towards each research construct. A discussion of the results of the correlation analysis between the constructs is given to show the associations between the research constructs. Finally, the results of regression analysis are presented in which the existence of predictive relationships between independent variables and the dependent variables is determined. Most of the discussions of the results are linked to previous literature.

4.2 RESPONSE RATE

The response rate is obtained by counting the number of questionnaires returned or completed, then divided by the total by the number of eligible people who were contacted or requested to participate in the survey (Zikmund et al., 2010). Represented in percentage form, it provides a clear indication of how many respondents are involved in the study and the percentage against the overall target population. The response rate in this study is presented in Table 4.1

Table 4.1: Response Rate

Total number of questionnaires distributed	104
Valid questionnaires retained	68
Unusable responses	36
Usable response rate	65%

As presented in Table 4.1, the total number of respondents who participated in this survey by completing the questionnaire is 104. Out of this number, 68 questionnaires were returned and classified as usable while 36 had errors and were excluded in the final data analysis. In percentage terms, the 68 questionnaires used in the final data analysis represent a response rate of 65%.

4.3 DEMOGRAPHIC DETAILS OF RESPONDENTS

This section discusses the demographic profile of respondents. There are five parameters that were used in the analysis: gender, age, racial group, academic qualification and employment period.

4.3.1 Gender

The gender distribution of respondents is provided in Table 4.2

Table 4.2: Gender of the Respondents

VARIABLES	CATEGORIES	N	n	%
Gender	Male	68	38	55.9
	Female	68	30	44.1

The gender of the respondents, as illustrated in Table 4.2, indicates that 55.9 percent (n = 38) were males and 44.1 percent (n = 30) were females. This leads to the opinion that more males than females were willing to participate in this study. It could also imply that there could be more male SCM professionals, managers and staff in the mining industry in the North West Province. This presents the need to develop and empower women to take up those within that industry.

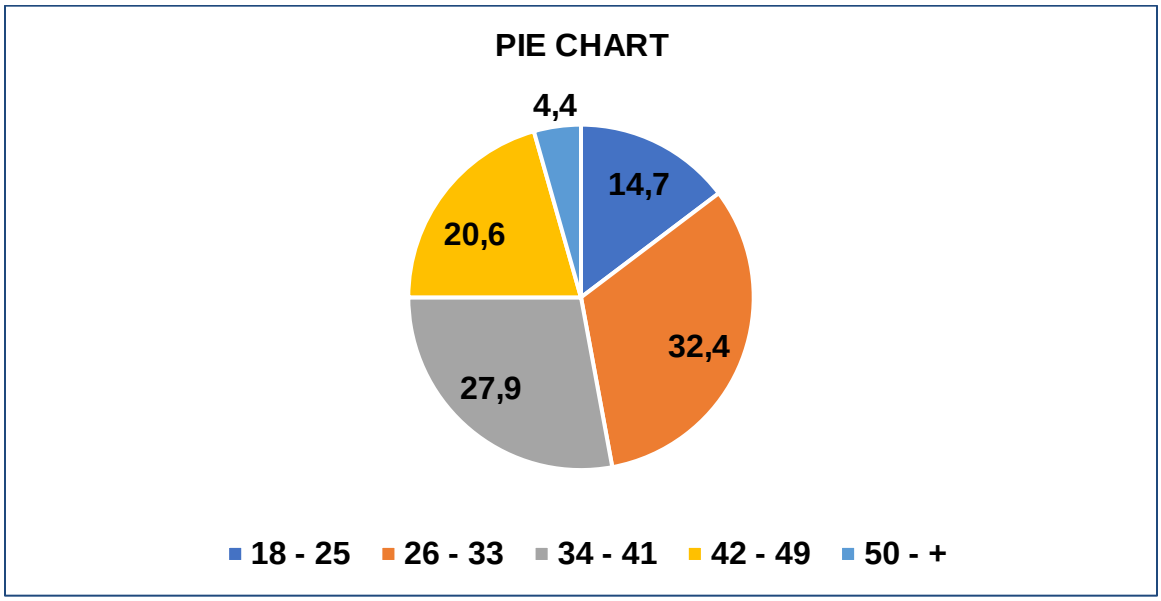
4.3.2 Respondent's age

This section reveals the age group of the respondents. The respondents' age categories are reported in Table 4.3

Table 4.3: Age Categories of the Respondents

AGE CATEGORIES	N	N	%
18 - 25	68	10	14.7
26 - 33	68	22	32.4
34 - 41	68	19	27.9
42 - 49	68	14	20.6
50 - >	68	3	4.4

Figure 4.1: Graphically illustrate respondents' age statistics



As illustrated in Table 4.3 and Figure 4.1, the respondents' ages are between 18 and over 50 years. The largest number of the respondents are aged between 26 and 33 years. It can further be observed that 14.7 percent (n = 10) are aged between 18 and 25 years representing the younger respondents; about 27.9 percent (n = 19) aged between 34 – 41 years; about 20.6 percent (n = 14) aged between 42 – 49 years; 32.4 percent (n = 22) aged between 26 – 33 years and 4.4 percent (n = 3) are either 50 years or older. These figures demonstrate that younger people are more willing to participate in this study than older ones. It could also mean that there are more young SCM practitioners in the mining industry in North West Province than older ones.

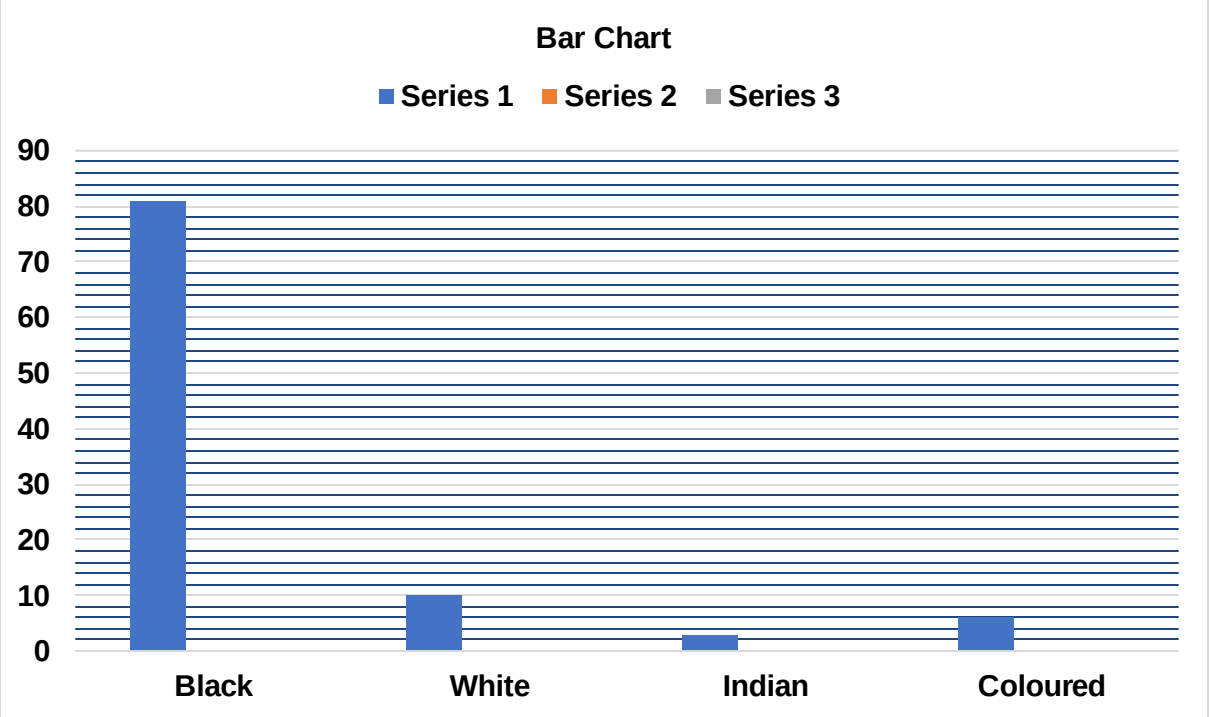
4.3.3 Race

The racial of respondents is presented in Table 4.4

Table 4.4: Racial Classification of the respondents

RACIAL CLASSIFICATION	N	n	%
Black	68	55	81
White	68	7	10
Indian	68	2	3
Coloured	68	4	6

Figure 4.2: The figure below displays racial group results



According to Table 4.4 and Figure 4.2, the black respondents represent 81 percent (n = 55) of the respondents, while whites represent 10 percent (n = 7). Coloured represent 6 percent (n = 4) and the Indians represent 3 percent (n = 2) of the respondents. These results depict that the different racial groups in RSA were adequately represented in the study. The dominance of blacks and whites

demonstrate that both racial groups are the prevailing race of people in the mining industry in North West Province.

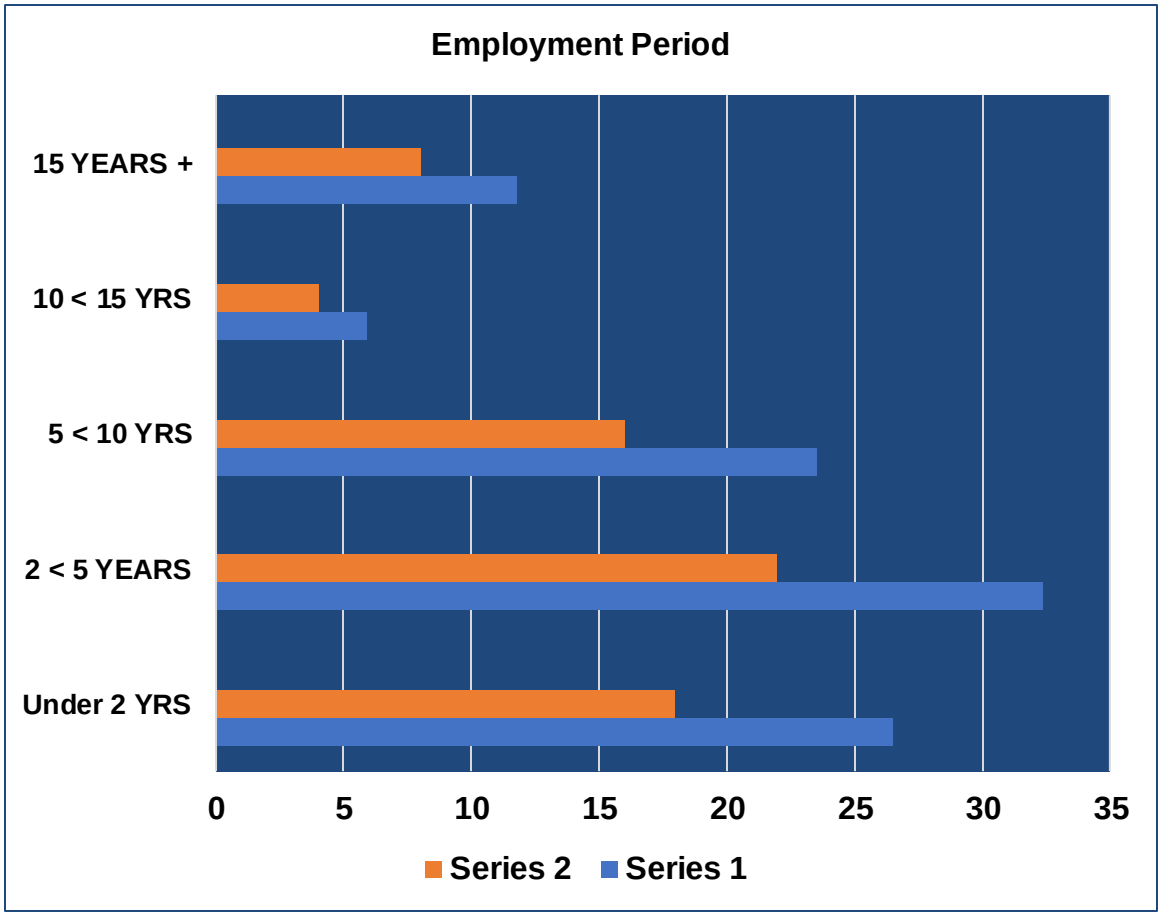
4.3.4 Employment period

The statistics collected regarding the employment period are presented in Table 4.5

Table 4.5: Employment Period

EMPLOYMENT PERIOD	FREQUENCES	PERCENTAGES
Less than 2 years	18	26.5
2 – 5 years	22	32.4
5 – 10 years	16	23.5
10 – 15 years	4	5.9
15 years +	8	11.8

Figure 4.3: Below presents employment period statistics reflected in Table 4.5



4.3.5 Positions occupied by the respondents

The details of the positions held by the respondents are presented in Table 4.6

Table 4.6: Positions Occupied by Respondents

POSITIONS	FREQUENCIES	PERCENTAGES
Clerical	19	27.9
Line Manager	9	13.2
Middle Manager	10	14.7
Senior Manager	5	7.4
Specialist	19	27.9

Supervisor	6	8.8
Total	68	100

The statistics shown in Table 4.6 show that most of the respondents (27.9%; n = 19 and n= 19) are specialists and clerical, respectively in the mining industry in the North West Province. Senior managers and supervisors represent some of the positions occupied by respondents had a very negligible number.

4.4 RELIABILITY ANALYSIS

Leedy and Ormrod (2015) define reliability as the consistency with which a measuring instrument yields a certain, consistent result when the entity being measured hasn't changed. It must also be noted that reliability tells you the extent to which a measure, procedure or instrument yields the same result on repeated trials (Eriksson & Kovalainen, 2008). This is also confirmed by Welman et al. (2005) that reliability is concerned with the findings of the research and relates to the credibility of the findings. To evaluate how reliable the measurement instrument is, the Cronbach's Alpha coefficient was used, and the results are presented in Table 4.7

Table 4.7: Reliability of Measurement Scales

QUESTIONNAIRE SECTION	SCALE	NUMBER OF ITEMS	CRONBACH ALPHA
B	GSCM	7	0.874
C	EJSAT	5	0.802
D	OPEFF	5	0.629
E	REFF	6	0.864
F	ENTPER	5	0.868
Overall Scale		28	0.807

The results provided in Table 4.7 above show that Cronbach alpha values for the scale ranged between 0.629 and 0.874. These values were acceptable since they were above the recommended limits. This is because Cronbach's Alpha for most of them are above the required value of 0.6. Based on these views, even the operational efficiency which had Cronbach's Alpha value at more than 0.6 was accepted in this study. Therefore, measurement scales used were deemed reliable or internally consistent because they satisfied the recommended parameters.

4.5 PERCEPTIONS OF RESPONDENTS TOWARDS GSCM PRACTICES AND ENTERPRISE PERFORMANCE

This section discusses the perceptions of the respondents towards the implementation of GSCM practices and enterprise performance. The analysis of the mean scores and the standard deviations was used to achieve this. A higher mean score was taken to point out that respondents agree or strongly agree with the question, whereas a lower mean score meant that respondents disagree or strongly disagree with the question.

4.5.1 Mean scores, standard deviations, skewness and kurtosis analysis for GSCM, employee job satisfaction, operational and relational efficiencies

Table 4.8: The mean and standard deviation scores of all variables

VARIABLE	N	MEAN	STANDARD DEVIATION	VARIANCE	SKEWNESS	KURTOSIS
GSCM	68	3.67	0.82	0.68	-1.16	1.03
EJSAT	68	3.59	0.74	0.55	-0.51	0.48
OPEFF	68	3.92	0.55	0.30	-0.37	0.75
REFF	68	3.91	0.72	0.52	-0.58	-0.15
ENTPER	68	4.06	0.71	0.49	-0.79	-0.01

Scale: 1= strongly disagree; 2=agree; 3=neutral; 4=agree; 5=strongly agree

The results of the mean and standard deviation score analysis for GSCM, the employee job satisfaction, operational efficiency, relational efficiency, and enterprise performance are reported in the Table 4.8. This analysis revealed that a relatively high number of the respondents agree that the application of GSCM has a positive impact

on the enterprise performance of the RSA mining industry, as shown by the overall mean and standard score of ($\bar{x}$ = 3.67 and SD = 0.82). The standard deviation for GSCM practices was the highest among the other variables. This means that there was a relatively high level disagreeing and agreeing among the employees on the implementation of GSCM.

Enterprise performance analysis revealed the highest number of the respondents agree that their firms are in a stronger competitive position than before, they have improved profitability than before, their firms have experienced improved customer satisfaction, the performance of suppliers has improved and the level of productivity has improved, as shown by the overall mean and standard score of ($\bar{x}$ = 4.06 and SD = 0.71).

Analysis on operational efficiency revealed that a relatively high number of the respondents agree that the overall costs have been lowered in their firms, overall, products' quality has been improved, customer service has been improved, project duration has been reduced, and that their firms have delivered greater value to their customers. This is shown by the overall mean and standard score of ($\bar{x}$ = 3.92 and SD = 0.55).

The analysis on employee job satisfaction revealed that a relatively high number of the respondents agree that most employees in their firms like their jobs in the present operations, most employees think their supervisor treats them well, most employees like their jobs more than most employees of other firms, most employees do not intend to work for a different company, and the overall employees are quite satisfied with their jobs, as shown by the overall mean and standard score of ($\bar{x}$ = 3.59 and SD = 0.74).

Finally, the analysis on relational efficiency revealed that a relatively high number of the respondents agree that there has been an increased respect for the skills and capabilities of customers in their firms, the level of honesty has improved, sharing of information with their customers has been more open, and working relationship with their customers has been more effective, as reflected by the overall mean and standard score of ($\bar{x}$ = 3.91 and SD = 0.72).

4.6 CORRELATION ANALYSIS

According to Leedy and Ormrod (2015), a correlational study examines the extent to which differences in one characteristic or variable are related to differences in one or more characteristics or variables. This is where researchers gather data about two or more characteristics for a particular group of people or other appropriate units of study. In this study, the Pearson's correlation coefficient, as a statistic to measure the degree of association between two variables (Welman et al. 2005), is used to determine the relationship between GSCM and Enterprise Performance. Denscombe, (2010), explains that the Pearson's correlation coefficients range between -1 and +1 ($-1 \leq r \leq +1$). The results are presented in Table 4.9.

Table 4.9: Correlations: GSCM and Enterprise Performance

		GSCM	EJSAT	OPEFF	REFF	ENTPE
GSCM	**Pearson Correlation**	1	.307*	.398**	.428**	.576**
	Sig. (2-tailed)		.011	.001	.000	.000
	N	68	68	68	68	68
EJSAT	**Pearson Correlation**	.307*	1	.498**	.495**	.485**
	Sig. (2-tailed)	.011		.000	.000	.000
	N	68	68	68	68	68
OPEFF	**Pearson Correlation**	.398**	.498**	1	.506**	0576**
	Sig. (2-tailed)	.001	.000		.000	.000
	N	68	68	68	68	68
REFF	**Pearson Correlation**	.428**	.495**	.506**	1	.795**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	68	68	68	68	68
ENTPE	**Pearson Correlation**	.576**	.485**	.576**	.795**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	68	68	68	68	68

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

The inter-factor correlations above show the associations between the variables. This is concerned with how closely the variables are connected (Denscombe, 2010). Positive inter-factor correlations are observed between the five dependent and independent variables. The strongest correlation occurs between Enterprise Performance and Relational Efficiency ($r = 0.795$; $p < 0.01$), while the weakest correlation is between GSCM and Job Satisfaction ($r = 0.307$; $p < 0.05$). This indicates that improvement in one of the independent variables results in the improvement of the other variable as well.

4.6.1 Correlation between GSCM and enterprise performance

Table 4.9 reveals that there is a moderate positive correlation and statistically significant results between GSCM and enterprise performance ($r = 0.576$; $p < 0.01$) in the mining supply chain in RSA. Therefore, these results suggest that intensified GSCM practices will increase enterprise performance. The failure to implement GSCM practices will result in a decrease in enterprise performance. However, Lee et al. (2012) did not find any statistical significance directly linking GSCM practice implementation and enterprise performance. Instead, there was a statistically significant direct relationship between two mediating variables of operational efficiency and relational efficiency.

GSCM can be defined as integrating environmental issues into supply chain management, including the processes from product design to end-of-life management of the product after its useful life (Aksoy et al., 2014). Moreover, Dashore and Sohani (2013) assert that green supply chain aims at confining the wastes and also recognises the disproportionate environmental impact of the supply chain processes within the industry system, hence helps to conserve the energy and prevent dissipation of dangerous material into the environment.

4.6.2 Correlation between employee job satisfaction and enterprise performance

Table 4.9 reflects a moderate positive correlation and statistically significant results occurring between employee job satisfaction enterprise performance ($r = 0.485$; $p <$

0.01) in the mining supply chain in RSA. These findings imply that employees satisfied with their jobs will have a positive influence on enterprise performance. In their conclusion, Dartey-baah and Harlley (2010) found that employee job satisfaction cannot be overlooked if an organisation wants to be successful in its overall performance. This also enables such companies to thrive in a consistently changing market environment to achieve better enterprise performance.

Job satisfaction is vital in the workplace, particularly in the twenty-first century, as workers have become more knowledgeable through education about their rights in the workplace (Dartey-baah & Harlley, 2010). When an organisation has skilled, capable, and knowledgeable individuals to transform its internal capabilities by making it more adaptive, aligned with current and future innovation and technology, that will improve its performance and competitiveness. Therefore, it is important for mining entities to develop a business environment that supports and promotes the wellbeing of their employees.

4.6.3 Correlation between operational efficiency and enterprise performance

Table 4.9 shows a strong positive correlation and statistically significant results ($r = 0.576$; $p < 0.01$) between operational efficiency and enterprise performance in the mining supply chain in RSA. These results imply that as operational efficiency of all the operational facets of the organisation improves, there will be an improvement in terms of the performance of the entire enterprise. Contrary to that, a decline of operational efficiency of these facets will result in a decreased enterprise performance. Operational efficiency refers to the ability of supplying firms to reduce costs and cycle time, improve product quality, and create great customer value (Zacharia et al., 2009).

It means going beyond short term cost reduction initiatives and a preoccupation with extra tonnes leaving the mines (Graham & Matt, 2014). It is also about what is happening inside the gates that is the key to arresting the industry's productive decline. The mines can increase performance by improving the efficiency and effectiveness of its core mining operations including the supply chain. This can be achieved through a variety of solutions, including; enterprise asset management, lean operations and supply chain management, revenue growth, and infrastructure funding (Boegman et al., 2015).

4.6.4 Correlation between relational efficiency and enterprise performance

Table 4.9 reveals a strong positive correlation and statistically significant results between relational efficiency and enterprise performance ($r = 0.795$; $p < 0.01$) in the mining supply chain in RSA. These results mean that a good strong relationship among the stakeholders will result in good and strong enterprise performance. There is a ninety-nine percent chance of that to happen in the mining industry. Inversely, the enterprise performance is likely to decrease if there is on relational efficiency. According to Zacharia et al. (2009), relational efficiency is the ability of supplying firms to increase transparency and openness in the business processes working jointly with buyers so that the suppliers can build trust and credibility in the relationship with buyers.

On their mediation analysis, Lee et al. (2012), suggest that a firm's business performance will improve when they accomplish relational efficiency after adopting GSCM practices.

4.7 REGRESSION ANALYSIS

Regression analysis is a statistical technique that quantifies the relationship between a single response variable and one or more predictor variables (Wegner, 2013). Similarly, Zikmund et al. (2010) define regression analysis as another technique for measuring the linear association between a dependent and independent variable. It is a dependent technique that makes a distinction between dependent and independent variables. According to Leedy and Ormrod (2015), regression helps to examine how effectively one or more variables allow the researcher to predict the value of another (dependent) variable.

4.7.1 Regression analysis: GSCM and employee job satisfaction

Table 4.10: Regression Model 1: GSCM and Employee Job Satisfaction.

INDEPENDENT VARIABLES: GSCM PRACTICES	DEPENDENT VARIABLE: EMPLOYEE JOB SATISFACTION			TOL	VIF
	Beta	t	Sig		
SAT	0.307	2.621	0.011	1.000	1.000

R= 0.307; R^2 = 0.094; Adjusted R^2 = 0.081; Sig. p < 0.011; Tol = Tolerance; VIF = Variance Inflation Factor

The regression model in Table 4.10, the independent variable (adjusted R^2 = 0.081) explained approximately 8% of the variance that impact on the employee job satisfaction of the enterprise performance in the mining industry in RSA. This means that 92% of the variances is explained by other practices that were not considered in this study. Analysis of this regression model shows that GSCM was statistically significant in predicting employee job satisfaction (β = 0.307; t =2.621; p = 0.011).

The positive beta implies that the implementation of GSCM practices improves the level of employee job satisfaction in the South African mining industry. This is also echoed by Lee et al. (2012) in their hypothesis, suggesting that the implementation of GSCM practices is positively related to employee job satisfaction. Furthermore, in their analysis, Lee et al. (2012) find that enterprise performance will improve when they accomplish operational and relational efficiencies as well as secure employee job satisfaction after adopting GSCM practices.

4.7.2 Regression analysis: GSCM and Operational Efficiency

Table 4.11: Regression Model 2: GSCM and Operational Efficiency

INDEPENDENT VARIABLES: GSCM PRACTICES	**DEPENDENT VARIABLE: OPERATIONAL EFFICIENCY**			**TOL**	**VIF**
	Beta	**T**	**Sig**		
OPEFF	0.398	3.528	0.001	1.000	1.000
R = 0.398; R^2 = 0.159; Adjusted R^2 = 0.146; Sig. p < 0.001; Tol = Tolerance; VIF = Variance Inflation Factor					

With regard to the regression model in Table 4.11, the independent variable (adjusted R^2 = 0.146) explained approximately 15% of the variance that impact on the operational efficiency of the enterprise performance in the mining industry in RSA. This means that 85% of the variances is explained by other practices that were not considered in this study. Analysis of this regression model shows that GSCM was

statistically significant in predicting operational efficiency (β = 0.398; t = 3.528; p = 0.001).

The positive beta implies that the implementation of GSCM practices improves the level of operational efficiency in the South African mining industry. Again, Lee et al. (2012), in their conclusion suggest that the mediation analysis revealed that enterprise performance could be enhanced through the achievement of operational efficiency after a company adopts GSCM practices.

4.7.3 Regression analysis: GSCM and Relational efficiency

Table 4.12: Regression Model 3: GSCM and Relational Efficiency.

INDEPENDENT VARIABLES: GSCM PRACTICES	DEPENDENT VARIABLE: RELATIONAL EFFICIENCY			TOL	VIF
	Beta	**T**	**Sig**		
REFF	0.428	3.845	0.000	1.000	1.000
R= 0.428; R^2 = 0.183; Adjusted R^2 = 0.171; Sig. p < 0.000; Tol = Tolerance; VIF = Variance Inflation Factor					

With regard to the regression model in Table 4.12, the independent variable (adjusted R^2 = 0.171) explained approximately 17% of the variance that impact on the relational efficiency of the mining industry in RSA. This means that 83% of the variances is explained by other practices that were not considered in this study. Analysis of this regression model shows that GSCM was statistically significant in predicting relational efficiency (β = 0.428; t = 3.845; p = 0.000). The positive beta implies that the implementation of GSCM practices positively improves the level of relational efficiency in the South African mining industry.

This has also been confirmed by results of hypotheses tests presented by Lee et al. (2012) that showed that the initial variable GSCM practice implementation was positively correlated with relational efficiency. The test results then showed that relational efficiency had a direct, positive and statistically significant relationship with the outcome variable, enterprise performance.

Table 4.13 presents the regression model summary of three mediating factors and enterprise performance in the mining industry in the North West province.

Table 4.13: Regression Model 4: Three Mediating factors and Enterprise Performance.

INDEPENDENT VARIABLES: GSCM PRACTICES	DEPENDENT VARIABLE: ENTERPRISE PERFORMANCE			TOL	VIF
	Beta	**T**	**Sig**		
EJSAT	0.050	0.570	0.571	0.673	1.487
OPEFF	0.218	2.491	0.015	0.663	1.508
REFF	0.660	7.543	0.000	0.666	1.502
R = 0.821; R^2 = 0.674; Adjusted R^2 = 0.659; Sig. p < 0.00; Tol = Tolerance; VIF = Variance Inflation Factor					

Regression model 5 in Table 4.13, the independent variables (adjusted R^2 = 0.674) explained approximately 67% of the variance of mediating variables that impact on the enterprise performance of the mining industry in RSA. This means that 33% of the variances is explained by other mediating variables that were not considered in this study. Tolerance and the variance inflation factor values were used to determine the effects of multicollinearity in this study.

According to Zikmund et al. (2010), multicollinearity is the extent to which independent variables in a multiple regression analysis are correlated with each other, high multicollinearity can make interpreting parameter estimates difficult or impossible. O'Brien (2007) defines tolerance values as the measure of the strength of the relationship between one independent variable and the other independent variables and should have a T > 0.5.

A comparison of the beta scores indicates that relational efficiency scored the highest beta (β = 0.660). This shows that relational efficiency exerts the strongest impact on enterprise performance in the South African mining industry. Employee job satisfaction scored the smallest beta (β = 0.050), making them the least important GSCM practices affecting enterprise performance.

This regression model further reveals that employee job satisfaction emerged as statistically insignificant in predicting enterprise performance (β = 0.050; t = 0.570; p = 0.571). The positive beta results indicate that the presence of employee job satisfaction results in improved enterprise performance. Job satisfaction is a psychological concept that refers to job-related attitudes and characteristics such as pay and reward, policies, leadership behaviours, management style and co-workers. Similarly, Rubel and Kee (2014) define job satisfaction as the expression of employees about their job and the expectations from the job that is a desired outcome of employees for their involvement in the organisation.

Job satisfaction cannot be overlooked, and organisations who desire to be successful must also appreciate the aspirations of their staff which are key to enterprise performance (Dartey-baah & Harlley, 2010). In their conclusion, Rubel and Kee (2014) consider and assert that assuming quality work life is essential for an organisation to enhance the level of satisfaction as satisfied employees are responsible for improving both their individual and enterprise performance.

Again, the above regression model shows that operational efficiency was statistically significant in predicting enterprise performance (β = 0.218; t = 2.491; p = 0.015). The positive beta value implies that operational efficiency has the effect of increasing enterprise performance in the South African mining industry. Seuk (2017) supports these results in their annual report, stating that they improve their operational efficiency by continuing implementation of the programme to upgrade their mining equipment and production processes.

Furthermore, Vachon and Klassen (2006) agree that mining companies form partnerships to strengthen their strategic and operational competencies, develop mutual supply chain benefits, and improve total supply control. Miners who rethink and shift their focus to proactively look inward into its processes, and leverage technology to drive operational excellence across the entire mining value chain, will be winners of tomorrow (Rao & Holt, 2005).

Finally, the analysis of the regression model shows that relational efficiency was statistically significant in predicting enterprise performance (β = 0.660; t =7.543; p = 0.000). The positive beta implies that the presence of relational efficiency in the South African mining industry. These results were supported in a study by of & Africa (2017),

in their conclusions that the performance of South African procurement regulation in the mining sector increases purchasing of goods and services, which in turn increases enterprise performance.

Zacharia et al. (2009) define relational efficiency as the ability of supplying firms to increase transparency and openness in the business processes working jointly with buyers so that suppliers can build trust and credibility in the relationship with buyers. In addition, Liao (2010) who further mentioned previous studies revealed that a well-established, long-term relationship between buyer and supplier firms helps suppliers improve their performance. In their conclusion, Lee et al. (2012) suggest that the implementation of GSCM practices helps improve the relational efficiency with their buyers and eventually achieve better enterprise performance. Therefore, the presence of relational efficiency within the supply chain in the South African mining will positively improve enterprise performance.

4.7.4 Regression analysis: GSCM and enterprise performance

Table 4.14: Regression Model 5: GSCM and enterprise performance

INDEPENDENT VARIABLES: GSCM PRACTICES	DEPENDENT VARIABLE: ENTERPRISE PERFORMANCE			TOL	VIF
	Beta	**T**	**Sig**		
GSCM	0.576	5.729	0.000	1.000	1.000
R = 0.576; R^2 = 0.332; Adjusted R^2 = 0.332; Sig. p < 0.00; Tol = Tolerance; VIF = Variance Inflation Factor					

Regression model 5 in Table 4.14, the independent variable (adjusted R^2 = 0.332) explained approximately 33% of the variance of GSCM practices that impact on the enterprise performance of the mining industry in RSA. This means that 67% of the variances is explained by other GSCM practices that were not considered in this study.

4.8 RESULTS OF HYPOTHESES TESTS

The seven relationships that were hypothesised in the conceptual framework (Figure 1.1) of this study were tested accordingly, employing regression analyses. The results

which show the beta coefficient values, the corresponding t and p-values and the outcome of each hypothesised relationship are provided in Table 4.15.

Table 4.15: Results of Hypotheses Testing

RELATIONSHIP	HYPOTHESIS	BETA COEFFICIENT	T VALUE	P VALUE	OUTCOME
GSCM vs REFF	H_1	.428	3.845	.000	Significant and supported
GSCM vs OPEFF	H_2	.398	3.528	.001	Significant and supported.
GSCM vs EJSAT	H_3	.307	2.621	.011	Significant and supported
REFF vs ENTPE	H_4	.660	7.543	.000	Significant and supported
OPEF vs ENTPE	H_5	.218	2.491	.015	Significant and supported
EJSAT vs ENTPER	H_6	.050	.570	.571	Insignificant and not supported
GSCM vs ENTPER	H_7	.576	5.729	.000	Significant and supported

The results of the hypotheses tests show that except for H_6 which initially suggested a weak positive relationship between employee job satisfaction and enterprise performance, the other six hypotheses (H_1, H_2, H_3, H_4, H_5 and H_7) were supported. Relational efficiency against enterprise performance revealed the highest beta

coefficient while employment job satisfaction against enterprise performance revealed the lowest beta coefficient. Further discussions on each hypothesised relationship are provided in the next section.

4.9 CONCLUSION

This chapter aims to analyse the information collected from the respondents using a structured questionnaire and to discuss these findings. The analysis of the demographic details of the respondents reflects that all groups of respondents are sufficiently represented in this study. Analysis of the respondents' perceptions shows that they are satisfied with their companies' enterprise performance as well as other three GSCM practices, such as operational efficiency, relational efficiency, employee job satisfaction.

Correlation analysis revealed that these GSCM practices positively affect enterprise performance. In the regression analysis, all the GSCM practices predict enterprise performance. The results show that these practices affect GSCM in the South African mining industry. Organisations encountering supply chain challenges on implementing the GSCM practices must be fully aware of the impact of the practices and act accordingly to ensure that enterprise activities generate enterprise growth through competitiveness and sustainability. The next chapter provides conclusions and recommendations.

CHAPTER 5
CONCLUSIONS, RECOMMENDATIONS, LIMITATIONS, AND IMPLICATIONS FOR FURTHER RESEARCH

5.1 INTRODUCTION

The purpose of this chapter is to present the conclusions, recommendations, limitations, and implications for further research. It starts by conducting a review of the chapters in the study. Conclusions for both theoretical and empirical objectives are outlined and based on the objectives various recommendations put forward for each objective. Limitations are acknowledged, which expose the shortcomings of the whole research. The chapter concludes by outlining the implications for further research.

5.2 REVIEW OF THE STUDY

This study examines the GSCM practices and their impact on enterprise performance in the South African mining industry. It is divided into six chapters, the first an introductory chapter, which discusses the background to the study, the problem statement, research objectives, the research design, and ethical considerations. The second chapter discusses literature on the nature and the composition of the South African mining industry and provides clear details about the context and industry in which the study was conducted. It also discusses the literature on GSCM and enterprise performance to provide a glimpse of how these constructs are related to previous literature.

The third chapter discusses the research methodology used in terms of the research paradigm, research design, sampling design, procedures for data collection, research ethics, and the different approaches selected for data analysis. The fifth chapter discusses the analysis of the data and the interpretation of the results. The sixth chapter concludes the study by discussing the conclusions, recommendations, research limitations, and implications for further research.

5.3 REALISATION OF THE OBJECTIVES OF THE STUDY

The study aims to achieve both theoretical and empirical objectives. The following theoretical and empirical objectives were set:

- to review literature on the nature and composition of the South African mining industry;
- to review literature on GSCM and enterprise performance;
- to review literature on the effect of GSCM practices enterprise performance;
- to establish perceptions of supply chain professionals of companies in the mining industry in the North West Province regarding the implementation of GSCM practices in their companies; and
- to analyse the effect of GSCM practices on enterprise performance in the mining industry in the North West Province.

The first theoretical objective is realised in the second chapter, which discusses the history of the South African mining industry, the recent developments and the current situation, challenges faced by the South African mining industry, and the importance of the mining industry to the South African economy.

The following theoretical objectives are also realised in chapter three, where previous literature on GSCM and enterprise performance are discussed: the definition of GSCM; relational efficiency; operational efficiency; and employee job satisfaction. The factors influencing the importance and benefits, and the outcomes of the GSCM are also discussed in depth.

The empirical objective was realised in chapter five, section 5.8 and 5.9, in which Pearson's correlations and regression analysis are used to determine the effects of GSCM and its practices on enterprise performance.

5.4 CONCLUSIONS BASED ON THE THEORETICAL OBJECTIVES

This section of the chapter discusses the conclusions based on the study's theoretical objectives, which are the literature review of the nature and composition of the mining industry, the literature review on GSCM and enterprise performance, and the literature review on the impact of GSCM on the enterprise performance.

5.4.1 Conclusions on literature review of the nature and composition of the mining industry.

The first theoretical objective focuses on a literature review on the nature and composition of the South African mining industry conducted in chapter two. The chapter acknowledges that the mining industry is a very prominent contributor to the

South African economy, with an estimated contribution of R18 billion to the fiscus in 2014. The country's mining value chains face significant supply-side challenges to adapt to the new social and environmental paradigms introduced by the transition to a green economy. The South African mining companies have to account for uniquely local issues with profound operational implications.

5.4.2 Conclusions on literature review on GSCM and enterprise performance

The next theoretical objective focuses on reviewing literature on GSCM and enterprise performance discussed in chapter two. This section discusses the definition, influencing factors, importance and benefits, and the outcomes of GSCM in relation to enterprise performance in the mining industry. It also points out the effectiveness of GSCM practices in maximising the total of the organisation through their better implementation to boost the whole enterprise performance. It identifies and discusses factors that force mining organisations to comply with environmental regulations such as laws and regulations, environmental advocacy groups competition, and customer preference. It is therefore concluded that a proper GSCM is needed in facilitating the well-being of an organisation and exerting an impact on enterprise performance.

5.4.3 Conclusions on literature review on the impact of GSCM practices on enterprise performance

Another theoretical objective focuses on conducting a literature review on the impact of the GSCM practices on enterprise performance, which has emerged as an important new archetype for the mining industry to achieve profit and market objectives by lowering their environmental risks and impacts while raising their ecological efficiency. The literature reinforces the impact that GSCM practices have on enterprise performance. It also shows that management in organisations should closely monitor the implementation of all GSCM practices on environmental sustainability and enterprise profitability.

5.5 CONCLUSIONS BASED ON EMPIRICAL OBJECTIVES

This section of the chapter discusses the conclusions based on empirical objectives of the study, which are the conclusions regarding the effect of GSCM practices on enterprise performance.

5.5.1 Conclusions regarding the effect of GSCM practices on enterprise performance

The second empirical objective focuses on investigating the effect of GSCM practices on enterprise performance in the South African mining industry. Regression analysis and Pearson's correlations are applied to realise this objective. Pearson's correlations show that GSCM, relational efficiency, operational efficiency, and relational efficiency are positively correlated with enterprise performance. In the regression analysis, all these GSCM practices positively predict enterprise. Relational efficiency emerges as the strongest practice influencing enterprise performance. It is therefore concluded that GSCM practices positively influence the enterprise performance of the South African mining industry.

5.6 RECOMMENDATIONS

The results of the study are crucial for organisations that aim to succeed in the South African mining industry. This section suggests different recommendations identified to address the effects of different GSCM related practices.

5.6.1 Recommendations regarding GSCM

The following recommendations are proposed to increase the effects of GSCM practices on enterprise performance:

- GSCM professionals must be trained to increase their knowledge, skills and overall competence within the mining industry.
- Mining organisations should adopt reliable GSCM practices to improve the effectiveness of the operations in the mining industry.
- The government of RSA must ensure increased importance of ecological concerns and enforced implementation of environmentally friendly policies and practices.

5.6.2 Recommendations regarding operational efficiency

The following recommendations are proposed to increase the effects of operational efficiency on enterprise performance:

- Improved operational efficiency in mining organisations would positively affect enterprise performance.

- Organisations should ensure that the personal development of employees is enforced not to increase their skills only but to increase their operational efficiency.
- There is also a need to continuously improve the safety of employees to increase operational efficiency, in turn, will drive the mining industry to transit towards automated operations.

5.6.3 Recommendations regarding relational efficiency

- Mining organisations should enforce an improved communication flow among departments, which in turn will develop the ability and willingness to work together to achieve great operational outcomes.
- Trust among organisations is gaining momentum in the supply chain management departments. It is therefore very important that mining firms in the supply chain collaborate as they depend on one another for long-term gains.
- Better assets' utilisation, stronger competitive position, and pursuing collaborations between buyers and suppliers of the mining organisations will lead to improved enterprise performance.
- Cooperation with government policies, legislation, safety standards, labour laws, DMR, and mining inspectors will improve working relationships of mining organisations and in turn improve their enterprise performance.
- Mining organisations should ensure regular and consistent communication through social media, organisation's websites, marketing campaigns with their buyers and suppliers to maintain an excellent working relationship.

5.6.4 Recommendations regarding employee job satisfaction

- Mining organisations should ensure that the wellbeing and satisfaction of their employees is prioritised and improved. There is a room for improvement between the employee job satisfaction and enterprise performance as Pearson's correlation results reflect a moderate positive correlation and statistically significant results.
- There were mixed emotions from the respondents in terms of how they feel about their jobs in the present operations, how their supervisors treat them, and their intention to work for different companies.

- Employers must ensure that their employees are in the good mental, physical and social state at all times. A strong, positive relationship between employees and the enterprise will yield great success, according to Pearson's correlation analysis.

5.7 LIMITATIONS OF THE STUDY

The current study provides useful information regarding the GSCM practices and their linkage to enterprise performance. However, there are limitations that have been pointed out that need to be addressed in future. The results of the current study are confined to a relatively small sample size of 68 respondents who were only based on two mining companies in the North West Province. There are other seven provinces that could have been considered for this study, but due to lack of financial resources, the study was restricted to only one province.

The questionnaire was self-administered, therefore the respondents completed it in the absence of the researcher. It is therefore possible that some of the respondents may have provided unreliable responses, which could negatively affect the validity of the results. The scales of measurement used were adapted from other studies that were not originally intended for supply chain management in the mining industry. Using convenience sampling method might have affected the study through sampling bias.

5.8 IMPLICATIONS FOR FURTHER RESEARCH

There are several implications for future research identified in this study. The first is that a similar study could be conducted in another location or province in RSA, as the views of the respondents differ in context. It could also be replicated in other industry segments apart from the mining industry. The section that elicits the opinions of the respondents could be conducted using interviews, which yields more information and better results when investigating perceptions.

Future studies could employ exploratory factor analysis to identify the GSCM practices instead of relying on literature for this purpose. More robust statistical approaches such as structural equation modelling could also be used in future studies since the study is multifactual in nature, involving numerous independent variables.

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APPENDIX 1: RESEARCH QUETIONNAIRE

RESEARCH QUESTIONNAIRE

NAME: ABEDNIGO NGCOBO

STUDENT NUMBER: 79138055

Supervisor: Prof C Mafini

RESEARCH QUESTIONNAIRE

Date: 28 June 2018

Dear participant

I am a postgraduate student at the University of South Africa studying towards a Master of Business Leadership degree. The title of my research project **is "Green Supply Chain Management and Enterprise Performance in the South African Mining industry".**

You are invited to participate in this research study by completing the attached survey questionnaire. This questionnaire consists of three sections. Before you complete the enclosed questionnaire, I wish to confirm that:

- Your employer has given me permission to carry out this research.
- Your participation in this study is voluntary and you are free to withdraw at any time.
- Your anonymity will be maintained and no comments will be ascribed to you by name in any written document or verbal presentation. Nor will any data be used from the questionnaire that might identify you to a third party. Please do not write your name anywhere on the questionnaire.
- On completion of the research, a copy of the completed research report will be made available to you upon request.
- Completion of the questionnaire will take approximately 10 minutes.

If you have any query concerning the nature of this research or should you have any question/s please feel free to contact me at khethangcobo4@gmail.com or ngcobam@unisa.ac.za or 073 205 6971.

Your response and time is greatly appreciated. Thank you!

Yours sincerely

Abednigo Ngcobo

SECTION A: Demographic Information

In this section we would like to find out more about yourself and the profile of your organisation. Please place a cross (x) in the appropriate block.

A1	Your gender	Male	Female

A2	Your age group	Below 25 years	26 – 33 years	34 – 41 years	42 – 49 years	50 years and above

A6	Employment period in your organisation	Less than 2 years	Between 2– 5 years	Between 5–10 years	Between 10-15 years	Over 15 years

A7	Ethnicity				
	African	White	Indian/Asian	Coloured	Other (Specify).....

A9	Position in your organisation	Clerical	Specialist	Supervisor/ Line manager	Middle manager	Senior manager

A10. Position in organisation

Top management	
Senior management	
Middle-management	
Junior management, supervisors, foremen, and superintendents	
Semi-skilled	
Unskilled	

A11. Occupational area

Legislators, Senior Officials and managers	
Professionals	
Technicians and Associate Professionals	
Clerks	
Service and Sales Workers	
Craft and Related Trades	
Plant and Machine Operators and Assemblers	
Elementary Occupations	

SECTION B: Green Supply Chain Management

We would like to find out more about the application of green supply chain management in your organisation. Please indicate the extent to which you agree or disagree by encircling the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree). A rating of 3 points towards a moderate acceptance of the statement.

Green Supply Chain Management

GSCM 1	Our major customers have assessed our environmental performance through a formal and green procurement process.	Strongly disagree	1	2	3	4	5	Strongly agree
GSCM 2	Our major customers have demanded that we establish an environmental management system.	Strongly disagree	1	2	3	4	5	Strongly agree
GSCM 3	Our major customers have conducted environmental audits on a regular basis.	Strongly disagree	1	2	3	4	5	Strongly agree
GSCM 4	Our major customers have demanded that we develop environmentally friendly products.	Strongly disagree	1	2	3	4	5	Strongly agree
GSCM 5	Our major customers have provided us with relevant and helpful information on how to comply with its environmental requirements.	Strongly disagree	1	2	3	4	5	Strongly agree
GSCM 6	Our major customers have provided us with technical, managerial and financial assistance to address environmental issues.	Strongly disagree	1	2	3	4	5	Strongly agree

GSCM 7	Our major customers and our firm jointly have developed environmentally conscious products.	Strongly disagree	1	2	3	4	5	Strongly agree

Employee Job Satisfaction (SAT)

We would like to find out more about the level of job satisfaction in your organisation. Please indicate the extent to which you agree or disagree by encircling the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree). A rating of 3 points towards a moderate acceptance of the statement.

SAT 1	Most employees in our firm like their jobs in the present operations.	Strongly disagree	1	2	3	4	5	Strongly agree
SAT 2	Most employees in our firm think their supervisor treats them well.	Strongly disagree	1	2	3	4	5	Strongly agree
SAT 3	Most employees in our firm like their jobs more than most employees of other firms.	Strongly disagree	1	2	3	4	5	Strongly agree
SAT 4	Most employees in our firm do not intend to work for a different company.	Strongly disagree	1	2	3	4	5	Strongly agree
SAT 5	Overall, our employees are quite satisfied with their jobs.	Strongly disagree	1	2	3	4	5	Strongly agree

Operational Efficiency (OE)

We would like to find out more about operational efficiency in your organisation. Please indicate the extent to which you agree or disagree by encircling the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree). A rating of 3 points towards a moderate acceptance of the statement.

OE 1	Overall, costs have been lowered in our firm.	Strongly disagree	1	2	3	4	5	Strongly agree
OE 2	Overall, products' quality has been improved in our firm.	Strongly disagree	1	2	3	4	5	Strongly agree
OE 3	Customer service has been improved in our firm	Strongly disagree	1	2	3	4	5	Strongly agree
OE 4	Project duration has been reduced in our firm.	Strongly disagree	1	2	3	4	5	Strongly agree
OE 5	Our firm has delivered greater value to our customers.	Strongly disagree	1	2	3	4	5	Strongly agree

Relational Efficiency (RE)

We would like to find out more about relational efficiency in your organisation. Please indicate the extent to which you agree or disagree by encircling the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree). A rating of 3 points towards a moderate acceptance of the statement.

RE 1	There has been an increased respect for the skills and capabilities of customers in our firm.	Strongly disagree	1	2	3	4	5	Strongly agree
RE 2	There has been an improved level of honesty in our firm.	Strongly disagree	1	2	3	4	5	Strongly agree
RE 3	There has been more open sharing of information with our customers.	Strongly disagree	1	2	3	4	5	Strongly agree
RE 4	There has been a more effective working relationship with our customers.	Strongly disagree	1	2	3	4	5	Strongly agree

RE 5	There has been an enhanced commitment to work with our customers in the future.	Strongly disagree	1	2	3	4	5	Strongly agree
RE 6	There has been an overall more productive relationship with our customers.	Strongly disagree	1	2	3	4	5	Strongly agree

Enterprise Performance (EP)

We would like to find out more about the performance of your organisation. Please indicate the extent to which you agree or disagree by encircling the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree). A rating of 3 points towards a moderate acceptance of the statement.

RE 1	Our firm is in a stronger competitive position than before.	Strongly disagree	1	2	3	4	5	Strongly agree
RE 2	Our firm has improved profitability than before.	Strongly disagree	1	2	3	4	5	Strongly agree
RE 3	Our firm has experienced improved customer satisfaction.	Strongly disagree	1	2	3	4	5	Strongly agree
RE 4	The performance of suppliers to our firm has improved.	Strongly disagree	1	2	3	4	5	Strongly agree
RE 5	The level of productivity in our firm has improved.	Strongly disagree	1	2	3	4	5	Strongly agree

The end

Thank you for taking your time to complete this questionnaire.

APPENDIX 2: ETHICAL CLEARANCE LETTER

University of South Africa, PO Box 392, Unisa, 0003, South Africa
Cnr Janadel and Alexandra Avenues, Midrand, 1685, Tel: +27 11 652 0000, Fax: +27 11 652 0299
E-mail: sbl@unisa.ac.za Website: www.unisa.ac.za/sbl

SCHOOL OF BUSINESS LEADERSHIP
RESEARCH ETHICS REVIEW COMMITTEE (GSBL CRERC)

02 July 2019

Ref #: 2019_SBL_MBL_004_FA
Name of applicant: Mr AN Ngcobo
Student #: 79138055

Dear Mr Ngcobo

Decision: Ethics Approval

Student: Mr AN Ngcobo, ngcobam@unisa.ac.za, 063 495 8228

Supervisor: Prof C Mafini, chengedzaim@vut.ac.za , 083 642 9215

Project Title: "Green supply chain management and enterprise performance in the South African mining industry"

Qualification: Masters in Business Leadership (MBL)

Expiry Date: December 2020

Thank you for applying for research ethics clearance, SBL Research Ethics Review Committee reviewed your application in compliance with the Unisa Policy on Research Ethics.

Outcome of the SBL Research Committee:
Approval is granted for the duration of the Project

The application was reviewed in compliance with 27/06/2019.

The proposed research may now commence with the proviso that:

1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the SBL Research Ethics Review Committee.

45 Building leaders who go beyond

SBL GRADUATE SCHOOL OF BUSINESS LEADERSHIP UNISA

Graduate School of Business Leadership, University of South Africa, PO Box 392, Unisa, 0003, South Africa
Cnr Janadel and Alexandra Avenues, Midrand, 1685, Tel: +27 11 652 0000, Fax: +27 11 652 0299
E-mail: sbl@unisa.ac.za Website: www.unisa.ac.za/sbl

3) An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.
4) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

Kind regards,

Prof R Ramphal
Chairperson: SBL Research Ethics Committee
011 – 652 0363 or ramphrr@unisa.ac.za

Prof RT Mpofu
Executive Dean (Acting): Graduate School of Business Leadership
011- 652 0256/mpofurt@unisa.ac.za

45 Building leaders who go beyond

SBL
GRADUATE SCHOOL OF BUSINESS LEADERSHIP
UNISA

APPENDIX 3: APPROVAL LETTER BY SUPERVISOR

The Programme Administrator: MBLREP / MBL 5913/ MBA 5929
Graduate School of Business Leadership
P O Box 392
UNISA
0003

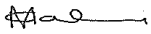
CONSENT TO SUBMIT RESEARCH REPORT

Consent is hereby given to:

Student name **ABEDNIGO MKHETHENI NGCOBO**

Student number ____**79138055**_____ to submit his/her research report in its final form.

Supervisor PROF C MAFINI Date: 15 October 2019

Supervisor signature 

The student acknowledges that sufficient feedback was provided by the study leader and that s/he took the responsibility to attend to the feedback in a way that satisfies the requirements for a research dissertation on the MBL level.

Student signature Date:21 NOVEMBER 2018

Students must obtain consent from their supervisors before submission of a final report.
Research reports should be submitted on the EDS as required.
Two (2) ring bound copies must be submitted before or on 30 November 2019 to:

Mr John Mouton (MBLREP and MBL5913) or
Me Marietjie Holzhauzen (MBA 5929)
Unisa SBL
ROOM 02-18, MIDRAND, 1685
tmoutoj@unisa.ac.za
011 652 0206

APPENDIX 4: DECLARATION BY LANGUAGE EDITOR

8 Belle Ombre Road

Tamboerskloof

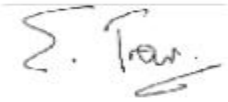
Cape Town

8001.

9 October 2019.

LANGUAGE EDITING

This is to certify that I language-edited the Research Report "Green supply chain management and enterprise performance in the South African mining industry", by Abednigo Ngcobo for the Master's degree in Business Leadership, presented to the Graduate School of Business Leadership at the University of South Africa (UNISA).



Elizabeth Trew
Trew.eliz@gmail.com
021 424 6135
073 235 1147

APPENDIX 5: DESCRIPTIVE STATISTICS

```
GET DATA
  /TYPE=XLSX
  /FILE='C:\Users\20090419.VUTAD\Documents\Supervision\UNISA
STUDENTS\Abednigo Ngcobo\Statistics\Abednigo Data Set.xlsx'
  /SHEET=name 'Sheet1'
  /CELLRANGE=FULL
  /READNAMES=ON
  /DATATYPEMIN PERCENTAGE=95.0
  /HIDDEN IGNORE=YES.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
COMPUTE GREENSCM=MEAN(GSCM1,GSCM2,GSCM3,GSCM4,GSCM5,GSCM6,GSCM7).
EXECUTE.
COMPUTE EJS=MEAN(SAT1,SAT2,SAT3,SAT4,SAT5).
EXECUTE.
COMPUTE OPEFF=MEAN(OE1,OE2,OE3,OE4,OE5).
EXECUTE.
COMPUTE REFF=MEAN(RE1,RE2,RE3,RE4,RE5,RE6).
EXECUTE.
COMPUTE ENTPERF=MEAN(EP1,EP2,EP3,EP4,EP5).
EXECUTE.
DESCRIPTIVES VARIABLES=GSCM1
  /STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
```

DESCRIPTIVE STATISTICS

Notes

Output Created		14-AUG-2019 10:47:18
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=GSCM1 /STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.05

```
[DataSet1]


DESCRIPTIVES VARIABLES=GREENSCM
  /STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
```

Descriptives

Notes

Output Created		14-AUG-2019 10:48:13
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=GREENSCM /STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.02

Descriptive Statistics

	N	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
GREENSCM	68	3.6723	.82271	.677	-1.157	.291
Valid N (listwise)	68					

Descriptive Statistics

	Kurtosis	
	Statistic	Std. Error
GREENSCM	1.033	.574
Valid N (listwise)		

```
DESCRIPTIVES VARIABLES=EJS
/STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
```

Descriptives

Notes

Output Created		14-AUG-2019 10:48:39
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=EJS /STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Descriptive Statistics

	N	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
EJS	68	3.5941	.74351	.553	-.510	.291
Valid N (listwise)	68					

Descriptive Statistics

	Kurtosis	
	Statistic	Std. Error
EJS	.476	.574
Valid N (listwise)		

```
DESCRIPTIVES VARIABLES=OPEFF
/STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
```

Descriptives

Notes

Output Created		14-AUG-2019 10:48:53
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=OPEFF /STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Descriptive Statistics

	N	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
OPEFF	68	3.9176	.54880	.301	-.366	.291
Valid N (listwise)	68					

Descriptive Statistics

	Kurtosis	
	Statistic	Std. Error
OPEFF	-.746	.574
Valid N (listwise)		

```
DESCRIPTIVES VARIABLES=REFF
/STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
```

Descriptives

Notes

Output Created		14-AUG-2019 10:49:06
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=REFF /STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02

Descriptive Statistics

	N	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
REFF	68	3.8995	.72284	.523	-.581	.291
Valid N (listwise)	68					

Descriptive Statistics

	Kurtosis	
	Statistic	Std. Error
REFF	-.153	.574
Valid N (listwise)		

```
DESCRIPTIVES VARIABLES=ENTPERF
/STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
```

Descriptives

Notes

Output Created		14-AUG-2019 10:49:18
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=ENTPERF /STATISTICS=MEAN STDDEV VARIANCE KURTOSIS SKEWNESS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Descriptive Statistics

	N	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
ENTPERF	68	4.0647	.69835	.488	-.791	.291
Valid N (listwise)	68					

Descriptive Statistics

	Kurtosis	
	Statistic	Std. Error
ENTPERF	-.014	.574
Valid N (listwise)		

APPENDIX 6: CORRELATIONS STATISTICS

```
CORRELATIONS
  /VARIABLES=GREENSCM EJS OPEFF REFF ENTPERF
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

CORRELATIONS

Notes

Output Created		14-AUG-2019 10:52:29
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=GREENSCM EJS OPEFF REFF ENTPERF /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.05

Correlations

		GREENSCM	EJS	OPEFF	REFF	ENTPERF
GREENSCM	Pearson Correlation	1	.307*	.398**	.428**	.576**
	Sig. (2-tailed)		.011	.001	.000	.000
	N	68	68	68	68	68
EJS	Pearson Correlation	.307*	1	.498**	.495**	.485**
	Sig. (2-tailed)	.011		.000	.000	.000
	N	68	68	68	68	68
OPEFF	Pearson Correlation	.398**	.498**	1	.506**	.576**
	Sig. (2-tailed)	.001	.000		.000	.000
	N	68	68	68	68	68
REFF	Pearson Correlation	.428**	.495**	.506**	1	.795**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	68	68	68	68	68
ENTPERF	Pearson Correlation	.576**	.485**	.576**	.795**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	68	68	68	68	68

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX 7: REGRESSION STATISTICS

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT EJS
  /METHOD=ENTER GREENSCM.
```

REGRESSION MODEL 1

Notes

Output Created		14-AUG-2019 11:13:07
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT EJS /METHOD=ENTER GREENSCM.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.03
	Memory Required	1980 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	GREENSCM[b]	.	Enter

a. Dependent Variable: EJS
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	Change Statistics F Change
1	.307[a]	.094	.081	.71293	.094	6.869

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	1	66	.011

a. Predictors: (Constant), GREENSCM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.491	1	3.491	6.869	.011[b]
	Residual	33.546	66	.508		
	Total	37.038	67			

a. Dependent Variable: EJS
b. Predictors: (Constant), GREENSCM

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.575	.398		6.466	.000
	GREENSCM	.277	.106	.307	2.621	.011

Coefficients[a]

Model	95.0% Confidence Interval for B	Collinearity Statistics

		Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.780	3.370		
	GREENSCM	.066	.489	1.000	1.000

a. Dependent Variable: EJS

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions GREENSCM
1	1	1.976	1.000	.01	.01
	2	.024	9.103	.99	.99

a. Dependent Variable: EJS

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT OPEFF
  /METHOD=ENTER GREENSCM.
```

REGRESSION MODEL 2

Notes

Output Created		14-AUG-2019 11:15:37
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT OPEFF /METHOD=ENTER GREENSCM.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.13
	Memory Required	1980 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	GREENSCM[b]	.	Enter

a. Dependent Variable: OPEFF
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.398[a]	.159	.146	.50717	.159	12.449

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	1	66	.001

a. Predictors: (Constant), GREENSCM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.202	1	3.202	12.449	.001[b]
	Residual	16.977	66	.257		
	Total	20.179	67			

a. Dependent Variable: OPEFF
b. Predictors: (Constant), GREENSCM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.942	.283		10.383	.000
	GREENSCM	.266	.075	.398	3.528	.001

Coefficients[a]

Model		95.0% Confidence Interval for B		Collinearity Statistics	
		Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	2.376	3.508		
	GREENSCM	.115	.416	1.000	1.000

a. Dependent Variable: OPEFF

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	GREENSCM
1	1	1.976	1.000	.01	.01
	2	.024	9.103	.99	.99

a. Dependent Variable: OPEFF

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT REFF
  /METHOD=ENTER GREENSCM.
```

REGRESSION MODEL 3

Notes

Output Created		14-AUG-2019 11:17:10
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT REFF /METHOD=ENTER GREENSCM.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.10
	Memory Required	1980 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	GREENSM[b]	.	Enter

a. Dependent Variable: REFF
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.428[a]	.183	.171	.65828	.183	14.786

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	1	66	.000

a. Predictors: (Constant), GREENSCM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.407	1	6.407	14.786	.000[b]
	Residual	28.600	66	.433		
	Total	35.008	67			

a. Dependent Variable: REFF
b. Predictors: (Constant), GREENSCM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.519	.368		6.850	.000
	GREENSCM	.376	.098	.428	3.845	.000

Coefficients[a]

Model		95.0% Confidence Interval for B		Collinearity Statistics	
		Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.785	3.253		
	GREENSCM	.181	.571	1.000	1.000

a. Dependent Variable: REFF

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions GREENSCM
1	1	1.976	1.000	.01	.01
	2	.024	9.103	.99	.99

a. Dependent Variable: REFF

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ENTPERF
  /METHOD=ENTER EJS OPEFF REFF.
```

REGRESSION MODEL 4

Notes

Output Created		14-AUG-2019 11:20:59
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ENTPERF /METHOD=ENTER EJS OPEFF REFF.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.10
	Memory Required	2532 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	REFF, EJS, OPEFF[b]	.	Enter

a. Dependent Variable: ENTPERF
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.821[a]	.674	.659	.40791	.674	44.126

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	3	64	.000

a. Predictors: (Constant), REFF, EJS, OPEFF

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.026	3	7.342	44.126	.000[b]
	Residual	10.649	64	.166		
	Total	32.675	67			

a. Dependent Variable: ENTPERF
b. Predictors: (Constant), REFF, EJS, OPEFF

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.324	.376		.861	.392
	EJS	.047	.082	.050	.570	.571
	OPEFF	.278	.111	.218	2.491	.015
	REFF	.637	.085	.660	7.543	.000

Coefficients[a]

Model		95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	-.427	1.075		
	EJS	-.117	.210	.673	1.487
	OPEFF	.055	.500	.663	1.508
	REFF	.469	.806	.666	1.502

a. Dependent Variable: ENTPERF

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	EJS	OPEFF	REFF
1	1	3.953	1.000	.00	.00	.00	.00
	2	.022	13.507	.22	.84	.03	.00
	3	.017	15.392	.18	.11	.03	.95
	4	.009	21.188	.61	.05	.94	.04

a. Dependent Variable: ENTPERF

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ENTPERF
  /METHOD=ENTER GREENSCM.
```

REGRESSION MODEL 5

Notes

Output Created		14-AUG-2019 11:19:11
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	68
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ENTPERF /METHOD=ENTER GREENSCM.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.10
	Memory Required	1980 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	GREENSCM[b]	.	Enter

a. Dependent Variable: ENTPERF
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	Change Statistics F Change
1	.576[a]	.332	.322	.57502	.332	32.823

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	1	66	.000

a. Predictors: (Constant), GREENSCM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.853	1	10.853	32.823	.000[b]
	Residual	21.822	66	.331		
	Total	32.675	67			

a. Dependent Variable: ENTPERF
b. Predictors: (Constant), GREENSCM

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.268	.321		7.061	.000
	GREENSCM	.489	.085	.576	5.729	.000

Coefficients[a]

Model		95.0% Confidence Interval for B		Collinearity Statistics	
		Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.627	2.910		
	GREENSCM	.319	.660	1.000	1.000

a. Dependent Variable: ENTPERF

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	GREENSCM
1	1	1.976	1.000	.01	.01
	2	.024	9.103	.99	.99

a. Dependent Variable: ENTPERF