

# Investigating strategic intelligence as a management tool in the mining industry

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Thesis submitted for the degree *Philosophiae Doctor in Business Administration* at the Potchefstroom Campus of the North-West University

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May 2016



## **REMARKS**

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## ABSTRACT

**Title:** Investigating strategic intelligence as a management tool in the mining industry.

The general aim of the study was to investigate the use of strategic intelligence as a strategic management tool in the mining industry. This type of study has never been conducted within this particular environment and as such a valuable contribution could be made to more effective strategic management and business performance within this context.

The mining industry was selected for this thesis. The supply of metal and mineral products has underpinned human endeavor over many years and will continue to play a huge role in meeting the needs of many societies. The industry continues to make a significant contribution to the economies of many countries through job creation, contribution to the GDP and socio-economic development.

The industry has gone through some considerable challenges with different macro-environmental forces and factors creating a turbulent competitive environment. Amid the complex nature of this environment with much uncertainty, a common denominator for these organisations is the struggle to create a sustainable business performance and competitive advantage. In order for these organisations to survive, it is imperative that they have increased strategic flexibility, speed and innovation to manage environmental discontinuities and unpredictable changes for the creation and maintenance of any competitive advantage.

Many of the risks and challenges that organisations in the mining industry face can be pre-empted by introducing strategic intelligence as early as possible in the strategy management processes. Strategic intelligence is about having the correct information in the hands of the right people at the right time to enable them to make informed strategic business decisions about the future of the organisation. Strategic intelligence is therefore all the information an organisation needs of its micro- and macro-environments to enable it to have a holistic intellectual capacity of all its present processes, anticipate and manage change for the future, develop competitive strategies and improve profitability. In this research, strategic intelligence is proposed to be the convergence and synergy of knowledge management, business intelligence, marketing intelligence and competitive intelligence.

A self-administered structured questionnaire was used to measure the extent of the use of strategic management processes, perceived business performance and different intelligence constructs; namely business intelligence, competitive intelligence, marketing intelligence, strategic intelligence and knowledge management in the global mining industry. A response rate of 64% was achieved from a target of 300 mines which were randomly selected from a population of 850 mining organisations.

The data showed statistically and practically significant positive relationships between strategic management dimensions, different intelligence constructs and perceived business performance. The results of the regression analysis showed that strategic intelligence can be situated as a function of business intelligence, marketing intelligence, competitive intelligence and knowledge management as proposed to help the mining organisations to develop competitive strategies, adapt to changing circumstances and have sustainable business performance.

**Key terms:** Strategy, strategic management, strategic intelligence, business intelligence, competitive intelligence, marketing intelligence, knowledge management, mining industry.

## ACKNOWLEDGEMENTS

I would like to express my sincere thanks and appreciation to the following people, without whom this thesis would not have been possible:

- My first gratitude goes to the Father, the Son (my Lord and Saviour Jesus Christ) and the Holy Spirit, for carrying me throughout this enduring and yet so enriching project.
- Prof Ronnie Lotriet and Prof Pieter Buys, my supervisors, for their professional guidance and contributions in completing the thesis.
- Dr Erika Fourie and Mr Shawn Liebenberg, for their assistance regarding the statistical processing.
- My wife, Dorcas Boikanyo, for your love, support and patience. Also to my precious family Odirile, Kutlwano, Reabetswe, Thato and Thuto for their love and hugs.
- My mother (Noiki Boikanyo) for reminding me of the importance of always being humble and my father (Raeson Boikanyo) for instilling in me the value of a good education. Also to my brothers and sister for their love and influence in my life.
- Antoinette Bisschoff for her excellent work in language editing.
- A special word of thanks to all the respondents for taking their precious time to complete the questionnaires.
- To the NWU School of Business & Governance and the various lecturers that have influenced my life in ways I still need to explore.

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### **List of Abbreviations**

BCG	: Boston Consulting Group
BI	: Business Intelligence
CI	: Competitive Intelligence
GDP	: Gross Domestic Product

EFE : External Factor Evaluation  
ETL : Extraction-Transformation-Load  
IE : Internal-External  
IFE : Internal Factor Evaluation  
KM : Knowledge Management  
KSF : Key Success Factor  
PESTLE : Political, Economic, Social, Technology, Legal, Environment  
PLC : Product Life Cycle  
SI : Strategic Intelligence  
SPACE : Strategic Position and Action Evaluation  
SWOT : Strengths, Weaknesses, Opportunities, Threats  
TOWS : Threats, Weaknesses, Opportunities, Strengths

# CHAPTER 1: SCOPE AND NATURE OF THE STUDY

## 1.1 INTRODUCTION

This study focuses on investigating the utilisation of Strategic Intelligence (SI) as a strategic management tool in the mining industry.

The concept of strategy in business has been around for many decades and there has been a vast number of research studies and writings on the subject. A strategy is made up of an integrated set of choices about where and how to compete and it serves as a response to external opportunities and threats as well as internal strengths and weaknesses (Wells, 2012:3). In order for any organisation to deliver superior sustainable business performance, it must develop a good competitive strategy. However the world and business environments are always changing, so organisations looking for long-term success must continuously adapt their strategies and innovate to stay competitive (Wells, 2012:4). As the pace accelerates, it becomes more challenging for senior managers and decision-makers to sufficiently monitor, interpret, and respond to environmental changes. Thus when markets keep moving and competitive conditions intensify as a result of globalization, increasing customer sophistication and technology development; the need for timely and strategically relevant information becomes critical (Djekic, 2014). Organisations need to steer decisively in the winning direction and this requires strategic intelligence, a logical and continuous process of collecting, analysing and communicating intelligence of strategic value in an actionable form to enable long-term decision-making (Djekic, 2014). There is a need for organisations to build a quantitative metric for measuring the level of strategic intelligence like a Strategic Intelligence Quotient (SIQ). According to Wells (2012:4), organisations with a low score for SIQ are considered to be the strategically blind; those with a moderate SIQ score are deemed to be able to keep up with the pack, but those with a high score are considered to be the smartest and do not only simply react to change; but drive it and shape the competitive environment to their advantage.

Definitions of strategy and strategic intelligence will be provided to serve as a framework for studying the relationship between strategic intelligence and business performance, strategic planning, strategy formulation and implementation. The concepts and structures for strategic intelligence systems and how they are designed to help organisations make more profitable strategic decisions will be discussed in detail.

This chapter will provide the background and problem statement of this study. The primary and secondary objectives of the study are subsequently presented, together with the research methodology that will be used, in order to achieve these objectives. The contribution of the study is also highlighted. The chapter will conclude with an overview of the structure of the study by briefly describing the content of each chapter.

A background to the research study is outlined below.

## **1.2 BACKGROUND**

Mining provides the building blocks for human development. The supply of mineral and metal products has underpinned human endeavour through many decades and will continue to play its role in meeting the needs of many societies (International Council of Mining & Minerals, 2012).

The International Council of Mining & Minerals (2012) accentuates that the search for minerals and metals has been international since antiquity. Mining became truly global before most other sectors of industry. The global mining industry continues to be characterized by the fact that its organisations come from a number of countries, both developing and developed. This is perhaps, not astonishing given the fact that economically viable metal and mineral ore deposits are distributed worldwide. Tracing the centre of gravity of global mining industry over the past two centuries clearly demonstrates its role as a good foundation of society throughout history.

Commercial mining activities generate a series of economic impulses that reverberate across society according to the report issued by the International Council of Mining & Minerals (2012). The payment of taxes and royalties to governments represents one of the most significant contributions by the mining industry in many countries. The GDP contribution of mining is defined as the total net incomes produced by the mining sector. The incomes directly produced by mining organisations comprise incomes from labour in a form of salaries and wages, financing costs and interest (payable to lenders) as well as profits (operational surplus before tax and depreciation charges). In addition, mining generates indirect contributions through the value generated by providers of mining industry inputs (that is procurement of goods and services). A good example of this industry's contribution is in South Africa, where mining organisations are key players in the global industry (Chamber of Mines of South Africa, 2013). In South Africa, the sector accounts for roughly one-third of the market capitalisation of the Johannesburg Stock Exchange (JSE), and continues to act as a magnet for foreign investment in the country. Chamber of Mines of South Africa (2013) reported that in the

past decade, the South African mining sector has contributed just over R2.1 trillion to the country's GDP and R2.16 trillion to the country's export earnings, in real money terms. In 2012, the sector accounted for 8.3% of GDP directly, on a nominal basis. Nominal mining GDP of R262.7 billion was recorded in 2012 (Chamber of Mines, 2013). The importance of the industry to the global economy necessitates that its role-players within their respective mandates, enhance the mining industry's competitiveness.

In today's changing and dynamic environment, mining organisations continuously need to assess, develop and implement strategies to ensure their competitive advantage and position themselves for growth by harnessing future opportunities whilst making sure that costs are kept under control (KPMG, 2014). Mining organisations need to consider and test their strategies relating to capital allocation, portfolio investment, supply chain, tax, financing, people and stakeholder management (KPMG, 2014).

Djekic (2014) stated that the world is now driven and affected by hyper-competition where the demand is exceeded by the supply of businesses. A better understanding of the organisation's competition and forces that affect its success is required in order to survive in such an aggressively competitive environment. Organisations should know how to remain competitive and how to anticipate and respond to changes inside and outside of their industries. Organisations should have a process in place for turning data into actionable intelligence, from which strategic and tactical decisions can derive. Gathering information and turning this raw data into intelligence is a fundamental feature of business (Laudon & Laudon, 2012).

Good decision-making requires that managers are cognisant of their surrounding environment and its effects on their organisations' operations. Vecchiato and Roveda (2010) consider that strategy formulation is strictly intertwined with the analysis of the likely evolution of the business environment. They accentuate that it is important to quickly identify opportunities and threats brought about by developing trends in order to deal with them appropriately. However, what makes this challenging, is that business environments are characterized by continuous change. These changes happen to a large extent in areas which an individual organisation has little control over, such as the governmental regulation, competitor moves, macro-economy and demographic trends. Although an organisation hardly has power to control these variables, they affect how business should be done in the future. Therefore it is of utmost importance to monitor these variables and take them into account in decision-making (Vecchiato & Roveda, 2010).

Strategy is management's action plan for competing successfully and operating profitably, based on an integrated array of considered choices (Thompson *et al.*, 2012). The strategy provides a framework for managerial decisions, and as such reflects on organisations' awareness of where, how, and when it ought to compete; against whom it ought to compete; and for what purposes it ought to compete (Carpenter & Sanders, 2009). The main thrust of a strategy is therefore undertaking moves to build and strengthen the long-term competitive position and financial performance by competing differently from competitors and gaining a sustainable competitive advantage (Thompson *et al.*, 2012).

Strategy includes processes of formulation and implementation which can be coordinated by strategic planning. Strategic planning is an organisational management activity which is utilised to establish priorities, focus all the resources and energy, make operations stronger, ascertain that employees and other stakeholders are working toward common goals, establish agreement around envisioned outcomes and assess and modify the organisation's direction in response to a changing environment. Strategic planning is a controlled effort that yields fundamental decisions and actions that shape and guide what an organisation is, what it does and why it does it, who it serves, with a focus on the future. Effective strategic planning articulates where an organisation is going and the actions needed to make progress as well as how it will know if it is successful (Rigby, 2013).

While dynamic in nature, strategic planning or management process entails a full set of commitments, decisions and actions required for an organisation to achieve competitive advantage and sustainable performance. Strategic inputs are derived from the assessment of the internal and external environment and are essential for effective strategy formulation and implementation. The strategic management process is used to match the conditions of an ever changing market and competitive structure with the organisations continuously evolving capabilities, resources and core competencies (Robbins & Coulter, 2009).

Strategic decisions have an effect on the organisation's long-term direction; influence competitive dynamics and involve main changes to the organisation's activities. They are commonly made by senior executives, managing directors including the senior management team and they eventually become the over-arching blue-print for consequent decisions (Fleisher & Bensoussan, 2007).

Insightful diagnosis of an organisation's external and internal environments is a prerequisite to prosper in crafting and formulating an excellent strategy (Thompson *et al.*, 2012). Conditions within the business environment create opportunities for and threats to organisations which could have a significant impact on strategic options and the decisions made in light of them. The business

environment consists of all the factors outside and inside the organisation which require understanding to form strategic intent, to develop its strategic mission, and enable it to take actions that lead to strategic competitiveness and above-average performance (Robbins & Coulter, 2009). Barbosa *et al.* (2010) argue that strategic decision-makers can challenge conventional wisdom and get ready for uncertainty better through assessing the complex and not-so-obvious ways global trends develop and interact in their industries. Being able to forecast the future is one of the most important tasks facing a strategist and it is also one of the most challenging. One way to tackle the challenge is to thoroughly scrutinize the societal values and lifestyles, population demographics, political, legal, technological, environmental, macroeconomic, and other long-term factors that constantly shape the global business environment. Each of these components has the potential to affect the organisation's immediate industry and competitive environment (Thompson *et al.*, 2012). The information gathered from the scanning of the environment has to be analysed, refined, interpreted and infused with developed implications in order to create intelligence (Fleisher & Bensoussan, 2007). Analysis is the utilization and application of scientific and non-scientific methods and processes to interpret data or information. Thus analysis produces insightful intelligence findings and actionable recommendations for decision makers.

The different intelligence concepts are used somewhat confusingly in business intelligence, market intelligence, competitive intelligence and strategic intelligence literature. Liebowitz (2006) positioned strategic intelligence as a synergy among business intelligence, competitive intelligence and knowledge management. The relationship among these different types of intelligentsia also forms part of the research in this study.

- Wixom and Watson (2010) define business intelligence as a general category of technologies, applications and processes for gathering, storing, accessing, and analyzing data to assist its users in making better decisions.
- Competitive intelligence is defined as the process by which organisations collect actionable information about their rivals and the competitive environment and use it in their planning processes and decision-making in order to enhance their performance (Wright *et al.*, 2009).
- Marketing Intelligence is defined as the information related to an organisation's markets, analyzed in detail for the main purpose of accurate and confident decision-making in determining market opportunity, market penetration strategy and market development metrics (Kotler *et al.*, 2009:64). Competitive and market intelligence are thus involved with the development of a methodical program for capturing, studying and managing external

information and knowledge to improve organisational decision-making capabilities (Jones, 2009:15).

- Bali *et al.* (2009) define knowledge as a fluid blend of framed experience, contextual information, principles and insight from experts that provides a framework for assessing and incorporating new experiences and information. Knowledge can provide added value if it results in actions and decisions (Greiner *et al.*, 2007:5). Knowledge management is defined as the broad process of locating, organising, transferring and utilizing the information and expertise within an organisation (Filemon & Uriarte, 2008). Knowledge management intends firstly to facilitate an organisation in acting intelligently, in order to ensure its viability and success and secondly to assist the organisation in realizing the best value of its knowledge assets. The knowledge management process is defined as the extent to which the organisation creates, shares and uses knowledge resources across functional boundaries (Chang & Chuang, 2011).

Strategic intelligence (SI) is about having the accurate and correct information in the hands of the right people at the right time so that those people are able to make informed business decisions about the status and future of the business (Xu & Kaye, 2009). SI can also be identified as what an organisation needs to know of its internal and external environment to allow it to gain insight into its present processes, anticipate and manage change for the future, craft and formulate suitable strategies that will generate business value for customers and lead to an increase in profitability in the existing and new markets (Marchand & Hykes 2007). SI can be summarised as strategically significant information provided to managers that is scanned, analysed, digested and is meaningful that could affect managers' views, obligations and actions (Xu & Kaye, 2009). According to Liebowitz (2006), strategic intelligence consists of the aggregation of the various types of intelligentsia, which creates a synergy between business intelligence, competitive intelligence and knowledge management to provide value-added information and knowledge towards making organisational strategic decisions. Strategic intelligence signifies the formation and transformation of information or knowledge that can be used in high-level strategic decision-making. The emphasis is on how best to position the organisation to deal with future challenges and opportunities to maximise its success (Marchand & Hykes, 2007). According to Ahlgren (2009:16), managing with strategic intelligence leads to a significant improvement in control, clarity, communications and decisions, but its effects go well beyond the daily and routine activities of corrective actions and tactical enhancements to operations, processes, and products. At a mission-critical level, there is an

improvement in profitability, costs are brought down, and an organisation's reputation is viewed as a responsive, responsible and reliable business partner (Ahlgren, 2009:16).

Wells (2012:4) alluded to different levels of strategic intelligence. The least intelligent do not realize they need to change or cannot change even if they do. Smart organisations respond and maintain or keep pace with external changes, but the smartest change even quicker, shaping the environment to their advantage. When the environment is not changing to a large extent, smart organisations will gain ground on their less intelligent competitors. When times are volatile, they are more likely to be able to weather the storm, adapt and survive (Wells, 2012:4).

The purpose of this study is to investigate the use of Strategic Intelligence as an input to the strategic management process in the mining industry and identify the perceived value strategic intelligence could add in the strategic planning and decision-making process as well as business performance.

The problem statement is discussed in the next section.

### **1.3 PROBLEM STATEMENT**

The mining industry has experienced substantial upheaval in recent times; in fact, during the past decade it has seen some of the greatest changes in its history (Deloitte, 2013.3). Different macro-environmental influences have formed a dynamic and turbulent competitive environment for the industry as a whole characterized by changing technologies and markets that represent both problems and opportunities (Thornton, 2013). Factors affecting the global mining industry are moving to a new level of extremity, compelling the organisations to consider more extensive scenarios than ever before (Deloitte, 2013.3). Challenges that confront the mining organisations include governments wanting to increase their stake through new requirements such as royalties, taxes, mandated beneficiation, export levies and limits on foreign ownership. In addition to this are metal price and currency volatilities, cost inflation and infrastructure issues, which are becoming more and more challenging as organisations expand into less developed countries (Benjamin, 2013). Thus commodity price, regulatory influences, global opportunities, global competition, mergers, takeovers, strategic alliances, restructuring and even a departure from the business scene are some of the serious issues that mining organisations currently have to face on an ever-increasing scale (Brummer *et al.*, 2007:20). Mining organisations also face significant challenges in performance management, budgeting, forecasting and reporting, owing to the complex and volatile nature of

many of the elements within these functions (Bogiages, 2013). The industry presents numerous challenges to executives and mine management by the nature of the operation and organisational processes used in running it (Barr & Cook, 2008:31).

Amid this complex environment, the struggle to create a sustainable competitive advantage has become a common denominator for many mining organisations (Mining Weekly, 2013). The complex nature of this environment needs better strategic flexibility, speed and innovation to enable the management of the environmental discontinuities and unpredictable changes for the creation and maintenance of any competitive advantage (Thornton, 2013). In the mining industry, it is challenging to predict and completely understand what is happening underground and there is the concern about above-ground operations, which include processes, people, markets and economies (Mining Weekly, 2013). Huge amounts of data are generated every second at a mine site. Without a way to organise this data, and present it in an easily accessible, timely and accurate manner, decisions regarding the daily operations and long-term viability of a mine site becomes very difficult (Mining Weekly, 2013). Lack of information, and knowledge of decisions taken by all role-players within the mining organisations' external, and often internal business environments, has led to the weakening and even failure of some of these mines. Thus SI is of the essence.

Some mining organisations currently look at historical trends and attempt to forecast based on what was occurring underground and to better direct above-ground operations (Mining Weekly, 2013). The organisations are increasingly accumulating information and data in a fragmented manner. Different departments collect information in their own silos without proper integration and dissemination of the gathered intelligence. The isolated pools of data are heavily influenced by the functional view of the company rather than a broader, general-management view of the enterprise. This approach does not lead to sufficient insight into the internal and external environment to make sound strategic decisions. Introducing a solution such as strategic intelligence can assist in understanding and applying this data in such a way that it will increase productivity and help the mining companies save on costs (Buthelezi, 2013). Strategic intelligence can help in providing insight into understanding what is influencing the industry. It can handle huge amounts of information to help identify and develop new opportunities in the mining organisations. Making use of new opportunities and implementing effective strategies can provide an advantage as well as stability.

Strategic intelligence, through the leveraging of internal and external intelligence from the constructs of business intelligence, competitive intelligence and knowledge management, can be

created to assist the organisation in maximising its strategic mission and vision (Marchand & Hykes, 2007). The main risk for managers is the presence of a number of organisational blind spots which are areas in which management fails to notice or comprehend important information and thus lead their organisation into one of any of a number of traps (Büchel, 2010:2). These traps include misjudging industry boundaries; failing to detect developing competition; falling out of touch with customers, over-emphasizing competitors' visible competence; and allowing corporate taboos or lack of foresight to limit their frame of reference. Any one of these errors will prevent the organisations from taking advantage of the available opportunities and instead fall into the rigidity trap. Continuously engaging in strategic intelligence will help leaders to overcome these blind spots (Büchel, 2010:2). The design of a Strategic Intelligence System (SIS) should include an understanding of the purpose for which it is intended (Fernando, 2014). The preferred result of an SIS is to provide essential information in a timely manner to support organisational planning and decision-making efforts, enabling the organisation to improve its competitiveness and business performance. SI needs to meet two major objectives; the first is to enable the organisation to improve and innovate and the second is to direct efforts for sustainable profitable growth (Fernando, 2014). Some method is required to avoid collecting huge quantities of worthless data, while concurrently preventing a focus so narrow that critical information is missed. An understanding of the purposes of a SIS is helpful in achieving this objective (Marchand & Hykes, 2007). In order to improve a company's strategic intelligence process, management must take a critical look at how effectively they manage information. Effective information management needs specific technology, information-processing practices, employee behaviours and values (Xu & Kaye, 2009).

This thesis proposes that Strategic Intelligence is formed by the convergence and synergy of Business Intelligence, Competitive Intelligence, Market Intelligence and Knowledge Management. SI will therefore act as a sonar, searching for underlying opportunities and threats that cannot easily be observed (monitoring critical strategic themes) and a radar helping the organisation on its road to the future, supplying intelligence about turning points (promoting a change in direction, forecasting what is ahead, developing scenarios) for the organisation. Thus it will allow organisations to respond to future trends or opportunities which will lead to the sustainability of those organisations. The organisations will be able to integrate all of their information and intellectual capital into a single database or system which will meet the intelligence requirements of management for strategic planning and decision-making.

Although the practice of involving intelligence is not particularly difficult, strategic intelligence is a relatively new phenomenon for the execution level. The latter is not fully understood, nor with regard to the commitment and hard work it entails, nor how to make best use of it (Strain, 2013:113). So far the emphasis of strategic intelligence literature has been on the process of gathering, analysing and disseminating data and there has been little research done on the extent of strategic intelligence activities and how it affects strategic planning plus decision-making and improve competitive advantage and business performance. There is still a void in academia and in practice about the effect and the use of strategic intelligence as a strategic management tool essential for decision-making and innovation.

The research objectives of the study are outlined in the next section.

## **1.4 RESEARCH QUESTIONS AND OBJECTIVES**

### **1.4.1 Primary Objective**

The primary objective of this research study is to investigate the extent to which Strategic Intelligence is utilised within the mining industry and whether it is used in strategic planning and decision-making to identify opportunities or threats within the global environment to remain competitive.

### **1.4.2 Research Questions**

The primary research questions centre on investigating strategic intelligence as a management tool in the mining industry.

The following secondary research questions have been generated from the above objective:

- What is the degree to which the Strategic Management Process is used within the mining industry?
- What is the extent to which Business Intelligence, Competitive Intelligence, and Marketing Intelligence are used within the mining industry?
- What is the degree to which Knowledge Management is used within the mining industry?
- What is the degree to which Strategic Intelligence is used within the mining industry?

These questions are considered in more detail in the four articles forming the primary chapters of the thesis.

### **1.4.3 Secondary Objectives**

Based on the above research questions, the objectives will be reached by:

- An evaluation of the use of strategic management process and determine if it is related to the perceived business performance within the mining industry. Determining which analytical tools and techniques are commonly used in the strategic management process.
- Assessment of the use of business intelligence, competitive intelligence and marketing intelligence and determine if these different types of intelligentsia are related to the perceived business performance.
- Assessment of the use of knowledge management and determine if it is related to the perceived business performance.
- Determining how Strategic Intelligence is used and contributes to the perceived business performance within the mining industry.
- Determining if the synergy among BI, CI, MI and KM can be used to form SI.

The scope of the study is briefly outlined in the next section.

## **1.5 SCOPE OF THE STUDY**

The constructs of strategic intelligence within the context strategic management are broad and multifaceted. Similarly, the mining industry is a very broad notion. In an effort to promote the relevance, the study will primarily focus on the use of strategic intelligence and its contribution to strategic planning, decision-making and business performance across organisations in the mining industry in South Africa, Africa and globally. The study involves principles of both strategy management and information management.

The research method used for the study is briefly discussed in the next section.

## **1.6 RESEARCH METHODOLOGY**

This section outlines the methodology that will be used to conduct this research which consists of two phases; namely a literature study and an empirical study. A review of the research design to be used will also be outlined. Issues of data collection and analysis in relation to this study will be provided.

### **1.6.1 Literature Study**

A proper comprehensive literature study was conducted. The aim of the study was to lay the theoretical foundation and better understanding of the different constructs that form a critical part of this research. The literature study was conducted by means of a study of relevant scientific journals, articles, books and research documents.

The following databases were considered:

- SACat: National catalogue of books and journals in South Africa
- Nexus: Databases compiled by the NRF of current and completed research in South Africa
- SAePublications: South African journals and SAMEDIA: Newspaper articles
- EbscoHost: International journals on Academic Search Premier, Business Source
- Premier, Communication and Mass Media Complete and EconLit
- Emerald: International journals
- ProQuest: International dissertations in full text
- Internet: Google Scholar

An overview of the mining industry forms part of the literature study because the industry is a critical part of this study and the research is carried out using participants in this industry. In addition and in line with the article format of this thesis, a theoretical study was conducted with the four focus areas which are presented mainly in the following chapter, but also integrated into the various articles.

- A first focus area will be on the constructs of strategy and strategic management. A theoretical base for strategic management and its components will be established. The tools and techniques used in the strategy analysis will also be reviewed.
- A second focus area will be to establish a theoretical base for the use of business intelligence, competitive intelligence and marketing intelligence. Clear-cut definitions of these different types of intelligence will be given.
- A third focus area will be to establish a theoretical base for the use of knowledge management and its benefits.
- The last focus area will be to establish a theoretical base for strategic intelligence and the benefits of using it.

The literature study was able to assist the researcher in the selection, structuring and execution of the empirical research activities and in identifying the issues and draft a questionnaire accordingly.

A brief description of how the empirical study was carried out is discussed below.

## **1.6.2 Empirical Study**

A brief overview of the research philosophy, research approach and design, questionnaire and its administration, sample, ethical aspects and statistical analysis is given in this section.

### **1.6.2.1 Research Philosophy**

Methodology focuses on the method used to gain knowledge about the world (Denzin & Lincoln, 2011). The research philosophy is dependent on the way one thinks about the development of knowledge. Two views in this regard are dominant in the literature, positivism and phenomenology (Saunders *et al.*, 2009). Positivism is an approach to social research that seeks to use the social science model of research in studies of social phenomena and descriptions of the social world. If an individual's research philosophy reflects the principles of positivism, then they will possibly adopt the philosophical stance of the natural scientist. They will favour working with a social reality that they can observe and the end-product of such research can be law-like generalizations which are the same as those generated by the physical and natural scientist (Bhattacharjee, 2012).

Phenomenology or interpretivism has come to give an umbrella term for a series of approaches that do not accept some of the basic premises of positivism. This includes that social reality is subjective, that it is not possible to gain objective knowledge about social phenomena and that people respond to the knowledge that they are being studied. Researchers who criticise positivism argue that if such complexity is reduced entirely to a series of law-like generalizations then the rich insights into this complex world will be lost. The terms which are usually used to differentiate these paradigms with regard to their associated techniques and methods are quantitative and qualitative respectively (Saunders *et al.*, 2009).

The quantitative or positivist approach concentrates on measuring phenomenon and is objective in nature. This involves collection and analysis of numerical data and applying statistical tests. The qualitative, phenomenological or interpretivist approach is deemed to be more subjective in nature and involves examining and reflecting on perceptions in order to gain an understanding of human and social activities.

Easterby-Smith *et al.* (2008) argued that each of these two philosophies has its own benefits and shortcomings. Positivism provides broad coverage of the series of situations quickly and economically and enables statistics to be applied on larger samples. However, it is not likely to give deep comprehension of the significance and processes people attach to actions. Positivism primarily concentrates on answering questions like “what are the causes of variable x”, and shows more commitment to quantitative methods. Despite that Phenomenology makes a contribution to the development and evolution of new theories by understanding people’s meanings, adopting a phenomenological philosophy is challenging to control and the process of data collection is in most cases time-consuming.

Saunders *et al.* (2009) highlighted that the research philosophy underpins the research strategy, time horizon and data collection methods. The research philosophy also determines whether the research ought to follow a deductive or inductive approach. Deduction is the approach through which rational conclusions result from logical generalization of known facts (Sekaran & Bougie, 2010); that is, according to Collis and Hussey (2009), where the researcher develops hypotheses and makes a research strategy in order to test these hypotheses. In addition, deduction, owes mainly to positivism. Induction, on the other hand which owes mainly to phenomenology, is the method through which the researcher looks at a particular phenomenon, and based on this observation,

reaches a conclusion (Sekaran & Bougie, 2010); that is according to Collis and Hussey (2009), where the researcher gathers data and a theory is developed based on the analysis of this data.

### **1.6.2.2 Research Approach**

Induction and deduction are two approaches utilised to find what is false or true in research and draw conclusions. Deduction is commonly undertaken using a structured quantitative research method. Quantitative research includes numerical analysis of data and enables the use of statistical techniques to answer research questions about differences and relationships between the measured variables (Ghauri & Gronhaug, 2010). On the other hand, induction is generally undertaken utilizing a qualitative research method that is less structured. Qualitative research includes gathering data, including words, narratives as well as observations and the interpretation of this data to answer research questions about the different views of phenomena rather than numbers (Saunders *et al.*, 2009).

Bryman and Bell (2007) argued that the selection of the research approach relies on the research aim and objectives. In the case of current research, quantitative data is required in order to measure the degree of the utilization of different types of intelligentsia and determine their effect on the performance of the organisations in the mining industry. Quantitative data is also necessary to test the selected hypotheses and to generalise from the sample to the overall population in the sector. Therefore the process of this research is primarily positivist or quantitative in that questionnaires are used for the individual research.

### **1.6.2.3 Research Design**

Research design is defined as the plan and structure of investigation so conceived as to get answers to research questions (Blumberg *et al.*, 2008:195). The design also gives the overall framework for the collection of the data. After the proper formulation of the problem, the design is developed as a format for the detailed steps in the study.

A survey design is used in this case. According to Saunders *et al.* (2009) a survey design tries to determine the incidence, distribution and inter-relationships among the psychological and sociological variables which focus on people, the essential and critical factors regarding people as well as their beliefs, opinions, attitudes, motivations and behaviour. Survey designs are also deemed to be accurate within sampling error. A survey design is also considered to be probably the best adapted to obtaining personal and social facts, beliefs, and attitudes.

Due to the descriptive nature of this research a questionnaire is utilised to collect the data that is needed for this study. The questionnaire technique was selected to allow the researcher an understanding of the attitudes, opinions, and organisational practices of the individuals and their organisations sampled, by having them respond to the same set of questions. This is expected to provide an efficient way of collecting responses from a large sample prior to analysis. Prior to utilising the questionnaire to collect data, it is important to pilot test the questionnaire. Saunders *et al.* (2009) explain that the purpose of a pilot test is to refine the questionnaire so that respondents will have no problems in recording the data.

#### 1.6.2.4 Questionnaire

For the purpose of this study, a self-administered structured questionnaire was developed, and then divided into different parts focusing on a single topic each. By structuring the questionnaire into different constructs, it was expected to simplify the completion and analysis of the results. In this context the questionnaire comprised mainly of four parts, some of which were further dissected into smaller sections, and include the following:

- **Cover Letter** to define the purpose of the questionnaire; give instructions for the completion of the questionnaire and provide contact information.
- **Part A** consisting of some biographical information of the respondent and some information questions regarding the respondent's mine.
- **Main Questionnaire which** focuses on the strategic management and intelligence constructs which are part of the research, and include a number of questions which were developed for each topic. This part contained the following sections:
  - ✓ Section 1: Strategic IQ of the mine
  - ✓ Section 2: Strategic Planning and Management Process
  - ✓ Section 3: Analytical Tools and Techniques
  - ✓ Section 4: Business Performance
  - ✓ Section 5: Intelligence Constructs (Business Intelligence, Competitive Intelligence, Market Intelligence, Knowledge Management, Strategic Intelligence)

The pilot was carried out with 10 respondents and allowed the researcher to check each completed questionnaire, to ensure that the respondents understand the questions and follow the instructions as

expected. Statistical Consulting Services of the North-West University was also requested to review the questionnaire and make recommendations before the questionnaire was used for the final data collection. Minor adjustments were made to the final questions as recommended. Thereafter it was distributed to the respondents included in the research sample.

#### **1.6.2.5 Administration of the Questionnaires**

A covering letter was compiled and attached to the questionnaire. The purpose of the letter was to encourage the respondents to understand the purpose of the study, to kindly ask for their assistance and to motivate them to complete the questionnaire. The covering letter also explained the auspices under which the study was conducted and the context of Strategic Management and Intelligence constructs being investigated. The covering letter also assured the respondent that the information will be kept confidential. The researcher took full responsibility for the administration of the questionnaires by e-mail or other means and also helped with any queries the respondents had.

#### **1.6.2.6 Sample**

According to Easterby-Smith *et al.* (2008), research in social sciences involves determining the research “population” and “sample”. Population is any group that shares similar characteristics or common traits and the sample is a subset of the population from which evidence is obtained. The population of interest in this research consists of all the mining organisations within South Africa and other countries. The individual mining companies were approached after being identified from the list of local and international operational mines.

The researcher used a simple random sampling technique to select participants. Saunders *et al.* (2009) state that simple random sampling involves the selection of a sample at random from the sampling frame using either random number tables or a computer. The simple random sampling technique gave every member of the population an equal opportunity to be selected for participation in the research. A total of 300 mines were randomly selected from a population of 850. The respondents from each mine were all part of their respective organisation’s senior management.

### **1.6.2.7 Ethical Aspects**

Ethical considerations of confidentiality and privacy were addressed. A concerted and conscious effort was made at all times to uphold this promise. Voluntary participation was highlighted and participants were thanked for their involvement.

### **1.6.2.8 Data capturing and feedback**

After the completed questionnaires were handed in, the data was captured in an MS Excel spreadsheet to facilitate statistical analysis in collaboration with the Statistical Consulting Services of the North-West University. Written feedback will be given to respondents who indicated that this is what they require.

### **1.6.2.9 Validity and Reliability Defined**

Reliability and validity are two key components to be considered when evaluating a particular instrument. Reliability, according to Easterby-Smith *et al.* (2008), is concerned with the consistency of the instrument and an instrument is deemed to have high or good reliability if it can be trusted to give an accurate and consistent measurement of an unchanging value. The validity of an instrument, on the other hand, refers to how well an instrument measures the particular concept it is supposed to measure (Bhattacharjee, 2012). He argues that an instrument must be reliable before it can be valid, implying that the instrument must be consistently reproducible and that once this has been achieved, the instrument can then be scrutinized to assess whether it is what it purports to be.

The reliability of the instruments is measured by the Cronbach alpha coefficient which is based on the average correlation of variables within a test (Sekaran & Bougie, 2010). If a construct yields a large alpha co-efficient, then it can be concluded that a large portion of the variance in the test results for the construct is attributable to general and group factors (Bhattacharjee, 2012). Sekaran and Bougie (2010) suggest that the Cronbach alpha coefficient should be greater than 0.70, for the data to be regarded as reliable and internally consistent. Generally, alpha values above 0.70 are acceptable, although Field (2009) states that, when attitudes and not abilities are tested, a score of up to 0.6 could still be held as acceptable.

In relation to the data collection method used in this research (that is questionnaires), Saunders *et al.* (2009) listed a number of factors that are likely to threaten reliability including: subject error; subject bias; observer-caused effects and observer bias.

Firstly, subject error refers to the tendency of the respondents to give responses that are different from the true facts. This will most probably happen if the researcher does not select an appropriate time during the day to collect data (Saunders *et al.*, 2009). To overcome this threat, the researcher will try to choose 'neutral' times for data collection when respondents are neutral in their feelings (for example, during midday) when this is possible to make.

Secondly, subject bias refers to the tendency of respondents to provide responses that differ from the true facts because they are obliged to do so or due to the firm's policy which restricts publishing sensitive or confidential information (Saunders *et al.*, 2009). To overcome this threat, the researcher will assure the respondents that the data collected from the questionnaire will be analysed with complete confidentiality and will not be used for other purposes than this research.

Thirdly, observer-caused effects are those effects which result from the observer's presence in the phenomenon under study and which are likely to influence the respondent's behaviour, conversation, and data he/she provides. This type of threat occurs when the role attributed to the researcher by the respondents is such that it drives them to change their normal behaviour. To overcome this threat, questionnaire will be preceded by opening statements and clarification of the role of the researcher in order to build confidence and trust between the researcher and the respondents (Saunders *et al.*, 2009).

#### **1.6.2.10 Statistical analysis**

The data received from the completed questionnaires was captured and analysed with the use of the statistical software program SPSS and STATISTICA with the assistance of the Statistical Consulting Services of the North-West University.

Descriptive statistics and effect sizes were used to decide on the significance of the findings. The results are to be described and compared by way of mean and standard deviations. In this study, the mean is to be used to measure the central tendency of the results. The standard deviation presents the average distance of the individual scores from the mean.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used to determine if the sample size is adequate to use for multivariate analysis (Field, 2009:640). A minimum KMO value

of 0.7 is set for this study, as advised by the Statistical Consultation Services of the North-West University. Confirmatory Factor Analysis (CFA) was used to verify the factor structure of the set of variables. Cronbach alphas were computed to assess the internal consistency of the measuring instrument. The number of participants is very close to 200 which is normally required for CFA. The researcher also reviewed the relevant theory and research literature to support the use of CFA.

Correlations were calculated to determine the relationships between variables. Pearson product-moment correlation coefficients were calculated to identify the relationships between the variables. The statistical significance level was set at a 95% confidence interval ( $p \leq 0.05$ ). The cut-off point of 0.30 was used to determine practical significance of a medium effect (Nandy, 2012).

T-tests and ANOVA were employed to determine differences between the groups in the sample. Effect sizes were used in addition to statistical significance to determine the importance of relationships. Effect sizes served to indicate whether the results obtained were practically significant.

A multiple regression analysis was conducted with the aim of determining the percentage of variance in dependent variables that could possibly be predicted by independent variables. A multiple regression analysis was conducted to determine the possible mediating or moderating effect of role clarity on the other variables.

## **1.7 LIMITATIONS OF THE STUDY**

The normal limitations regarding the use of questionnaires as data-gathering tool are recognised. At best, these relationships could only be analyzed and described, not causality established. Therefore, the establishment of relationships in the present study serves to set-up certain patterns which can be compared with existing or previous theoretical research regarding the chronological relationships of the different variables being studied.

## **1.8 CONTRIBUTION OF THE STUDY**

There is plenty of literature regarding the fields of intelligence activities and strategic management, but only a few studies have focused on how the two practices can be integrated. At country level, there is also a scarcity of empirical literature on the connection between strategic management and strategic intelligence in South Africa and mining organisations in particular. This study contributes to the research field of strategic intelligence through mapping out the role of SI in business

performance, strategic planning and decision-making in the mining industry. This will be done through empirically investigating how strategic planning and decisions are made in the mining industry and then mapping out SI's role in the processes. Therefore, the study is significant in the sense that it generates new empirical data on the use of SI as a strategic management tool. The data may contribute towards understanding how organisations may integrate different forms of intelligentsia and strategic management in pursuit of competitive advantage, sustainable performance and wealth creation.

The research will seek to show that strategic intelligence has a conceptual and empirical support to allow it to function as a strategic management tool. By understanding the extent in which strategic intelligence is utilised in the mining industry, the research will identify the benefits that are experienced by implementing and using strategic intelligence as an input to the strategic management processes and what value strategic intelligence adds in the strategic planning and decision-making processes. In addition to contributing to the research in the field of strategic intelligence and strategic management, another purpose of the study will be to produce managerial recommendations on what SI's role in strategic management could be in the future and how the function could be improved to better support strategic planning and corporate decision-making. The mining organisations have been under a great deal of pressure due to much uncertainty and turbulence in their environment, therefore this thesis will seek to identify better methods of implementing strategic intelligence and how to customize it to the needs of these mining organisations and other organisations such that they will have a sustainable performance. This study will not only aim to improve understanding on the topic, but also produce findings of practical relevance and value for the mining and other industries. Therefore, this research seeks to contribute to both management practitioners and academics alike.

## **1.9 LAYOUT OF THE STUDY**

The study will follow the article format route and is divided into eight chapters (including four research articles) as follows:

## **Chapter 1: SCOPE AND NATURE OF THE STUDY**

This chapter introduced the content of the paper and explained why the topic was chosen for the research. The chapter presented the problem statement, the research goals, methods and research limitations.

## **Chapter 2: RESEARCH METHODOLOGY**

This chapter will report the research method that will be employed to achieve the goals of the research project. Aspects that will be covered include research design, measuring instruments that will be used to gather data and then data analyses techniques will be discussed.

## **Chapter 3: LITERATURE STUDY**

This chapter will include an extensive literature study to give an overview of the mining industry and establish a theoretical base for the following constructs and their components: Strategic management, strategic intelligence, business intelligence, competitive intelligence, marketing intelligence and knowledge management.

## **Chapter 4 (Article 1): INVESTIGATING THE USE OF STRATEGIC MANAGEMENT PROCESS IN THE MINING INDUSTRY**

The article will focus on the use of the strategic management process in the mining industry. A study will also determine which analytical tools and techniques are commonly used in the strategic management process within this sector. A brief theoretical base for strategic management will be established. A problem statement and research objectives will be outlined. The results of the empirical study will then be discussed by focusing on the implications of the findings for managers.

## **Chapter 5 (Article 2): INVESTIGATING THE USE OF BUSINESS, COMPETITIVE AND MARKETING INTELLIGENCE IN THE MINING INDUSTRY**

The article will focus on investigating the use of these different types of intelligence in the mining industry. It will include a literature review to establish a theoretical base for Business, Competitive

and Marketing Intelligence. The results of the empirical study will then be discussed by focusing on the implications of the findings for managers.

### **Chapter 6 (Article 3): INVESTIGATING THE USE OF KNOWLEDGE MANAGEMENT AS A MANAGEMENT TOOL IN THE MINING INDUSTRY**

The article will focus on investigating the use of knowledge management in the mining industry. It will include a literature review to establish a theoretical base for knowledge management. The results of the empirical study will then be discussed by focusing on the implications of the findings for managers.

### **Chapter 7 (Article 4): INVESTIGATING THE USE OF STRATEGIC INTELLIGENCE AS A MANAGEMENT TOOL IN THE MINING INDUSTRY**

The article will focus on investigating the use of strategic intelligence as a strategic management tool. It will include a literature review to establish a theoretical base for strategic intelligence and strategic IQ. The results of the empirical study will then be discussed by focusing on the implications of the findings for managers.

### **Chapter 8: CONCLUSIONS AND RECOMMENDATIONS**

The final chapter in the thesis will provide a summary of the study in the light of the objectives as set out. Conclusions, recommendations and areas for further studies will also be discussed briefly in this final chapter.

#### **1.10 SUMMARY**

This chapter has introduced the content of this thesis and explained why the topic was chosen for the research.

The mining industry contributes significantly to the economies of many countries. The industry is facing many challenges and there is significant turbulence in the environment within which it operates. A brief literature review shown in this chapter accentuates that the use of strategic

intelligence as a strategic management tool will benefit the mining organisations and help them to have sustainable performance.

The chapter also outlined how a quantitative research design in a form of a structured questionnaire will be used in a response to the research questions which were clearly stated in the chapter. Statistical techniques will be used to confirm the reliability of the instrument used and help to make necessary inferences based on the findings.

The chapter also showed the layout of the thesis which is basically an article format with four articles.

The next chapter presents the research methodology that will be used for this study.

## **CHAPTER 2: RESEARCH METHODOLOGY**

The purpose of the previous chapter was to provide the background and motivation for the study including the problem statement, research questions, objectives, scope and the layout. The objective of this chapter is to explain and provide supporting reasoning for the research philosophy, design and methodology used in this research study, aimed at responding to the research questions expressed in chapter 1.

### **2.1 INTRODUCTION**

Research is a methodical investigative process that involves interpretation of observations, guided by the previously existing body of knowledge, with an aim to answer specific questions. Research methodology can be defined as the path along which research can be directed (Jonker & Pennink, 2010:40). Furthermore, research methodology shows mechanisms or strategies used to collect, manipulate and interpret data that will be used in the research (Leedy & Ormrod, 2010:12).

This chapter describes the approach used to address the research questions. The research design and study type are presented. The study population and sampling are also described. This is followed by an account of the instrumentation design along with arguments for instrument validity and reliability. The data collection process and subsequent data analysis are presented in detail. Additionally, aspects of confidentiality and anonymity associated with human subjects are covered in this chapter.

### **2.2 RESEARCH APPROACH**

Bhattacharjee (2012:38) grouped data collection methods into two categories: positivist and interpretive. Positivist methods, such as survey research and laboratory experiments, are aimed at theory (or hypotheses) testing, while interpretive methods, such as ethnography and action research, are aimed at theory building. Positivist methods employ a deductive approach to research, starting with a theory and testing theoretical postulates using empirical data. In contrast, interpretive methods employ an inductive approach that starts with data and tries to derive a theory about the phenomenon of interest from the observed data (Bhattacharjee, 2012).

According to Saunders *et al.* (2009), the quantitative or positivist approach is objective in nature and concentrates on measuring phenomena. This involves collecting and analyzing numerical data and applying statistical tests. The qualitative, phenomenological or interpretivist approach is more subjective in nature and involves examining and reflecting on perceptions in order to gain an understanding of social and human activities. By quantitative methods, researchers mean the techniques of randomized experiments, quasi-experiments, paper and pencil “objective” tests, multivariate statistical analysis, sample surveys and the like. In contrast, qualitative methods include ethnography, case studies, in-depth interviews and participant observation (Bhattacharjee, 2012:38). Quantitative research determines the quantity or extent of an outcome in numbers and hence provides an exact approach to measurement. Qualitative research is subjective in nature and leaves much of the measurement process to the discretion of the researcher. This approach does not use rigorous mathematical analysis. Table 2-1 summarizes the main features of the two paradigms as they relate to research methodology, as pure forms at the two ends of the continuum:

**Table 2-1: Features of the two main paradigms**

POSITIVIST PARADIGM	PHENOMENOLOGICAL PARADIGM
<ul style="list-style-type: none"> <li>• Tends to produce quantitative data</li> <li>• Uses large samples</li> <li>• Concerned with hypothesis testing</li> <li>• Data is highly specific and precise</li> <li>• The location is artificial</li> <li>• Reliability is high</li> <li>• Validity is low</li> <li>• Generalizes from sample to population</li> </ul>	<ul style="list-style-type: none"> <li>• Tends to produce qualitative data</li> <li>• Uses small samples</li> <li>• Concerned with generating theories</li> <li>• Data is rich and subjective</li> <li>• The location is natural</li> <li>• Reliability is low</li> <li>• Validity is high</li> <li>• Generalizes from one setting to another</li> </ul>

(Source: Collis & Hussey, 2009:63)

Saunders *et al.* (2009:127) summarizes some of the major differences between deduction and induction as follows:

**Table 2-2: Major differences between deductive and inductive approaches to research**

Deduction emphasizes:	Induction emphasizes:
<ul style="list-style-type: none"> <li>• scientific principles</li> <li>• moving from theory to data</li> <li>• the need to explain causal relationships between variables</li> <li>• the collection of quantitative data</li> <li>• the application of controls to ensure validity of data</li> <li>• the operationalization of concepts to ensure clarity of definition</li> <li>• a highly structured approach</li> <li>• researcher independence of what is being researched</li> <li>• the necessity to select samples of sufficient size in order to generalize conclusions</li> </ul>	<ul style="list-style-type: none"> <li>• gaining an understanding of the meanings humans attach to events</li> <li>• a close understanding of the research context</li> <li>• the collection of qualitative data</li> <li>• a more flexible structure to permit changes of research emphasis as the research progresses</li> <li>• a realization that the researcher is part of the research process</li> <li>• less concern with the need to generalize</li> </ul>

(Source: Saunders *et al.*, 2009)

Table 2-3 summarizes the key differences between the two paradigms as they relate to the concepts of validity, reliability and generalizability.

**Table 2-3: Differences between the two paradigms as they relate to three key concepts**

	POSITIVIST	PHENOMENOLOGICAL
<b>Validity</b>	Does the research instrument measure what it is supposed to measure?	Has the researcher gained full access to the knowledge and subjective meanings of informants?
<b>Reliability</b>	Will the measure yield the same results on different occasions?	Will similar observations be made by different researchers on different occasions?
<b>Generalizability</b>	What is the probability that patterns observed in a sample will also be present in the wider population from which the sample is drawn?	How likely is it that ideas and theories generated in one setting will also apply in other settings?

(Source: Saunders *et al.* 2009)

In the case of current research, quantitative data is required in order to measure the degree of utilization of different types of intelligentsia and determine their effect on the performance of the mining industry. The quantitative data is also necessary to test the selected hypotheses and to generalize from the sample to the overall population in the company. Therefore the process of this research is primarily positivist or quantitative in that questionnaires are used for the individual research.

## **2.3 RESEARCH DESIGN**

The survey is a positivist research design in which a selected sample is studied to make inferences about the rest of the population (Saunders *et al.*, 2009). Surveys typically use questionnaires and interviews in order to determine the opinions, attitudes, preferences and perceptions of persons of interest to the researcher. A survey design is used in this case. According to Saunders *et al.* (2009) a survey design attempts to determine the incidence, distribution, and inter-relationships among sociological and psychological variables that focus on people, the vital factors concerning people as well as their beliefs, opinions, attitudes, motivations and behaviour. Survey designs are also considered to be very accurate within sampling error. A survey design is also considered to be probably the best adapted to obtaining personal and social facts, beliefs, and attitudes.

### **2.3.1 Survey Research**

Survey research is a method involving the use of standardized questionnaires or interviews to collect data about people and their preferences, thoughts, and behaviours in a systematic manner (Bhattacharjee, 2012:75). Surveys involve selecting a representative and unbiased sample of subjects drawn from the group the researcher wishes to study (Neville, 2007:7). There are two main types of surveys: a descriptive survey; concerned with identifying and counting the frequency of a particular response among the survey group, or an analytical survey: to analyse the relationship between different elements (variables) in a sample group (Neville, 2007:7).

Depending on how the data is collected, survey research can be divided into two broad categories: questionnaire surveys (which may be mail-in, group-administered, or online surveys), and interview surveys (which may be personal, telephone, or focus group interviews). Questionnaires are

instruments that are completed in writing by respondents, while interviews are completed by the interviewer based on verbal responses provided by respondents (Bhattacharjee, 2012:76).

Surveys can be administered in at least five different ways: mailed, group administered, by phone, in person and electronically as summarised in Table 2-4 (Sagepub, 2014:171).

**Table 2-4: Typical Features of the Five Survey Designs**

<b>Design</b>	<b>Manner of Administration</b>	<b>Setting</b>	<b>Questionnaire Structure</b>	<b>Cost</b>
Mailed survey	Self	Individual	Mostly structured	Low
Group survey	Self	Group	Mostly structured	Very low
Phone survey	Professional	Individual	Structured	Moderate
In-person interview	Professional	Individual	Structured or unstructured	High
Web survey	Self	Individual	Mostly structured	Low

### 2.3.2 Questionnaire Survey

Bhattacharjee (2012:76) defined a questionnaire as a research instrument consisting of a set of questions intended to capture responses from respondents in a standardized manner. Questions may be unstructured to ask respondents to provide a response in their own words or structured to ask respondents to select an answer from a given set of choices. Responses to questions on a structured questionnaire may be aggregated into a composite scale or index for statistical analysis. A structured questionnaire will be used to provide evidence of patterns amongst large populations.

In order to increase the response rate, the researcher used a multiple approach for the administration of the questionnaires. Self-administered, mailed and electronic surveys were used. The choice of the method depended on the resources and the proximity of the respondent.

A mailed survey was conducted by mailing a questionnaire to respondents, who then administered the survey themselves. Follow-up mailings were sent to non-respondents in an attempt to obtain an adequate response rate. Some questionnaires were printed and copies were given to the respondents who were reachable to complete the questionnaires and return to the researcher.

## **2.4 SAMPLE**

Easterby-Smith *et al.* (2008) describe a research population as a group that the researcher wants to generalise from and the sample as the group of people that are selected to be in the study. The research population consists of mining organisations in South Africa and globally.

The researcher used a simple random sampling technique to select participants for the research. Saunders *et al.* (2009) state that simple random sampling involves the selection of a sample at random from the sampling frame using either random number tables or a computer. The simple random sampling technique gave every member of the population an equal opportunity to be selected for participation in the research. A total of 300 mining organisations were randomly selected from a population of 850. The respondents were representatives of the senior mine management in their respective organisations.

## **2.5 VALIDITY AND RELIABILITY**

Validation is an important cornerstone of research in social sciences, and is a symbol of research quality and rigor (Venkatesh *et al.*, 2013:31). Validation in quantitative research is discussed independently below.

### **2.5.1 Validation in Quantitative Research**

Typically, in quantitative research, two primary validation issues are addressed (that is, reliability and validity of measures). According to Straub *et al.* (2004) and Venkatesh *et al.* (2013.32), reliability is related to the quality of measurement and a measure is considered reliable if it yields the same result over and over again. Without reliable measures, a quantitative study is considered invalid. Therefore, reliability is a precondition for validity of quantitative research.

Validity refers to the legitimacy of the findings (that is, how accurately the findings represent the truth in the objective world (Venkatesh *et al.*, 2013:32). Shadish *et al.* (2002) mentioned three broad types of validity in quantitative research:

- Measure validity estimates how well an instrument measures what it purports to measure in terms of its match with the entire definition of the construct.
- Design validity encompasses internal and external validity:

- Internal validity is the extent of approximate truth about inferences regarding cause-effect or causal relationships in a scientific inquiry.
- External validity is the extent to which the results of a research study can be generalized to other settings and groups.
- Inferential or Statistical conclusion validity is related to the findings of quantitative studies. It refers to the appropriate use of statistics to infer whether the presumed independent and dependent variables co-vary.

The measuring instrument used for the study is discussed below.

## 2.6 MEASURING INSTRUMENT

The survey questions for the proposed study were developed based on the existing literature. Some of the questions were taken from a study by Kruger (2010) and some were adopted from a questionnaire by Strategic Futures Consulting (2009) which is normally used for self-assessment of the Strategic Planning Process. The questions about the Strategic IQ were adopted from a questionnaire by Decision Processes International (2003) which gives a company's score for its level of strategic intelligence. This quantitative metric (SIQ) was used to measure the level of strategic intelligence of the mining organisations from which it can be inferred whether organisations are strategically blind or smart. The questions about different analytical tools used in strategic planning and the different types of intelligentsia covered in this study were also developed based on the extant literature to measure all the constructs used in the proposed model.

All the items used in this study were measured in 4-point Likert-type scales. The option for the neutral view was not included as it was deemed to be unnecessary. The measuring system had scales ranging from the following scores:

**1** = Strongly Disagree; **2** = Slightly Disagree; **3** = Slightly Agree, **4** = Strongly Agree

The questionnaire comprised mainly of the following parts:

- **Cover Letter** to define the purpose of the questionnaire; give instructions for the completion of the questionnaire and provide contact information.
- **Part A** consisting of some biographical information of the respondent and some information questions regarding the respondent's mine.

- **Main Questionnaire which** focuses on the strategic management and intelligence constructs which are part of the research, and include a number of questions which were developed for each topic. This part contained the following sections:
  - ✓ Section 1: Strategic IQ of the mine
  - ✓ Section 2: Strategic Planning and Management Process
  - ✓ Section 3: Analytical Tools and Techniques
  - ✓ Section 4: Business Performance
  - ✓ Section 5: Intelligence Constructs
    - Business Intelligence
    - Competitive Intelligence
    - Marketing Intelligence
    - Knowledge Management
    - Strategic Intelligence

The Statistical Consulting Services of the North-West University were consulted and assisted in making the final minor adjustments to the structure of the questionnaire and the questions used. A pilot study for the questionnaire was conducted before distributing the questionnaire to all of the study population. The pilot was carried out with 10 respondents and allowed the researcher to check each completed questionnaire, to ensure that the respondents understand the questions and follow the instructions as expected. A copy of the questionnaire is shown in Appendix A on page 214.

## **2.7 RESEARCH PROCEDURE**

### **2.7.1 Administration of the measuring instruments**

A covering letter was compiled and attached to the questionnaire. The purpose of the letter was to encourage the respondents to understand the purpose of the study, to kindly ask for their assistance and to motivate them to complete the questionnaire. The covering letter also explained the auspices under which the study was conducted and the context of Strategic Management and Strategic Intelligence being investigated. The letter also assured the respondent that the information will be kept confidential.

The researcher took full responsibility for the administration of the questionnaires by e-mail or other means and also helped with any queries the respondents may have had.

### **2.7.2 Data capturing and feedback**

After the completed questionnaires were handed in, the data was captured in an MS Excel spreadsheet to facilitate statistical analysis in collaboration with the Statistical Consulting services of the North-West University.

## **2.8 STATISTICAL ANALYSIS**

The data received from the completed questionnaires was captured and analysed with the use of the statistical software program SPSS and STATISTICA with the assistance of the Statistical Consulting Services of the North-West University.

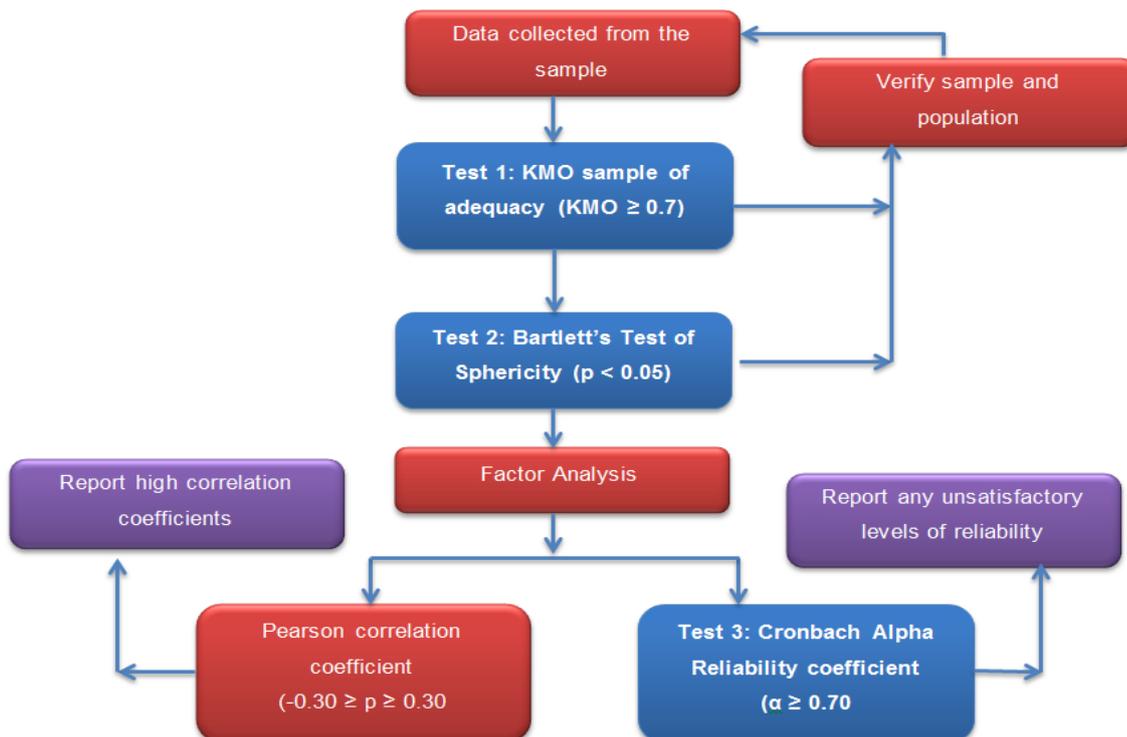
Descriptive statistics and effect sizes were used to decide on the significance of the findings. The results are to be described and compared by way of mean and standard deviations. In this study, the mean is to be used to measure the central tendency of the results. The standard deviation presents the average distance of the individual scores from the mean. The other statistical techniques which were used were: Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy; Bartlett's test of sphericity; factor analysis; Cronbach Alpha's reliability coefficient and Pearson's correlation coefficient. Figure 2-1 shows the data analysis decision tree that was used.

Kaiser-Mayer-Olkin measure of sampling adequacy was set at a minimum 0.7. The Bartlett Test of Sphericity was used to compare the correlation matrix with a matrix of zero correlations. From this test, the statistical significance was set at  $p \leq 0.05$  values.

Correlations were calculated to determine the relationships between variables. Pearson product-moment correlation coefficients were calculated to identify the relationships between the variables. The statistical significance level was set at a 95% confidence interval ( $p \leq 0.05$ ). The cut-off point of 0.30 was used to determine practical significance of a medium effect.

Confirmatory Factor Analysis (CFA) was used to verify the factor structure of the set of variables. Cronbach Alphas were computed to assess the internal consistency of the measuring instrument. The number of participants is very close to 200 which is normally required for CFA. The researcher also reviewed the relevant theory and research literature to support the use of CFA.

**Figure 2-1: Data analysis decision tree**



(Source: Naidoo, 2011:19)

T-tests and ANOVA were employed to determine differences between the groups in the sample. Effect sizes were used in addition to statistical significance to determine the importance of relationships. Effect sizes served to indicate whether the results obtained were practically significant. A multiple regression analysis was conducted with the aim of determining the percentage of variance in dependent variables that could possibly be predicted by independent variables. A multiple regression analysis was conducted to determine the possible mediating or moderating effect of role clarity on the other variables.

## 2.9 CHAPTER SUMMARY

The objective of this chapter was to provide an understanding of the research design and methodology followed in the study. The empirical study was carried out using a quantitative research methodology. The data collection technique utilised was a structured questionnaire. A random sampling technique was used to select the participants. Statistical techniques were used to confirm the reliability of the instrument, and also to do descriptive and inferential statistics.

The next chapter is about the main literature review of this study.

## **CHAPTER 3: LITERATURE REVIEW**

The previous chapter dealt with all the aspects pertaining to the method used for the empirical study. The choice and compilation of the participants, measuring battery, administration and scoring of the measuring instruments were discussed and the statistical methods used to analyse the data were also discussed.

This chapter establishes a theoretical base for the following constructs and their components:

- Strategic management;
- Analytical tools and techniques used in strategy analysis;
- Strategic intelligence;
- Business intelligence;
- Competitive intelligence;
- Marketing intelligence, and
- Knowledge management.

A brief overview of the mining sector will also be presented in this chapter.

### **3.1 STRATEGY AND STRATEGIC MANAGEMENT CONCEPTS**

The next section gives an overview of how the concept of strategy has evolved over the years.

#### **3.1.1 The evolution of strategy**

Strategic thoughts have existed throughout history, when the earliest historians combined life-and-death strategies and converted them into wisdom and guidance for human well-being. Later on, and as societies grew and conflicts started to arise, strategy was used mainly in a militaristic fashion. The concept of strategy comes from the ancient Greeks. The word strategy comes from the Greek word “*stratego*”, which means “to plan the destruction of one’s enemies through the effective use of resources” (Burns, 2009:247). An attempt to provide a tie between the contemporary use of the term strategy in the organisational context and other historical uses of the term has been made by Bracker (1980:219). In recent history, strategy has become widely used in many fields, particularly in business administration. The concept, as applied to organisations, has been growing due to the contributions of a number of early business management scholars of the twentieth century,

including Igor Ansoff (1965), Alfred Chandler (1962), Peter Drucker (1954), William Newman (1951), Alfred Sloan (1963), Mintzberg (1994) and Porter (1996). Since then the concept has grown into a rich and robust intellectual domain. Progress has been evident on a number of fronts, such as advancing the conceptual and empirical understanding of the concept and practice of strategy; looking at strategy from multiple perspectives or schools of thought; and the use of innovative and diverse methodological approaches in strategy research.

The 1960's represented the acknowledged introduction of strategy into the business community and the popularization of corporate planning. One of the first individuals credited with crafting and implementing strategy in the business landscape is Alfred Sloan who was the head of General Motors (GM) from 1923 to 1955. In 1921, Sloan reorganized GM as documented in his book entitled, *My Years with General Motors*, published in 1963 (Sloan, 1963). Alfred Chandler was among the first academic researchers of business strategy and he published a ground-breaking work entitled, *Strategy and Structure*, in 1962. According to Chandler (1962:13), strategy is defined as the determination of the basic long-term goals and objectives of an organisation, and the adoption of courses of action and the allocation of resources necessary for carrying out those goals. Chandler (1962) advocated that organisations should first determine their strategy and then develop their structure to support the strategy. He believed that large organisation's best chances for success resided in their move to decentralization. Chandler also recognized that strategic growth results from an awareness of needs and opportunities, which are created by changes in population, income and technology (Chandler, 1962). Ansoff (1965) advocated that the strategy process should be formalized through detailed procedure, including the use of checklists for delivering objectives and assessing synergy. Corporate strategy's adoption in the 1970's was mainly influenced by portfolio planning and large organisations' need to establish synergy between the business units and corporate parent. In the 1980's, organisations began taking a closer look at their choice of industries, their markets, segments and positioning within those segments. Putting a depth charge into this field of thought was Michael Porter who wrote one of the most influential book on business strategy entitled, *Competitive Strategy*, in 1980. Porter's work propelled the analysis of industry and competition through models such as the 'Five Forces' (Porter, 1980). The focus was also on the quest for competitive advantage and the sourcing of competitive advantage from within the organisation, which follows the Resource-Based Theory that focuses on the organisation's assets and capabilities and how these internal strengths provide advantage over rivals.

Others such as Mintzberg (1994) took a more evolutionary view of strategy and distinguished between four types of strategy: intended strategy (what the organisation intends to do at the planning phase); unrealised strategy (what the organisation fails to achieve); emergent strategy (the

subsequent direction that arises during implementation); and realised strategy (the final outcome). What emerges from Mintzberg's interpretation is that the strategy is both the outcome of the process and the process itself.

Porter (1996:62) has described strategy in terms of positioning and focus, trade-offs and choice, fit and sustainability, and growth and leadership in an iterative style around the central theme that strategy is making trade-offs in competing.

Henry (2008:6) defined strategy as simply an outline of how an organisation has planned to achieve its intended objectives. The goals that the organisation has set itself are the objectives and the strategy is therefore a well worked out plan on how to reach those objectives. Thus a strategy is a plan or course of action for the allocation of scarce resources in order to achieve specified goals. Strategy is a plan of action stating how an organisation will achieve its long-term objectives. Henry (2008:8) went further to distinguish among three types of strategies namely corporate strategy, business strategy and functional strategy. Corporate strategy deals with the broader issues of what industries the organisation wants to compete in, and the allocation of resources between its strategic business units. Corporate strategy is usually dealt with at senior management level. Business strategy deals with how an organisation is going to compete within a particular industry or market and is also more about how an organisation is going to achieve competitive advantage over its rivals. Functional strategy is basically responsible for the provision of support to business strategy and is the responsibility of managers in the different functional units to ensure that their activities are geared to assist and complement the efforts towards achieving the business strategy (Henry, 2008:8).

Some of the most recent definitions are from Hitt *et al.* (2011), Wells (2012) and Thompson *et al.* (2012). Hitt *et al.* (2011:4) define strategy as an integrated and coordinated set of commitments and actions designed to exploit core competencies and gain a competitive advantage. When choosing a strategy, organisations make choices among competing alternatives as the pathway for deciding how they will pursue strategic competitiveness. According to Wells (2012:3), a strategy is made up of an integrated set of choices about where and how to compete and it serves as a response to external opportunities and threats as well as internal strengths and weaknesses. Thompson *et al.* (2012:63) summarised the definition of strategy as the game plan that management is using to stake out a market position, conduct its operations, attract and please customers, compete successfully and achieve the desired performance targets.

The central thrust of a strategy is undertaking moves to build and strengthen the long-term competitive position and sustainable financial performance by competing differently from rivals and gaining a competitive advantage (Thompson *et al.*, 2012).

Starting from about 100 years ago when Ford adopted his famous strategy of '*any color a person likes as long as it is black*', strategy has evolved and is now proposed to have five key elements according to Abell (2014). The elements are as follows:

- Objectives: Mainly the role in the overall corporate or business portfolio.
- Business Definition and Scope:
  - Horizontally: The definition in terms of customer groups that are served, customer functions that are performed and technologies or other means used to meet these requirements.
  - Vertically: Where and how the organisation utilizes its value chain and business system within and beyond the organisation to gain competitive advantage.
- Positioning: Where the organisation competes in a map with two dimensions where delivered cost or price is on one axis and perceived value is on the other. Further, how the organisation and its rivals move on this map as they prepare to compete in the future.
- Segmentation and Focus: How the market may be segmented to gain competitive advantage, and where the organisation can choose to compete through a focused strategy, a differentiated strategy within each segment or an undifferentiated approach to the broader market.
- Differentiation and Unique Selling Proposition: What the basis of the organisation's competitive advantage is overall as well as within each segment and how this differentiation is promoted and communicated.

Strategy concept remains to be relevant and will continue to be necessary in the future. According to the Boston Consulting Group (2015), globalization, increasing economic interconnections and technological change are posing a challenge to the traditional and conventional strategy approaches. Yet strategy is key and more necessary than ever. The rate at which leadership is changing is rising and the performance gap between the losers and winners is spreading. To beat these emerging

trends, strategists have to understand, compete across and adapt to a much wider range of strategic environments, each requiring distinct approaches and competencies.

Organisations need to have a winning strategy which has to be well matched to industry and competitive conditions and must exhibit a good external fit and be in sync with the prevailing market conditions. Managers must be willing and ready to modify strategy in response to changing market conditions, advancing technology, moves of competitors, shifting buyer needs and emerging market opportunities (Thompson *et al.*, 2012:60).

Different perspectives of strategic management are discussed in the next section.

### **3.1.2 Scientific and Artistic Perspectives of Strategic Management**

Strategic management is a broader term than strategy and can be viewed as a set of managerial decisions and actions of an organisation that can be used to facilitate competitive advantage and long-run superior performance over other organisations (Wheelen & Hunger, 2011). There are different perspectives about strategic management as discussed below. Managers should take one of the two different perspectives on the approach to strategic management.

#### **❖ Scientific Perspective**

Most strategy scholars have recommended a scientific perspective, whereby strategic managers are encouraged to methodically assess the organisation's external environment and evaluate the advantages and disadvantages of countless alternatives before formulating strategy. The business environment is deemed to be generally objective, analysable, and to a certain predictable. As such, strategic managers are expected to follow a systematic or logical process of environmental, competitive and internal analysis and craft the organisation's strategy on this groundwork (Parnell, 2013:5). According to this perspective, strategic managers need to be trained, highly skilled systematic or analytical thinkers who are capable of going through and examining huge amount of objective data and translating it into a desired direction for the organisation. "Strategy scientists" tend to reduce or refuse to accept altogether the role of imagination and creativity in the strategy process and are not generally receptive to alternatives that arise from any process other than a comprehensive, analytical approach (Okigbo, 2013:7).

## ❖ Artistic Perspective

Other strategy scholars, however, have an alternative view and their historical perspective is briefly discussed. According to the artistic perspective on strategy, the lack of predictability in the environment and the quick pace of change render elaborate strategy planning as suspect at best. Instead, strategists ought to incorporate a great deal of creativity and intuition in order to design and formulate a comprehensive strategy for the organisation (Tse, 2015). Mintzberg's view of a craftsman encompassing individual skill, commitment and perfection through the ability to master detail embodies the artistic model. The strategy artist seeks to mould the strategy of an organisation like a potter moulding clay by sensing the state of the organisation and interpreting its subtleties. The artist envisages the outcomes related to various alternatives and ultimately plans a course based on holistic thinking, intuition and imagination (Mintzberg, 1987:66). "Strategy artists" lack interest in strategic planning exercises and may view it as time wasted and may not make the effort necessary to maximize the value of a formal planning process (Okigbo, 2013:8).

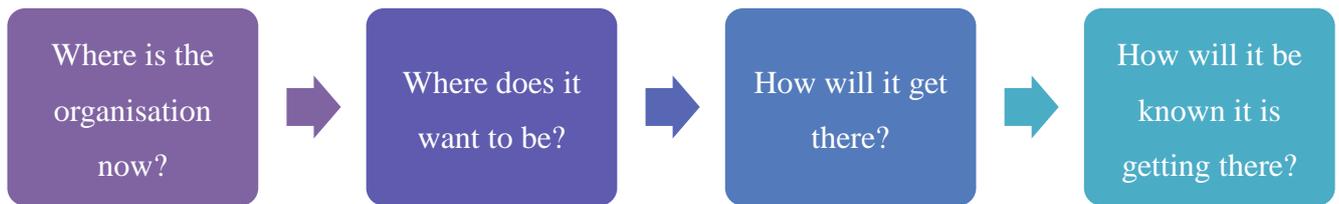
This study acknowledges the validity of the artistic perspective but gives emphasis to the scientific view. Creativity and innovation are essential and encouraged, but are most likely to translate into success for the organisation when they occur as part of a comprehensive approach to strategic management. The researcher in this study uses the scientific view whereby strategic management is concerned with the continuous evaluation and control of a business and the environment within which it operates; assessing the internal and external factors that can influence organisational goals, building a strategic model, testing it and putting it into action and where necessary, making changes to goals and/or strategies to ensure success.

The next section gives a brief overview of the strategic management process.

### 3.1.3 Strategic Management Process

The comprehensive, systematic model which is proposed herein is presented as a proper foundation for understanding the strategic management process. The basic building blocks of strategic management are concerned with answering four basic questions (Wilkinson, 2013):

**Figure 3-1: Basic questions for strategic management**



(Source: Wilkinson, 2013)

The questions show that strategic management essentially has planning, execution and review or control components. The following issues can be taken into consideration in developing the comprehension of strategic management process (Failte, 2013):

#### **Where is the organisation now?**

- What is the present status of the organisation? How is its performance?
- What are its internal weaknesses and strengths as an organisation?
- What are the threats and opportunities from the external environment?
- How is the competitive environment?
- Does the organisation have sufficient resources?
- What are the emerging trends in the markets that are key?

#### **Where does it want to be?**

- What is the main goal for the organisation?
- What kind of organisation does it eventually want to become?
- Is there a gap between the current status and the ideal and why?

#### **How will it get there?**

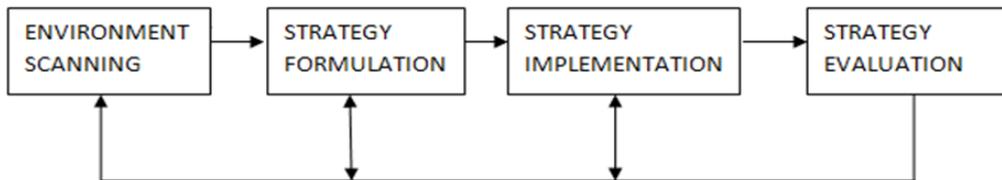
- What strategic objectives and goals will be used for guidance?
- What are the best strategies to achieve those objectives?
- What is required to execute and implement the strategy?
- What should the organisation focus on in the short and medium term to make sure that it is moving in the correct direction?

#### **How will it be known it is getting there?**

- Is the strategy working?
- What actions are taken to produce the desired impact?
- How is it known that the organisation is achieving its objectives and goals?

There are many parts of the process which are spread throughout different stages of strategic planning. Most frequently, the strategic management process has four common phases as shown in Figure 3-2 (David, 2009); (Johnson *et al.*, 2008); (Rothaermel, 2012); (Thompson & Martin, 2010):

**Figure 3-2: Four common phases of strategic management process**



(Source: Rothaermel, 2012)

Some strategy scholars like Jurevicius (2013) split the process into five stages which are to a certain extent similar to the four common stages shown in Figure 3-2 above. For clearer understanding of all the required steps, the five stages are presented and discussed in detail below.

### **Stage 1: Initial Assessment**

The process begins with the initial assessment of the organisation. The vision and mission need to be identified clearly at this stage.

### **Stage 2: Situation Analysis**

The organisation needs to evaluate its current status or situation in the market when identifying its vision and mission. This includes analysis of the competition and assessment of the external and internal environments of the organisation.

During the analysis of the **external environment** analysis, leaders assess the macro- and micro-environments and competition. Political, economic, socio-economic, technological, environmental and legal frameworks represent all the macro-environment elements that affect the organisation in the global environment. Micro-environment influences the organisation in its immediate industry and is commonly analysed using Porter's 5 Forces Framework which is explained in more detail in section 3.1.3.4.

**Competition** is another key external force that has a huge impact on the organisation. Organisations assess their rivals or competitors by using competitors' profile matrix and benchmarking to evaluate their performance status, weaknesses and strengths (Jurevicius, 2013).

**Internal analysis** of the organisation includes the assessment of its activities, resources and core competencies. An organisation holds both tangible resources: land, equipment and capital as well as intangible resources: trademarks, knowledge, patents, brand equity, trademarks and copyrights (Rothaermel, 2012). Managers look closely at the whole production process and the value chain when evaluating the organisation's activities.

Situation analysis should therefore help the organisation to identify threats, opportunities, weaknesses and strengths and reveal a clear picture of its situation in the market.

According to Jurevicius (2013), some of the strategy analysis tools commonly used in this stage are: SWOT, PESTEL, Porter's 5 Forces, Critical Success Factors, Unique Selling Proposition, Core Competencies, Competitor Profile Matrix, External Factor Evaluation Matrix, Internal Factor Evaluation Matrix, Benchmarking, Financial Ratios, Scenarios Forecasting, Market Segmentation and Value Chain Analysis.

### **Stage 3: Strategy Formulation**

An establishment of the long-term objectives follows after a successful situation analysis. The long-term objectives are essentially the goals that are set in an effort to improve the organisation's competitive position in the long run. These objectives assist in guiding the organisation to select suitable strategies which can be chosen at three different levels:

- **Business level strategy:** This is the kind of strategy used when divisions, business units or small and medium organisations make a choice of strategies for a product that is sold in a certain market. Organisations may select from one of Porter's three generic strategies: differentiation, cost leadership and focus strategies.
- **Corporate level strategy:** At this corporate level, managers choose between diversification, integration, intensive and defensive strategies. For instance, at this level they can select which markets to enter with specific products or whether to acquire a rival or merge with it.
- **Global / International strategy:** The main questions to answer are about which new markets to develop and a penetration strategy for those markets as well as the level of diversification that may be necessary (Thompson & Martin, 2010:557).

There are many strategic options from which managers can select based on the organisation's objectives, results of situation analysis and the level for which the strategy is chosen.

According to Jurevicius (2013), some of the strategy analysis tools used in this stage are: Porter's Generic Strategies, Scenario Planning, Boston Consulting Group Matrix, GE-McKinsey Matrix, SPACE Matrix, Bowman's Strategy Clock, Porter's Diamond and Game Theory.

#### **Stage 4: Strategy Implementation**

Implementation of strategic plans is critical and only well executed strategies can lead to competitive advantage for an organisation (Jurevicius, 2013).

Strategy implementation requires an organisation to establish annual objectives, devise policies, motivate employees and allocate resources so that formulated strategies can be executed (David, 2011:6). According to Thompson *et al.* (2012:87), strategy implementation includes the following aspects:

- Establishing a chain of command or some alternative structure such as cross-functional teams.
- Allocation and management of sufficient resources (financial, human, time, technology support).
- Giving responsibility of specific tasks or processes to specific groups or individuals.
- Involves the management of processes. This comprises monitoring results, comparing to benchmarks and best practices, evaluating the efficiency and efficacy of the process, controlling for variances and taking corrective action or making modifications to the process as required.
- When implementing specific programs. This involves acquiring and securing the necessary resources, developing the process and training of the people, testing of the process, documentation and integration with legacy processes.
- Creating a culture and work climate conducive to successful implementation of strategy.

#### **Stage 5: Strategy Monitoring**

Implementation has to be monitored in order to succeed. New opportunities, threats, weaknesses and strengths may arise anytime. It is therefore essential for managers to continuously evaluate both

the internal and external environments which are constantly changing. Managers must take necessary corrective actions timeously if new circumstances affect the organisation (Hill & Jones, 2012:12). All strategies are subject to future adjustment because internal and external factors are continually changing. Three fundamental strategy-evaluation activities are (David, 2011:7):

- Reviewing and evaluating the internal and external factors that are the bases for current strategies.
- Measuring performance.
- Taking corrective actions.

Strategy evaluation is needed because success today is no guarantee of success tomorrow (David, 2011:7).

Once a strategy has been implemented, its execution has to be monitored closely to determine the degree to which strategic goals and objectives are actually being accomplished and to what extent competitive advantage is being created and sustained. This information and knowledge are passed back up to the corporate using feedback loops and become the input for the following round of strategy formulation and implementation. Top managers can then decide whether it is necessary to reaffirm current strategies and goals or suggest changes or modifications for the future (Hill & Jones, 2012:12).

According to Jurevicius (2013), some of the strategy analysis tools used in this stage are: Balanced Scorecard, Benchmarking and Strategy Evaluation Framework.

The benefits of using strategic management process are discussed in the next section.

### **3.1.3.1 Benefits of Strategic Management**

Strategic management leads to both financial and non-financial benefits as discussed below.

#### **❖ Financial Benefits**

According to Bradutan and Sarbu (2012:51), formalized strategic management does indeed lead to superior performance by organisations. The formalized strategic management process does make a positive difference in the recorded measurements of sales, return on assets and profits. Organisations that adopt a strategic management approach can expect that the system will yield

enhanced financial performance. Research has also shown that organisations that use strategic-management processes are more successful and profitable than those that do not and show substantial improvement in profitability, productivity and sales compared to organisations with no systematic planning activities (Rao *et al.*, 2008:39).

High-performing organisations appear to make more informed decisions with good anticipation of both short and long-term consequences. In contrast, organisations that perform badly and get poor results often engage in short-sighted activities with very little forecasting ability that can help them to prepare better for future circumstances. Strategists of low-performing organisations are often pre-occupied with addressing routine internal problems and meeting paperwork deadlines. They are likely to misjudge their competitors' strengths and overestimate their own organisation's strengths. Some of them regularly attribute weak performance to uncontrollable factors like foreign competition, technological change and a poor economy (Bradutan & Sarbu, 2012:51).

#### ❖ **Non-financial Benefits**

Besides financial benefits, strategic management also offers intangible benefits which according to Rao *et al.* (2008:40), are as follows:

- Enhances awareness of external threads;
- Provides a way to anticipate future problems and opportunities;
- Improved understanding of the strategies of the rivals;
- Reduced resistance to change;
- Enhanced problem-prevention capabilities of the organisation;
- Provides employees with clear objectives and directions for the future of the organisation;
- Encourages forward thinking;
- Increases employee satisfaction and motivation;
- Results in faster and better decision-making, and
- Gives a degree of discipline and formality to the management of business.

Strategic plans do fail in reality and some of the reasons for their failure are listed below:

### **3.1.3.2 Reasons why strategic plans fail**

Forbes (2011) list some of the reasons for the failure of strategic plans as follows: Having a plan simply for plans sake, not understanding the business environment or focusing on results, partial commitment by business owners and management, not having the right people involved, unwillingness or inability to change, having the wrong people in leadership positions, ignoring marketplace reality, no accountability or follow through and unrealistic goals or lack of focus and resources.

According to Nate (2014), strategic plans usually fail due to two main types of reasons which are ineffective or unsuitable strategy and poor execution of the plan. Unsuitable or ineffective strategies can happen due to the following reasons: objectives that are not clearly defined, failure to do a proper SWOT analysis with respect to the desired objectives, lack of insight and creativity in identifying potential strategies, selected strategies being incapable of achieving the desired objective and having a poor fit between the environment and the resources of the organisation.

Nate (2014) also listed some common reasons for the execution of the strategic plan to fail as follows: inaccurate estimation of the abilities and resources such as time, personnel and financial requirements, lack of the ability to predict the responses from the rivals, inability to manage change properly, poor communication and sometimes loss of focus and sponsorship from senior management.

Guidelines for effective strategic management are discussed below.

### **3.1.3.3 Guidelines for effective strategic management**

Rao *et al.* (2008:42) and David (2011:20) summarized the guidelines for effective strategic management as follows:

- Organisations should take strategy serious;
- Build a corporate culture in which the role played by strategic management and its critical purpose are well understood;
- Strategic management must not become a self-perpetuating bureaucratic mechanism. It must be a self-reflective learning process for all the employees resolving strategic challenges;
- It should challenge the assumptions underlying the current corporate strategy;

- It should welcome bad news and if the strategy is not working, managers should know about it, and
- Continually strengthen the “good ethics is good business” policy.

Below is a discussion of the external and internal assessments used in strategy.

### **3.1.3.4 The External and Internal Assessments**

#### **❖ The External Assessment**

An external assessment focuses on identifying and evaluating trends and developments beyond the organisation’s control, such as shifts in population, a society that is aging, increased rivalry and volatility in the stock market (David, 2011). An external audit leads to the identification of important opportunities and possible threats confronting the organisation so that managers can craft or formulate strategies to take advantage of the opportunities and avoid or decrease the impact of threats.

There are generally considered to be two levels of analysis according to Ritson (2013:33) which are the environmental analysis of the macro-environment which basically affect all the organisations and the industry analysis of the immediate or micro-environment.

According to Ritson (2013:33) the benefits of external analysis include the following:

- Improving managerial awareness of any changes in the environment;
- Improving decision-making about the allocation of resources;
- Enabling proper management of risk;
- Focusing attention on the primary influences on strategic change;
- Acting as an early warning system for the organisation, and
- Improving the understanding of the multi-national settings.

According to Thompson *et al.* (2012:98), the macro-environment includes seven principal components:

- Population demographics – size, growth rate and age distribution of different sectors of the population.

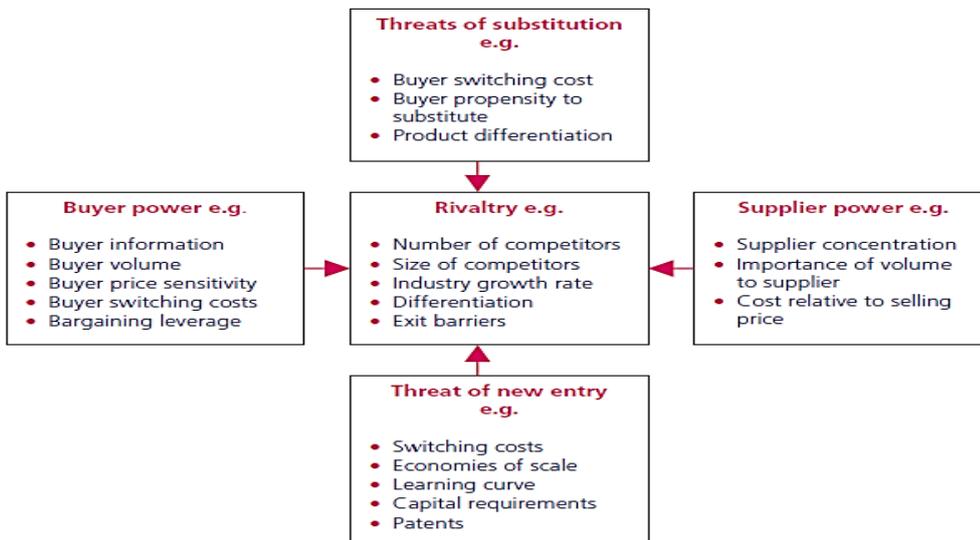
- Societal values, cultural factors, main attitudes and lifestyles that have an impact on businesses.
- Political policies and practices, as well as the laws and regulations with which organisations have to comply.
- Ecological and environmental forces like the effect of weather, climate and other related factors such as water scarcity.
- Technological factors – The rate at which technology changes and the possible effects on the organisation or society.
- Economic conditions – Rates of the growth or contraction of the economy, level of unemployment, inflation, trade deficits or surpluses, savings, per capita gross domestic product and other situations in the markets affecting consumer confidence and discretionary income.
- Global forces – Situations and developments in the global markets, including political policies and practices toward international trade, socio-cultural practices and the institutional environment in which the global markets function.

According to Deloitte (2013), mining organisations are also unavoidably affected by developments in the world, with macro-economic growth or contraction and international markets heavily influencing the demand for resources and the profitability of the mining organisations. Some of the external factors influencing the mining organisations are the slow global economic recovery, margins being under pressure, uncertainty in the regulatory environment, a rising trend in resource nationalism in certain countries, stagnant or falling commodity prices and other factors in certain countries such as labour unrest or political unrest.

As discussed above, the macro-environment includes the wide-ranging environmental framework in which an organisation is placed, however the factors and forces in the organisation's environment which have the largest strategy-shaping impact pertain to the organisation's immediate industry and competitive environment (Thompson *et al.*, 2012:99). Analysis of this micro-environment therefore involves the assessment of the industry's competitive environment which is commonly done using a tool that was developed in 1979 by Michael Porter (Porter, 1985). Porter's 5-Forces Model of competitive analysis simply used for assessing and evaluating the competitive strength and position of an organisation. This theory is grounded on the concept that there are basically five forces which determine the intensity of the rivalry and the attractiveness of a market. Porter's 5 forces assist in establishing where the power lies in a business situation. This is valuable for understanding the

relative strength of an organisation's present competitive position and the strength of a position that the organisation may want to move into. According to Porter (1985), the nature of the extent of competition in a given industry can be viewed as a combination of five forces which are shown graphically in Figure 3-3:

**Figure 3-3: Graphical presentation of Porter's 5 Forces**



Source: Ritson (2013)

- **Rivalry among competing organisations** – The main factor is the number and capability of the rivals. Having many rivals offering similar and undifferentiated products will lead to a decrease in the market attractiveness.
- **New competing entrants** – Unless there are strong and long-lasting barriers to entry, new entrants will enter profitable markets and this will eventually lead to reduced profitability.
- **Possible development of substitute products** – The existence or development of close substitute products increases the prospect of customers changing to these alternatives in response to price increases. This normally leads to a reduction in the attractiveness of the market as well as the power that the suppliers had.
- **Bargaining power of suppliers** – An assessment of how relatively easy it is for suppliers to increase prices. This is determined by a number of factors including the number of suppliers, the uniqueness of their product, the relative strength and size of the supplier as well as the cost of changing to another supplier.

- **Bargaining power of buyers** – An assessment of the relative easiness for the buyers to bring prices down. This is determined by a number of factors including the number of buyers in the market and the cost to the buyer of changing from one supplier to another.

The ability for an organisation to make an acceptable profit in a certain industry can be determined by using the Porter's 5 force model and following the steps recommended by David (2011) which are as follows:

- Find key elements of each competitive force that has an impact on the organisation;
- Determine the strength and relative importance of each element for the organisation, and
- Decide whether it is worth entering or staying in the industry based on the combined strength and impact of the elements.

Clear and insightful analysis and evaluation of an organisation's external situation is a crucial first step in developing strategies that are in line with the industry and competitive conditions (Thompson *et al.*, 2012:134).

The internal assessment of the organisation is discussed below.

#### ❖ **The Internal Assessment**

According to Deac and Duna (2012:25), the internal strategic assessment must enable an organisation's management to detect the weaknesses and strengths of the organisation, compare their weaknesses and strengths with the ones of the competition and enable the establishment of the strategic potential in terms of existent or possible competitive advantages in relation to the competition.

The following partial diagnostics which are part of the internal assessment are discussed.

- **Analysis of the resources** to find the combination of financial, human, technical and both internal and external informational resources which the organisation can exploit to apply and consolidate its strategy (Ketchen & Short, 2011:104).

- **Analysis of the organisation's competencies:** The strengths of the organisation that cannot be easily imitated or matched by competitors are called distinctive competencies. Building competitive advantages involves taking advantage of these distinctive competencies.
- **The value chain analysis,** can help the organisation to identify areas that can be optimized for maximum efficiency and profitability (Arline, 2015). Every organisation's business comprises a collection of activities that are carried out in the course of designing, producing, marketing, delivering and supporting its service or product. An organisation's cost-competitiveness relies to a great extent not only on the costs of its own value chain, but also on costs in the value chains of its suppliers and forward channel allies.
- **The financial analysis,** which measures an organisation's performance making a ratio between the financial means it had and the results (Brigham & Erhardt, 2008:131). A range of efficiency indicators are taken into consideration in this analysis: profitability indicators, indicators about the financial balance, indicators about the claims and debts, indicators about the activity of an organisation and the indicators concerning the costs.
- **Benchmarking,** that essentially improves performance by finding and applying the best demonstrated practices to operations and operations (Bain, 2015). The main objective of benchmarking is to find good examples of superior performance and to understand the practices that are driving that performance. The organisation can then improve its performance by adapting and integrating these best practices into their own operations by innovating.

There are other different analytical methods used in strategy analysis. Some of the commonly used techniques are discussed below.

### **3.2 TOOLS AND TECHNIQUES USED IN THE ANALYSIS OF STRATEGY**

There are many tools and techniques used in the strategic management processes. A few of them have been selected and discussed in this review based on their frequent use in the industry and being commonly cited, used and recommended in literature. Section 3.1.3 of this thesis also highlighted some of the most common tools recommended in literature for the different phases of

the strategic management process. The listed tools also form part of this research whereby the extent of their use is investigated in the mining industry.

- SWOT;
- TOWS Matrix;
- Internal-External Matrix;
- BCG Matrix;
- McKinsey 7-S;
- Porter's Value Chain Analysis;
- Porter's 4 Corners' Analysis;
- Space Matrix;
- Product Life Cycle;
- Balanced Scorecard;
- Scenario Planning;
- Competitive Strength Analysis;
- Strategic Group Maps;
- Industry Attractiveness;
- Key Success Factors;
- Assessing Uncertainty;
- Competitive Blind-spots;
- Early Warning Systems, and
- War Games and Gap Analysis.

Below is a brief overview of the tools listed above.

### **3.2.1 SWOT**

According to Morrison (2014), SWOT is an acronym of Strengths, Weaknesses, Opportunities, and Threats. SWOT is a logical method used to examine both external and internal factors that are likely to have an impact on the success of the organisation. Weaknesses and strengths in SWOT analysis are labelled as internal factors while threats and opportunities are labelled as external factors.

Morrison (2014) also reiterates the following:

- **Strengths:** Positive attributes which are internal to an organisation and also deemed to be within the control of the organisation.
- **Weaknesses:** Negative attributes which are also internal to an organisation and have a negative impact on its ability to attain the desired goal.
- **Opportunities:** External attractive factors and prospects which represent the reason for an organisation to exist and develop.
- **Threats:** External factors which could put the operation or mission of the organisation at risk and are beyond its control. The organisation may benefit by having some contingency plans to counter or reduce their impact. It is advisable to sort them by their “probability of occurrence” and “seriousness”.

Figure 3-4 depicts the typical plot of the 2 x 2 matrix that is commonly used. A few questions that can be used as a guideline for the mining industry are shown.

**Figure 3-4: SWOT Analysis diagram**

<b>Strengths</b>	<b>Opportunities</b>
<ul style="list-style-type: none"> <li>• What does the mining organisation do better than other organisations in the industry?</li> <li>• What is the competitive edge of the mining organisation?</li> <li>• What do the rivals in the industry and customers perceive as the strength of the organisation?</li> </ul>	<ul style="list-style-type: none"> <li>• What political, economic, socio-cultural technology changes are taking place that could be favorable to the organisation?</li> <li>• Where in the world are there gaps in the market or opportunities to boost demand for metals?</li> <li>• What are the opportunities for beneficiation?</li> </ul>
<b>Weaknesses</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• What elements within the organisation add little or no value?</li> <li>• What do other mining organisations do better?</li> </ul>	<ul style="list-style-type: none"> <li>• What political, economic, socio-cultural technology changes are taking place that could be unfavorable to the organisation?</li> <li>• What are the competitors doing that could harm the organisation?</li> <li>• What are the external factors that could have a negative impact on the demand for metals and drive the price down?</li> </ul>

(Source: Own compilation based on literature)

A SWOT analysis is normally followed by a TOWS matrix which serves as a guideline for crafting necessary strategies as outlined below.

### 3.2.2 TOWS Matrix

According to Zideate (2014), the TOWS (threats, opportunities, weaknesses, strengths) matrix is a 2-cell by 2-cell matrix that helps organisations in determining strategic choices by scrutinizing external opportunities and threats and how they compare to an organisation's existing strengths and weaknesses. All the threats, opportunities, strengths and weaknesses are detailed on the outside of the matrix and compared within each cell. The TOWS matrix is mainly used for strategic planning and assists organisations to spot the threats and opportunities and measure them against internal weaknesses and strengths.

The aim of this tool is to answer the following four questions according to Zideate (2014):

- **Strengths and Opportunities (SO):** How can the organisation take advantage of the opportunities by using the current strengths?
- **Strengths and Threats (ST):** How can the existing strengths assist the organisation to find and avoid or lessen the impact of current and possible threats?
- **Weaknesses and Opportunities (WO):** How can the organisation make use of the opportunities to improve and overcome the current weaknesses?
- **Weaknesses and Threats (WT):** How can the organisation get rid or reduce the weaknesses and avoid current and possible threats?

The matrix is depicted in Figure 3-5 below:

**Figure 3-5: TOWS matrix**

	Internal factors	Strengths (S)	Weaknesses (W)
External factors			
<b>Opportunities (O)</b>		<p><b>SO Strategies</b></p> <p>Generate strategies here that use strengths to take advantage of opportunities</p>	<p><b>WO Strategies</b></p> <p>Generate strategies here that take advantage of opportunities by overcoming weaknesses.</p>
<b>Threats (T)</b>		<p><b>ST Strategies</b></p> <p>Generate strategies here that use strengths to avoid threats.</p>	<p><b>WT Strategies</b></p> <p>Generate strategies here that minimize weaknesses and avoid threats.</p>

Source: Zideate (2014)

SWOT and TOWS matrices use internal strengths and weakness as well as external treats and opportunities in their analysis. The similar factors are used in the Internal-External matrix which normally follows after these two tools as discussed in the next section.

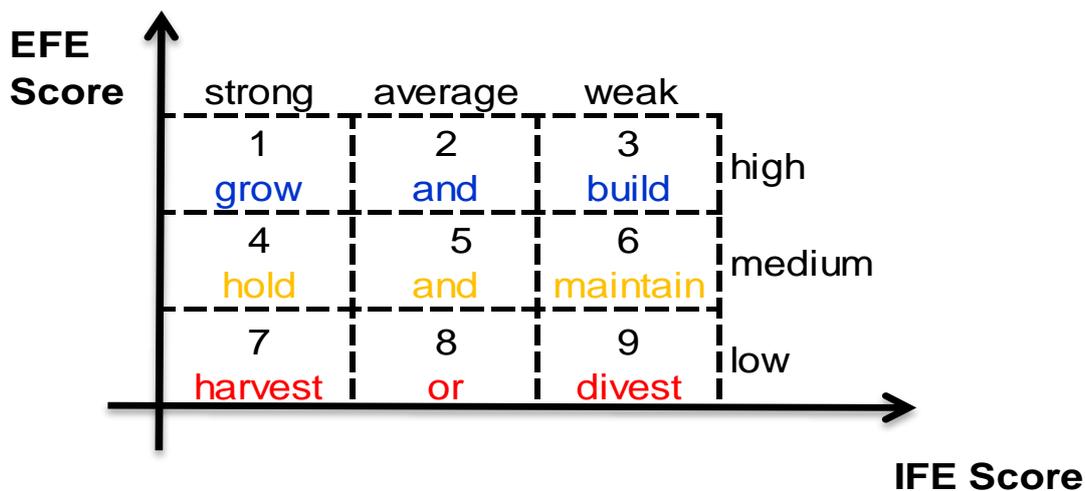
### 3.2.3 Internal-External Matrix

The Internal-External (IE) Matrix is grounded on an assessment of external and internal business factors that are brought together into one suggestive model (Jurevicius, 2014). The IE matrix is an extension of the Internal Factor Evaluation (IFE) matrix and External Factor Evaluation (EFE) matrix models. IFE matrix is a strategic management tool for examining or assessing the main weaknesses and strengths in an organisation. IFE matrix also provides a basis for finding and examining relationships among those areas. The EFE matrix is a valuable tool to picture and give priority to the threats and opportunities that an organisation is facing.

According to David (2009), the IE matrix is used in such a manner that the total weighted score from the EFE matrix is plotted on the y-axis and a horizontal line is drawn across the plane. Then the score calculated in the IFE matrix is plotted on the x-axis and a vertical line is drawn across the

plane. The point where the vertical line crosses the horizontal line is the point which shows the strategy that the organisation ought to follow. On the y-axis, an EFE total weighted score of 1.0 to 1.99 is considered low. A score of 2.0 to 2.99 is medium. A score of 3.0 to 4.0 is high. On the x-axis of the IE Matrix, an IFE total weighted score of 1.0 to 1.99 represents a weak internal position. A score of 2.0 to 2.99 is considered medium. A score of 3.0 to 4.0 is strong (Jurevicius, 2014).

**Figure 3-6: Internal-External Matrix**



Source: Jurevicius (2013)

The IE matrix can be divided into three main regions which have completely dissimilar strategy suggestions. The **grow and build strategy** is suggested in cells 1, 2 and 3. This implies intensive and aggressive tactical strategies. The organisation's strategies ought to focus on product development, market development and market penetration. From the operational viewpoint, a horizontal integration, backward integration and forward integration should also be considered.

The **hold and maintain strategy** is suggested in cells 4, 5 and 6. In this scenario, the tactical strategies ought to focus on product development and market penetration. The **harvest or divest strategy** is suggested in cells 7, 8 and 9. If costs for revitalising the business are reasonable and low, then an attempt should be made to rejuvenate the business. Otherwise, an aggressive cost management strategy should be pursued (David, 2009).

### 3.2.4 BCG Matrix

According to Brooks (2013), the Boston Consulting Group (BCG) matrix is founded on the product-life-cycle theory that can be utilised to establish the priorities that ought to be given in the product portfolio of a business unit. An organisation typically has a range of products that consists of both high-growth products in need of cash inputs and low-growth products that produce a lot of cash. The BCG matrix has two dimensions: market growth rate and relative market share. It can be inferred from the matrix that the higher the relative market share a product enjoys or the faster the product's market grows the better it is for the organisation.

To assist organisations to assess and evaluate its assets, the matrix divides the business units or products into 4 main categories, including (Arline, 2015):

- **Stars:** high growth, high market share – These are the products or business units that have the best market shares and produce the most cash. However, because of their high growth rate, stars also use huge amounts of cash. This commonly results in the same amount of money coming in that is going out. Stars can become cash cows if they sustain their success until a time that the market growth rate declines.
- **Cash Cows:** low growth, high market share – The cash cows generate more cash than they use and are generally leaders in the marketplace. They are business units or products that enjoy a high market share, but have a low growth outlook. Cash cows generate the cash required to turn question marks into market leaders, to cover the administrative costs of the organisation, to service the debt and to pay dividends to shareholders.
- **Dogs:** low growth, low market share – These are the business units or products with both a low market share and low growth rate. They do not earn a lot of cash and do not use a lot. Dogs are cash traps and are prime candidates for divestiture.
- **Question Marks:** high growth, low market share – These units or products have high growth prospects, but a low relative market share. They use a lot of cash, but bring little back in return. They have the potential to turn into a star as they are growing rapidly. Question marks must be assessed thoroughly in order to determine whether they are worth the investment required to grow their market share. The matrix is depicted in Figure 3-7.

**Figure 3-7: Picture showing the BCG matrix**



(Source: Jurevicius, 2013)

### 3.2.5 McKinsey 7-S

Jurevicius (2013) summarizes the definition of McKinsey’s 7-S model as a tool that analyses the design of the organisation by looking at seven key internal elements: strategy, structure, systems, shared values, style, staff and skills, in order to establish if they are well aligned and enable the organisation to realize its objectives. Hanlon (2014) iterates that the 7-S model can be utilised to review the efficiency or effectiveness of an organisation in its marketing operations, determine the best way to realign an organisation to support a new strategic direction and assess the changes needed to support transformation of an organisation.

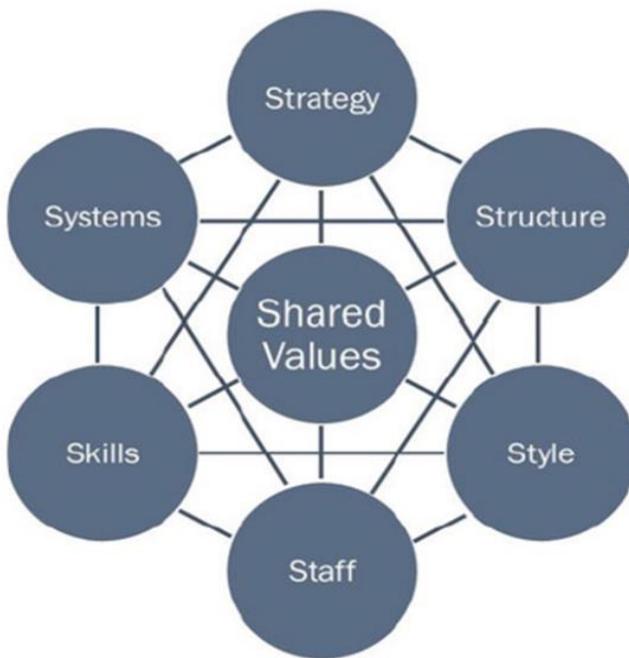
Figure 3-8 below shows the model, which represents the connections among all the seven areas. The shape of the model highlights interconnectedness of the elements.

The elements of the framework are summarized by Hanlon (2014) as follows:

- **Strategy:** The definition of critical approaches for an organisation to realize its goals.
- **Structure:** The organisation of resources within an organisation into different business groups and teams.

- **Style:** The culture of the organisation in terms of management and interfaces between personnel and other stakeholders.
- **Staff:** The kind of employees, remuneration packages and how they are recruited and retained.
- **Skills:** Competencies and capabilities to complete different activities.
- **Systems:** Business processes and the technical platforms used to support operations.
- **Shared Values:** Summarized in a vision and mission.

**Figure 3-8: McKinsey 7-S model**



(Source: Jurevicius, 2013)

According to Hanlon (2014) and Jurevicius (2013), the model can be used to almost any organisational issue related to effectiveness. The process of analysing where the organisation is currently in terms of these elements is very important. Taking this analysis to the next level and determining the ultimate state for each of the factors, the organisation can really move forward (Hanlon, 2014; Jurevicius, 2013).

### 3.2.6 Porter's Value Chain Analysis

Downey (2007) mentioned that it is important to understand how activities within the organisation create value for customers before making a strategic decision. One way to do this is to conduct a value chain analysis.

Value chain analysis is founded on the principle that organisations exist in order to create value for their customers. In the analysis, the organisation's activities are divided into separate sets of activities that add value. The organisation can assess its internal capabilities more effectively by identifying and examining each of these activities. Each value adding activity is deemed to be a source of competitive advantage (Downey, 2007).

According to Downey (2007), the three steps for conducting a value chain analysis are:

- Separate the organisation's operations into primary and support activities. Primary activities are those that physically create a product, as well as market the product, deliver the product to the customer and provide after-sales support. Support activities are those that facilitate the primary activities.
- Allocate cost to each activity. Activity cost information provides managers with valuable insight into the internal capabilities of an organisation.
- Identify the activities that are critical to customer satisfaction and market success. There are three important considerations in evaluating the role of each activity in the value chain.
  - Company mission. This influences the choice of activities an organisation undertakes.
  - Industry type. The nature of the industry influences the relative importance of activities.
  - Value system. This includes the value chains of an organisation's upstream and downstream partners in providing products to end customers.

Value chain analysis is a comprehensive technique for analysing an organisation's source of competitive advantage.

### **3.2.7 Porter's 4 Corners' Analysis**

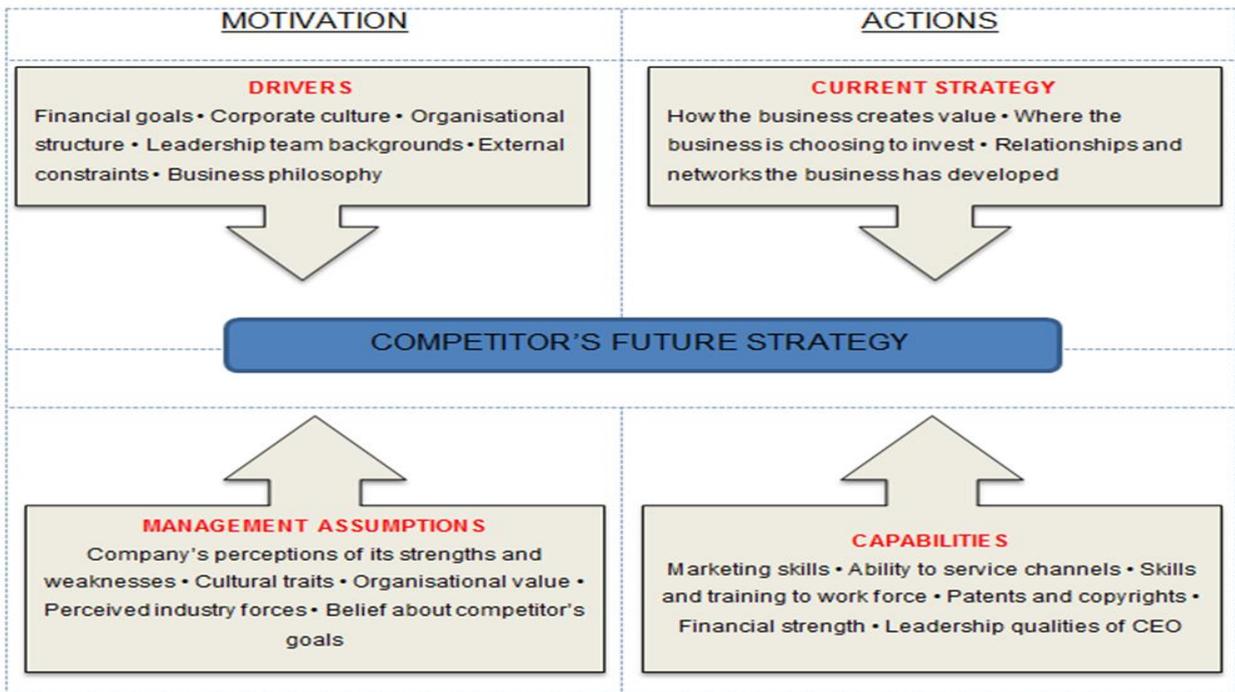
The Four Corners' Model, like the Porters 5 Force model discussed above in section 3.1.3.4 helps organisations to assess their competitors' positions and envisage their future courses of action (Metayer, 2013). The model can be used to:

- develop a profile of the possible and likely changes in strategy that a competitor might make and how successful they may be;

- determine each rival’s possible reaction to the range of feasible strategic moves competitors might make, and
- determine each competitor’s probable reaction to the range of industry moves and environmental changes that may occur.

According to Downey (2007), the ‘four corners’ refer to four diagnostic components that are necessary to competitor analysis: future goals, current strategy, assumptions and capabilities as shown in Figure 3-9 below.

**Figure 3-9: A summary of Porter’s Four Corners’ Analysis**



( Source: Downey, 2007)

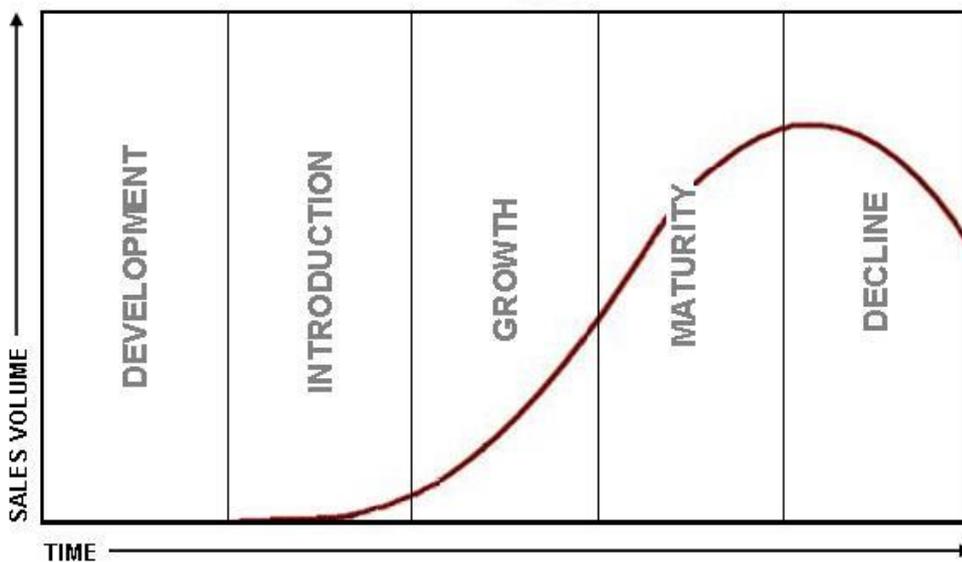
### 3.2.8 Space Matrix

Metayer (2013) summarizes the Strategic Position and Action Evaluation matrix or short a “SPACE” matrix as a valuable method for analysing the competitive position of an organisation. It focuses on two internal dimensions (financial strength and competitive advantage) and two external dimensions (industry strength and environmental stability) to determine the organisation’s strategic position in the industry. The organisation’s strategic strength is then defined as either aggressive, competitive, conservative or defensive.

### 3.2.9 Product Life Cycle

Costa (2012) defined Product Life Cycle (PLC) as a term used to define individual stages in the life of a product. Product life cycle is an important aspect of conducting business which affects strategic planning and can be divided into several stages characterized by the revenue generated by the product. The method identifies the distinct stages affecting sales of a product, from the product's inception until its retirement as shown in Figure 3.10 below.

**Figure 3-10: Product Life Cycle**



Source: Costa (2012)

The product is being created in the development stage, and is not yet available for concrete sales. The introduction stage starts with the first sales which then start to grow. Sales growth is initially slow but starts to accelerate leading to the growth stage which is a period of rapid growth in sales. The maturity stage then follows and is characterized by growth as well, but the sales growth is decelerating. Sales volume reaches its maximum at the end of the maturity stage. The last stage is the decline stage which represents the period of declining sales. The sales may still be very high, but they are declining (Costa, 2012).

### 3.2.10 Balanced Scorecard

Kaplan and Norton (2006) defined Balanced Scorecard as a performance management framework utilised by strategists to make the correct decisions about their organisation. The balanced scorecard is designed to give a view of an organisation from both internal and external perspective and includes forming a set of measurements for four strategic perspectives. These perspectives include: financial, customer, internal business process plus learning and growth. Some generic measurements are presented in the table below.

**Table 3-1: Four perspectives of the Balanced Scorecard and their Generic Measurements**

Perspective	Generic Measurements
Financial	Return of Capital Employed, Economic value added, Sales growth, Cash flow
Customer	Customer satisfaction, retention, acquisition, profitability, market share
Internal business process	Includes measurements along the internal value chain for:  Innovation - measures of how well the company identifies the customers' future needs.  Operations - measures of quality, cycle time, and costs.  Post sales service - measures for warranty, repair and treatment of defects and returns.
Learning and growth	Includes measurements for:  People - employee retention, training, skills, morale.  Systems - measure of availability of critical real time information needed for front line employees

The balanced scorecard method is meant to transform an organisation's strategic plans and goals from mere statements into plans that can be executed. The scorecard gives a framework that not only provides performance measurements, but also assist planners to identify what ought to be done and how it should be measured. It enables executives to execute their strategies.

### 3.2.11 Scenario Planning

Jisc (2008) summarizes scenario planning as a strategic planning tool utilised to formulate flexible long-term plans. It is a technique for learning about the future by understanding the nature and effect of the most uncertain and essential driving forces affecting the world. Scenario planning makes an assumption that the future can vary a lot from the way it is known today. The method is centred on creating a series of ‘diverse futures’ produced from a mixture of known factors, such as demographics, with plausible alternative political, economic, social, technical, legal and environmental trends which are essential driving forces. The main objective is to craft diverging worlds by extrapolating these driving forces (Jisc, 2008).

According to Keeley (2011), scenario planning provides:

- The tools required for an organisation to respond to critical changes;
- Method for comprehending and understanding specific trends and how to make decisions based on those trends, and
- Organised process to link “what if” situations with action steps and financial impact on the organisation.

Scenario planning is meant to be a group process which encourages knowledge exchange and development of a better understanding of the central issues which are critical to the future of the organisation.

### 3.2.12 Competitive Strength Analysis

Competitive strength assessments provide valuable conclusions about an organisation’s competitive state of affairs (Thompson *et al.*, 2012:318). The ratings show how an organisation compares against rivals, factor by factor or capability by capability, thus revealing where it is strongest and weakest. Moreover, the overall competitive strength scores indicate whether the company is at a net competitive advantage or disadvantage against each rival. In addition, the strength ratings provide guidelines for designing wise offensive and defensive strategies (Thompson *et al.*, 2012:318). An example of such analysis is depicted in Figure 3-11.

Based on the shown example, Rival 1 has the highest overall weighted competitive strength and can be used as benchmark among the three which were compared.

**Figure 3-11: Competitive Strength Analysis**

Competitive Strength Assessment (Rating scale: 1 = very weak; 10 = very strong)							
Key Success Factor/Strength Measure	Importance Weight	ABC Co.		Rival 1		Rival 2	
		Strength Rating	Weighted Score	Strength Rating	Weighted Score	Strength Rating	Weighted Score
Quality/product performance	0.10	8	0.80	5	0.50	1	0.10
Reputation/image	0.10	8	0.80	7	0.70	1	0.10
Manufacturing capability	0.10	2	0.20	10	1.00	5	0.50
Technological skills	0.05	10	0.50	1	0.05	3	0.15
Dealer network/distribution capability	0.05	9	0.45	4	0.20	5	0.25
New product innovation capability	0.05	9	0.45	4	0.20	5	0.25
Financial resources	0.10	5	0.50	10	1.00	3	0.30
Relative cost position	0.30	5	1.50	10	3.00	1	0.30
Customer service capabilities	<u>0.15</u>	5	<u>0.75</u>	7	<u>1.05</u>	1	<u>0.15</u>
Sum of importance weights	<b>1.00</b>						
<b>Overall weighted competitive strength rating</b>			<b>5.95</b>		<b>7.70</b>		<b>2.10</b>

(Source: Thompson *et al.*, 2012)

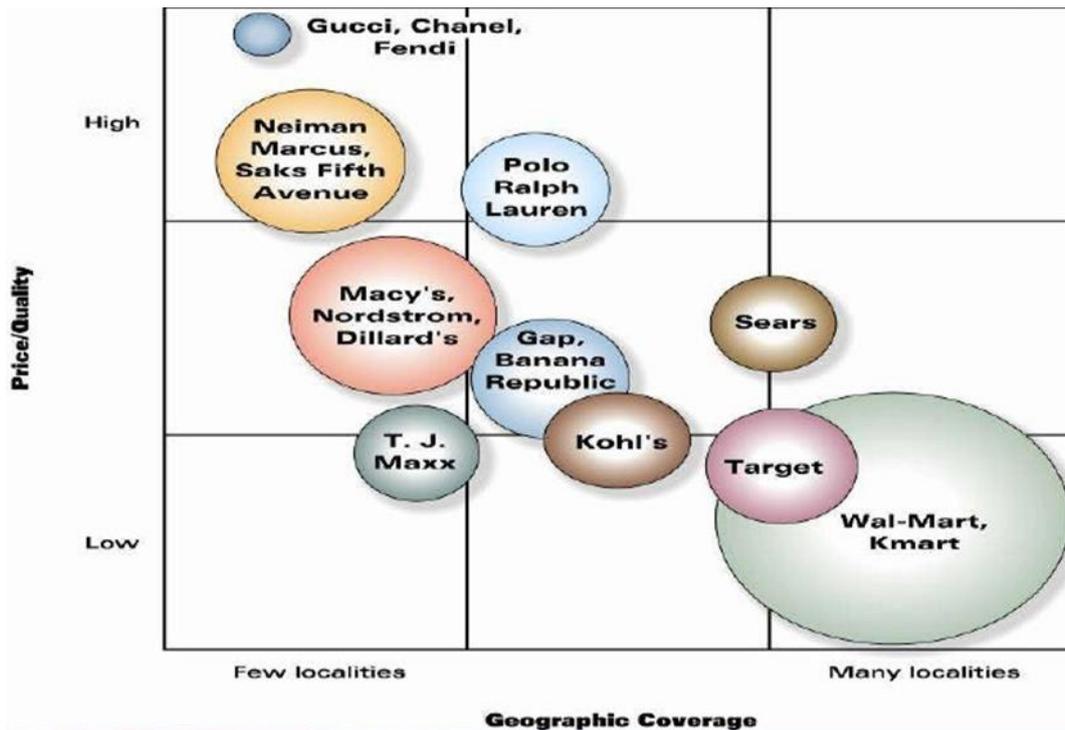
### 3.2.13 Strategic Group Maps

Strategic group mapping is a tool for presenting the different market and competitive positions that rival organisations occupy in the industry (Thompson *et al.*, 2012:127). There is a number of benefits to strategic group mapping:

- It can help the organisation to identify the direct and indirect competitors (or possible partners).
- It can demonstrate how easy it might be to move from one strategic group to another.
- It may help identify future opportunities or strategic problems.
- It ascertains that the organisation takes its customers' or beneficiaries' views into account when developing or assessing its strategy.

An example of such a map is shown in Figure 3-12.

**Figure 3-12: Example of a strategic group map of selected retail chains**



(Source: Thompson *et al.*, 2012:127)

### 3.2.14 Industry Attractiveness

Doyle (2014) reiterates that it is vital to understand the underlying competitive factors in the industry sector in which the organisation operates. The organisation needs a clear understanding of the attractiveness of the industry and the organisation's position within this industry. A number of standard attractiveness measures can be used to determine general industry attractiveness. The criterion used by Doyle (2014) is as follows: Growth, size, profitability, competitive structure, market diversity, cyclicability and community risk.

According to Doyle (2014), it is nearly impossible to find an industry that has high positive attractiveness in every one of these areas, but an analysis of each area will give a balanced view of the attractiveness of the industry and also help in defining strategies to manage any less attractive components of the industry.

### 3.2.15 Key Success Factors

Thompson *et al.* (2012:133) summarized industry's key success factors (KSFs) which can also be used in competitive strength analysis discussed in section 3.2.12 as particular strategy elements,

product attributes, operational approaches, resources and competitive capabilities that all industry members need to have in order to survive and prosper in the industry. KSFs can be deduced by answering the following basic questions according to Thompson *et al.* (2012:133):

- On what basis do buyers choose between the competing brands of the sellers?
- What resources and competitive capabilities must an organisation have to be competitively successful?
- What shortcomings are almost certain to put the organisation at a significant competitive disadvantage?

Correctly diagnosing an industry's KSFs improves a company's chances of crafting a sound strategy.

### **3.2.16 Assessing Uncertainty**

Similarly to the McKinsey's 7-S model discussed in section 3.2.5, a McKinsey framework of four levels of uncertainty can be helpful to select the right set of strategic tools as summarized by Courtney *et al.* (2000):

- **Level One: A predictable future**

This would apply to circumstances where sufficiently precise expectations can be made about key variables affecting an organisation's markets and businesses (for example, market demographics in a reasonably stable consumer goods sector). In this case, executives can apply the standard strategy tool to define an optimal course of action.

- **Level Two: Alternative futures**

Sometimes organisations are confronted with discrete scenarios, for example, regulatory changes, significant actions of competitors and others. Organisations find it difficult to predict which outcome will occur, although one can give probabilities to various alternatives. The recommendation here is to develop strategic scenarios and apply a decision analysis framework or a "real option" approach. It is important to define trigger points and monitor markets and competitors closely, in order to respond quickly once some of these uncertainties are removed.

- **Level Three: A range of futures**

Unlike level two (where the outcome is either-or), in level three, a small number of variables define a wide range of possible results, but the actual result may lie anywhere in between. An example would be an organisation entering an emerging market, where the consumer penetration rate could be either very low or very high, or anywhere in between. Similar to level two, executives are advised here to develop a number of scenarios. It will be essential to define these cautiously, make sure they do not overlap and cover a reasonably wide range of outcomes.

- **Level Four: True ambiguity**

This type of uncertainty is in reality quite rare. It may occur in cases of completely new technologies (for example, mobile internet applications), where technology adoption, platform prevalence, competitive landscape and revenue models are all up in the air. Strategy in this situation would be highly qualitative, based on the study of analogous markets and patterns.

### **3.2.17 Competitive blind-spots**

According to Porter (1998), competitive blind spots are the areas where a competitor will either not see the importance of events at all, will perceive them incorrectly or will perceive them very slowly. The blind spots may result in an organisation's sluggish reaction to its competitors' actions or an organisation's possible wrong strategic decisions. They may also result in the wrong estimation of competitors' capabilities and resources. These competitive blind spots lead to an organisation having flawed competitive-analysis thereby weakening its ability to seize the new opportunities in the market or interact effectively with its competitors. Eventually, it leaves an organisation with declining or eroding market share, decreasing market position and decreasing profitability.

According to Gupta (2013), there are four main aspects of competitive-analysis while analysing the Competitive Blind Spots: Industry, Customers, Competitors and Organisation. The detailed list of competitive blind spots within each of these four aspects is shown in Figure 3-13.

**Figure 3-13: Detailed list of typical blind spots**



(Source: Gupta, 2013)

Porter (1998) and Gupta (2013) recommend that in order to get rid of these competitive blind spots, managers are required to have a formal unit for competitive analysis, with the main focus being on competitor's strategic intent and their response patterns. Organisations can be able to track their competitors, their strategic moves and change the perception of their management. All these put together can result in harnessing new opportunities and designing or formulation of a new strategy to gain a sustainable competitive advantage.

### 3.2.18 Early Warning Systems

According to Downey (2007), the main objective of strategic early warning systems is to detect or predict strategically important events as early as possible. The systems are often utilised to identify the initial scene of attack from a competitor or to assess the probability of a given scenario becoming reality.

The seven key components of an early warning system are listed by Downey (2007) as follows:

- Market definition: A clear definition of the scope of the arena to be scrutinized;
- Open systems: An ability to gather a broad range of information on relevant competitors;
- Filtering: Information needs to be filtered according to significance. Expert interpretation is needed in order to identify particular trends that signify strategic moves;

- Predictive intelligence: Using knowledge of the forces driving a competitor to predict which direction they are likely to take;
- Communicating intelligence: Ensuring that the correct people in an organisation get regular briefing on important signals;
- Contingency planning: Events that have a high potential impact or likelihood of occurring may merit contingency plans, and
- A cyclical process: The process of scrutinizing information for new warning signals should never stop. While the emphasis is on emerging threats and opportunities, the process should be flexible enough to be able to tackle unforeseen developments too.

### **3.2.19 War Games**

This is a process to look out for the rivals' probable moves by getting the management team to play out different scenarios and reactions as if they were the competitors themselves, responding to one of their strategic moves (Metayer, 2013). War games are a valuable technique for identifying competitive weaknesses and misguided internal assumptions about competitors' strategies.

### **3.2.20 Gap Analysis**

According to Sharma (2013), gap analysis is a technique that organisations use to determine the steps that need to be taken in order to move from the current state to the desired, future state. Gap analysis technique entails listing of distinguishing factors (such as attributes, competencies, performance levels) of the present situation, listing factors needed to achieve future objectives and then underlining the gaps that exist and need to be filled. Gap analysis forces the organisation to reflect on who it is and ask who it wants to be in the future.

Below is the review of literature about the intelligence constructs and knowledge management which are also viewed as essential inputs to the strategic management processes.

### **3.3 INTELLIGENCE CONSTRUCTS AND KNOWLEDGE MANAGEMENT**

The purpose of this part of the literature study is to examine key concepts and related research relevant to strategic intelligence and its role in strategic management. The overview will highlight the contextual definitions and differences of business intelligence, competitive intelligence, marketing intelligence, knowledge management as constructs for strategic intelligence and well-informed by the literature study. The review will also describe the strategic intelligence framework and systems and their utilisation in strategic decision-making and management.

The review starts with the overall theoretical overview of the concept of intelligence in business as discussed in the next section. The discussion of the specific types of intelligence such as business intelligence will follow thereafter.

#### **3.3.1 INTELLIGENCE**

Understanding the place of intelligence within the larger context of an organisation is imperative and intelligence processes in business organisations have received significant attention in recent decades. Intelligence can be defined as information that is analysed, interpreted and infused with developed implications (Bensoussan & Fleisher, 2007).

Singh *et al.* (2014:2) emphasized that information will not do much good if any intelligence cannot be derived from it, and to do that, the organisation needs to be able to analyse the information properly. Good analysis is the key to successful insights as well as intelligence and can provide valuable strategic decision support competence in the organisations. Intelligence about customers, rivals, potential partners, suppliers and other stakeholders is an organisation's first, and usually only, line of offense or defence (Bensoussan & Fleisher, 2007).

The intelligence cycle is the process of developing crude data into polished intelligence for the use of managers. According to Djekic (2014), the intelligence cycle consists of six steps. The figure below shows the circular nature of this process.

**Figure 3-14: Six steps of Intelligence Cycle**



(Source: Djekic, 2014)

1. **Requirements:** These are information needs which were identified and are developed based on critical information.
2. **Planning and Direction:** This is the second stage which requires the identification of the critical intelligence topics and the determination of the course.
3. **Collection:** The collection phase involves the gathering of crude information from which the required intelligence can be generated and also includes the processing of information so that it can be easily transmitted and electronically stored. Once the data is in electronic format, it can be manipulated into a form that allows for it to be analyzed.
4. **Processing and Exploitation:** This involves converting the vast amount of information collected into a form that can be used by analysts. Processing includes the loading of raw data into databases where it can be exploited for use in the analysis process.

5. **Analysis and Production:** This analysis phase requires highly skilled practitioners who will weigh information, look for trends and patterns and come up with various scenarios based on what the analyst has discovered.
6. **Dissemination:** This is the step where the practitioner communicates the results of the analysis to the decision makers. The analyst has to be able to propose possible courses of action and provide useful recommendations which must be supported by logical arguments, if requested (Djekic, 2014).

Below is the review of literature on Business Intelligence.

### **3.3.2 BUSINESS INTELLIGENCE**

#### **3.3.2.1 Definition**

Gartner (2013) defines business intelligence (BI) as an umbrella term that comprises the applications, infrastructure, tools and best practices that enable access to and analysis of information to improve and optimize decisions and performance. According to Elena (2011), BI refers to computer-based techniques utilized in spotting, digging-out, and analysing business data, such as sales revenue by products or departments or associated costs and incomes. Ranjan (2008) defines BI as the conscious, methodical transformation of data from data sources into new forms to give results-oriented and business-driven information, transform from the environment that is mainly reactive to data to a proactive one, automate and integrate as many steps and functions as possible in business, analysis and integrate powerful capabilities in business event.

Almost all the definitions share the same focus, even if the term has been defined from several perspectives and they all include the idea of analysing data and information. The need for BI and its benefits are discussed below.

#### **3.3.2.2 Need and Benefits of BI**

According to Techopedia (2014), BI technologies provide current, historical and predictive views of internally structured data for products and business units by establishing more effective decision-making and strategic operational insights through functions such as online analytical processing

(OLAP), reporting, predictive analytics, data mining, benchmarking and Business Performance Management (BPM)

According to the Polasek (2013), objectives of a BI exercise include better decision-making, enhanced operational efficiency, growth in revenue and competitive advantage as well as enhanced customer service.

Schiff (2010) listed the following benefits of using BI:

**Eliminate guesswork:** BI helps in eliminating guesstimate by providing more accurate historical data, real-time updates, forecasting and trending and predictive analysis.

**Get quicker answers to business questions:** BI users can get answers to business questions at a faster rate rather than having to spend a lot of time reading through volumes of printed reports.

**Get critical business metrics reports when and where they are needed:** Users can access important business metrics, reports and dashboards on mobile devices, giving sales and marketing people access to critical business information when they need it.

**Get insight into customer behaviour:** BI enables organisations to gain visibility into the buying patterns of customers, giving them the ability to turn this knowledge into additional profit and retain valuable customers.

**Identify cross-selling and up-selling opportunities:** BI enables organisations to leverage customer data to build; refine and modify predictive models that assist sales representatives to up-sell and cross-sell products at appropriate customer touch points.

**Learn how to streamline operations:** Organisations can easily see where they need to make changes to streamline operations.

**Improve efficiency:** Using BI systems can lead to all the information being centralized and viewed in a dashboard, saving enormous amounts of time and eliminating inefficiencies.

**Learn what your true manufacturing costs are:** BI systems can give users greater insight into production costs and the ability to adjust production quickly for greater profitability.

**Manage inventory better:** Business intelligence systems can assist the organisation to order the required amount of inventory at the right time so that customers receive their products when they need them and the business does not bear the cost of stocking excess inventory.

**See where the business has been, where it is now and where it is going:** From simple content-based metrics to sophisticated sentiment analysis, BI systems can provide a more complete view on customer and competitor experience and opportunities therein and help management plan for the future.

### 3.3.2.3 BI Tools and Implementation

Kumari (2013:972) listed the following key general categories of business intelligence tools:

- Spreadsheets, reporting and querying software, OLAP (Online analytical processing), digital dashboards, data mining, data warehousing, decision engineering, process mining, business performance management and local information systems.

Kumari (2013:972) listed the following BI Delivery Mechanisms:

**Scheduled Reports:** These reports are generated at regular intervals and provide the information to business.

**Ad hoc/User Query Tools:** With the assistance of the accessible BI tools, businesses can query the underlying data and make decisions.

**Dashboards:** These are BI solutions where analysis and reporting tools are utilised to give feedback on the realisation of objectives.

**Trend Analysis Reports:** Preparation of the trend analysis reports can be done on a segment of customers by certain attributes.

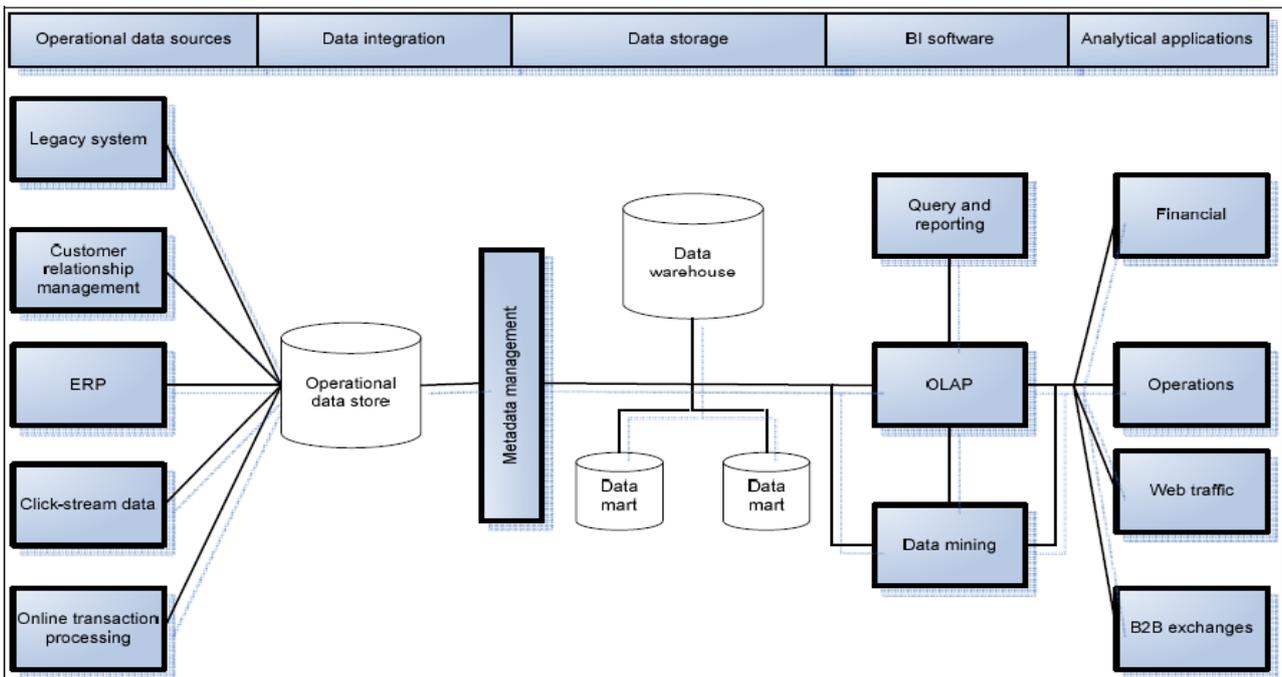
**Forecasting:** This BI solution enables an insurer to figure out what is likely to happen in the future based on evaluation of current and historic data.

In order for BI tools to be effective, the structure has to be characterised by the following modules (Ziemba & Olszak, 2007):

- **Tools to extract, transform and load data (ETL, Extraction-Transformation-Load tools)** – they are mainly responsible for data transfer from transaction systems and the Internet to data warehouses;
- **Data warehouses** – they provide some room for thematic storing of aggregated and data that is already analyzed;
- **Analytic tools (OLAP, On-Line Analytical Processing)** – they enable users to access, analyze and model business problems and share information that is stored in data warehouses;
- **Data mining tools** – they enable their users to discover various trends, patterns, generalizations, regularities and rules in data resources;
- **Tools for reporting and ad-hoc inquiring** – they allow for forming and utilizing different synthetic reports; and
- **Presentation layer** – applications including graphic and multimedia interfaces whose task is to give users information in a comfortable and accessible form.

Figure 3-15 represents a BI system that queries a data source, and uses well-founded approaches such as OLAP and data mining to analyse information in the source and report results (Flici, 2011:68).

**Figure 3-15 Business Intelligence Diagram**



(Source: Flici, 2011)

The selection for the type of BI tools depends on how the data is being managed and how the organisation prefers to analyse it (Adesoba, 2014). For example, if the data is scattered across disparate transactional databases, the organisation might need to build a data warehouse to centralize it and invest in data management tools that give ETL functionality to move and re-structure the data. Once the data has a common structure and format, the organisation can invest in data discovery solutions such as OLAP, data mining and semantic or text mining applications, with the competence to generate custom, ad-hoc reports. Users can quickly pull reports without impacting the performance of the organisation's software applications, such as CRM, ERP and supply chain management solutions (Adesoba, 2014).

Some of the leading vendors of BI tools include Qlikview, SAP, SAS, Oracle, IBM, Microsoft, and Tableau (ITWeb, 2014).

Most BI tools' vendors provide six main functions: 1) reporting, 2) data integration, 3) visualisation techniques, 4) database management, 5) analytical techniques, and 6) dashboards and scorecards (Howson & Eckerson, 2008). In other words, even if BI tools differ, they will only differ in small features rather than in their key capabilities.

#### **3.3.2.4 Recommendations for Implementation of BI Systems**

Cawley (2014) as well as Ziemba and Olszak (2007) made the following recommendations when handling issues related to the implementation of BI systems:

- BI systems ought to be implemented rapidly. Each implementation necessitates adjusting of a particular system to specific requirements of an organisation;
- BI solutions should not be rigid, they must be flexible. When business changes, organisations should be able to adjust their BI systems to new conditions;
- BI systems ought to be independent of their hardware and software platforms;
- While creating BI systems, attention should be paid to the fact that there are different information technology systems in organisations;
- BI solutions have to be scale-able. Flexibility and open architecture enable easy expansion of the system, and
- BI systems should be based on modern technologies.
- End-users should be empowered by simplifying the toolset and infrastructure.

Below is the review of literature on Competitive Intelligence

### **3.3.3 COMPETITIVE INTELLIGENCE**

#### **3.3.3.1 Definition**

Wright *et al.* (2009:942) identified Competitive Intelligence as the process by which organisations gather information on competitors and the competitive environment, ideally using this information in their decision-making and planning processes with the goal of adjusting activities to improve performance.

Pellissier and Nenzhelele (2013:5) proposed the following definition for CI: *A process or practice that produces and disseminates actionable intelligence by planning, ethically and legally collecting, processing and analysing information from and about the internal and external or competitive environment in order to help decision-makers in decision-making and to provide a competitive advantage to the enterprise.*

Competitive Intelligence is a timely and fact-based data on which management may rely in decision-making and strategy development. It is carried out through the following:

- industry analysis, which means understanding all the players in an industry;
- competitive analysis, which means understanding the weaknesses and strengths of rivals, and
- benchmarking.

The overall goal of CI therefore is to identify and act upon signals, events and discernible patterns which can inform and enhance the organisation's decision-making activities (Wright *et al.*, 2009:942).

#### **3.3.3.2 Benefits of CI**

The main objectives of competitive intelligence are to provide help in decision-making and to provide an organisation with a competitive advantage. It is a way to alert organisations constantly of developments in the competitive environment (Muller 2005).

Wright *et al.* (2009) identified the following main objectives:

- enhancing the organisation's competitiveness;
- predicting, with a high level of accuracy and trust, the business environment's evolutions, rivals' actions, customers' needs and requirements and even influences generated by political change;
- providing better support for the strategic decision-making process;
- revealing opportunities and threats by surveying weak signals and early warnings;
- handling and combining data and information to produce knowledge and insights about competitors, and
- decreasing reaction time and help in devising marketing strategies.

The Competitive Intelligence Foundation (2006) commissioned study found that in respondent organisations; CI was focused on new or increased revenue, new product or services, cost savings or avoidance, time savings, increase in profit and meeting financial goals. The study by The Competitive Intelligence Foundation (2006) also showed that there was clear evidence that CI resulted in supporting decisions in the following areas: business strategy, sales or business development, market entry decisions, product development, research and development or technology decisions, mergers and acquisitions decisions, due diligence, joint venture decisions and regulatory or legal responses.

### 3.3.3.3 Stages of CI process

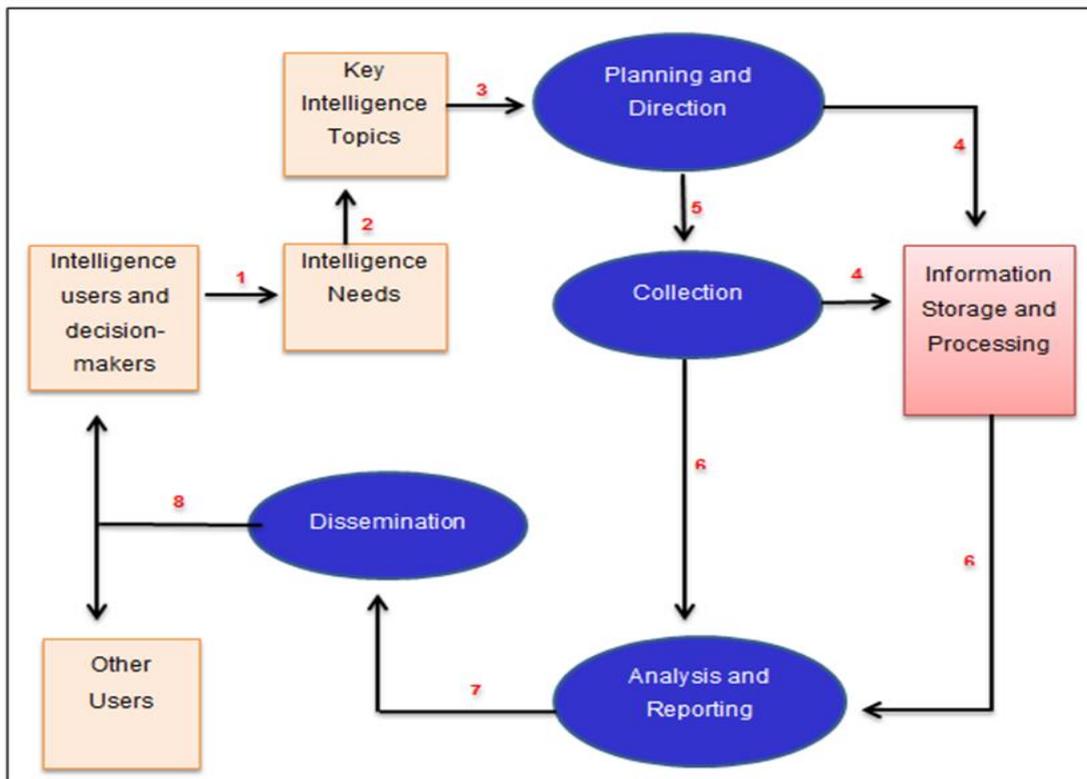
Botha and Boon (2008) identified the following steps of the CI process:

- **Intelligence needs and determining key intelligence topics:** Ascertaining intelligence needs of decision-makers and narrowing all intelligence leads to key intelligence topics;
- **Planning and direction:** Formulating plans and directions in order to fulfil the intelligence needs of decision-makers;
- **Collection:** Information is gathered from the external environment in an ethical and legal manner;
- **Information processing:** Collected information gets captured and stored;
- **Analysis:** Stored information is analyzed to produce actionable intelligence, and

- **Dissemination:** Actionable intelligence is distributed to intelligence users and decision-makers: New intelligence needs are identified.

The CI cycle is depicted in Figure 3-16.

**Figure 3-16: The competitive intelligence cycle**



(Source: Botha & Boon, 2008)

Even though all processes and operations of the intelligence cycle are very important, the most critical factor for success is the identification of the user's needs. The identification and determination of the user's real intelligence requirements is important in order to accomplish the correct CI operations and produce the appropriate intelligence (Botha & Boon, 2008).

### 3.3.3.4 Quality of CI provided

The value of the intelligence, produced through a Competitive intelligence process, can be measured across one or more of the following attributes (Nasri, 2012:29):

- **Accuracy** – does the intelligence usually prove to be accurate?
- **Clarity** – is the information understandable or comprehensible to the target group?

- **Usability** – has to be in a form that enables ready comprehension and immediate application;
- **Depth** – is the intelligence given adequate detail to facilitate the definition of counter measures?
- **Relevance** – does the intelligence cover topics that are relevant to the daily management of the organisation?
- **Responsiveness** – does the system provide a response within an acceptable timescale?
- **Timing** – is the intelligence received with satisfactory lead-time for the organisation to make effective plans?
- **Comprehensiveness** – how regularly do events occur that were not flagged in advance by the CI system?

Below is the discussion of Marketing Intelligence.

### 3.3.4 MARKETING INTELLIGENCE

#### 3.3.4.1 Definition

According to Kotler *et al.* (2009) and Fleisher and Craig (2003), marketing intelligence (MI) is industry-targeted intelligence that is established on real-time (dynamic) features of competitive activities taking place among the 4Ps of the marketing mix (pricing, place, promotion, and product) in the product or service marketplace in order to better understand the attractiveness of the market. MI is primarily external data gathered and studied by an organisation about markets that it expects to participate in with the intention of using it in making decisions. Marketing intelligence can be used to assess market entry opportunities and to formulate market development plans and penetration strategies (Skyrme, 2011).

#### 3.3.4.2 Benefits of MI

Skyrme (2011) summarized the benefits of MI as follows:

- Market and customer orientation;
- Identifying market opportunities for new products and acquisitions;
- Understanding market conditions, trends and performance of the organisation;
- Getting insight into product success and superiority;

- Minimizing risk for investment;
- Improving customer interaction;
- Improving market selection and positioning – better understanding of customer needs and competitor positioning, and
- Establishment of a system will make information more quickly and easily accessible.

### 3.3.4.3 MI System

Kotler and Keller (2012:226) define the Marketing Information Systems (MIS) as —*“interacting structure of people, equipment and procedures to gather sort, analyse, evaluate and distribute, timely and accurate information for use by marketing decision makers to improve their marketing planning, implementation, and control”*.

MIS can also be viewed as a set of processes and sources used by managers to obtain everyday information about pertinent developments in the marketing environment. These facts about the development in the environment are disseminated to the executives to be used as a basis for marketing decisions (Igbaekemen, 2014).

When addressing the issue of marketing intelligence the following questions need to be addressed (Igbaekemen, 2014):

- What environment do organisations need to scan or probe?
- What information in the environment does the organisation need to gather?
- What are those necessary, relevant and up-to-date consumers’ needs and wants?
- Of what relevance is this information?
- What techniques are available to marketing executives or managers for scanning?

The general system elements for MI include a data acquisition system, database management system, graphical and statistical analysis tools, model base, directories (specific data elements or information classification schemes) and retrieval systems (Bahloul, 2011).

According to Bahloul (2011), the functions of any MI system are fundamentally to identify information needs, gather information from different sources, process data and make the information ready for use, disseminate information to the decision-makers and save as well as record the information.

Bahloul (2011) listed the following factors which have to be taken into consideration when building the MI system:

- How to reach and get the needed data;
- A continuous flow of information and input it in the system in a timely fashion;
- The ability to provide the reports to the management in a way that will help in the decision-making process;
- The system must not be rigid, it must be flexible, which means that the system will be able to have some modifications when necessary; and
- The system designer should be one of the decision-makers in the firm.

Kotler and Keller (2012) mentioned eight steps to improve the quality and quantity of marketing intelligence:

- Train and encourage the sales force to spot and report new developments;
- Encourage distributors, retailers and other intermediaries to pass along important intelligence, because they are closer to the customer and the competitor;
- Appoint or hire external experts to collect intelligence;
- Network internally and externally;
- Set up a customer advisory panel;
- Take advantage of government-related data sources;
- Purchase information from outside research organisations and vendors, and
- Collect marketing intelligence on the Internet.

The concept of knowledge management is discussed below:

### **3.3.5 KNOWLEDGE MANAGEMENT**

#### **3.3.5.1 Definition**

Knowledge Management (KM) is defined by Prior (2010) as the organised and systematic process of generating, creating and distributing information, and selecting, distilling, deploying and exploiting explicit and tacit knowledge through the critical pillars such as people, process, and technology to create unique value that can be used to achieve a competitive advantage in the marketplace by an organisation.

Frost (2011) defined Knowledge Management as the systematic management of an organisation's knowledge assets creating value as well as meeting tactical and strategic requirements. Knowledge management consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge.

According to Frost (2011), KM therefore implies a strong connection to organisational goals and strategy, and it involves the management of knowledge that is useful for some purpose and which creates value for the organisation. Expanding upon the previous knowledge management definition, KM involves the understanding of the following:

- where and in what forms knowledge exists;
- what the organisation needs to know;
- how to promote a culture conducive to learning, sharing, and knowledge creation;
- how to make the right knowledge available to the right people at the right time;
- how to best generate or acquire new relevant knowledge, and
- how to manage all of these factors so as to enhance performance in light of the organisation's strategic goals and short-term opportunities and threats.

Knowledge management must therefore provide the correct tools, people, knowledge, structures and culture so as to enhance learning; it must understand the value and applications of the new knowledge created; it must store this knowledge and make it readily available for the correct people at the right time; and it must constantly assess, apply, refine, and remove organisational knowledge in conjunction with real long and short-term factors (Frost, 2011).

The benefits of Knowledge Management are discussed below.

### **3.3.5.2 Benefits of KM**

The primary objective behind the knowledge management initiative is to capture the explicit and tacit knowledge about people, skills, processes, markets, competitors, customers, suppliers, organisation, environment, policies, procedures, regulation and legislation that exist and to make it available to all employees (Ganesh *et al.*, 2014:3). The application of knowledge in the workplace is to reuse knowledge to reduce rework, redeploy knowledge to leverage best practices, transfer skills and behaviours, repurpose knowledge to drive innovation and achieve business benefits.

The critical business benefits of knowledge management are according to Ganesh *et al.* (2014:5) as follows:

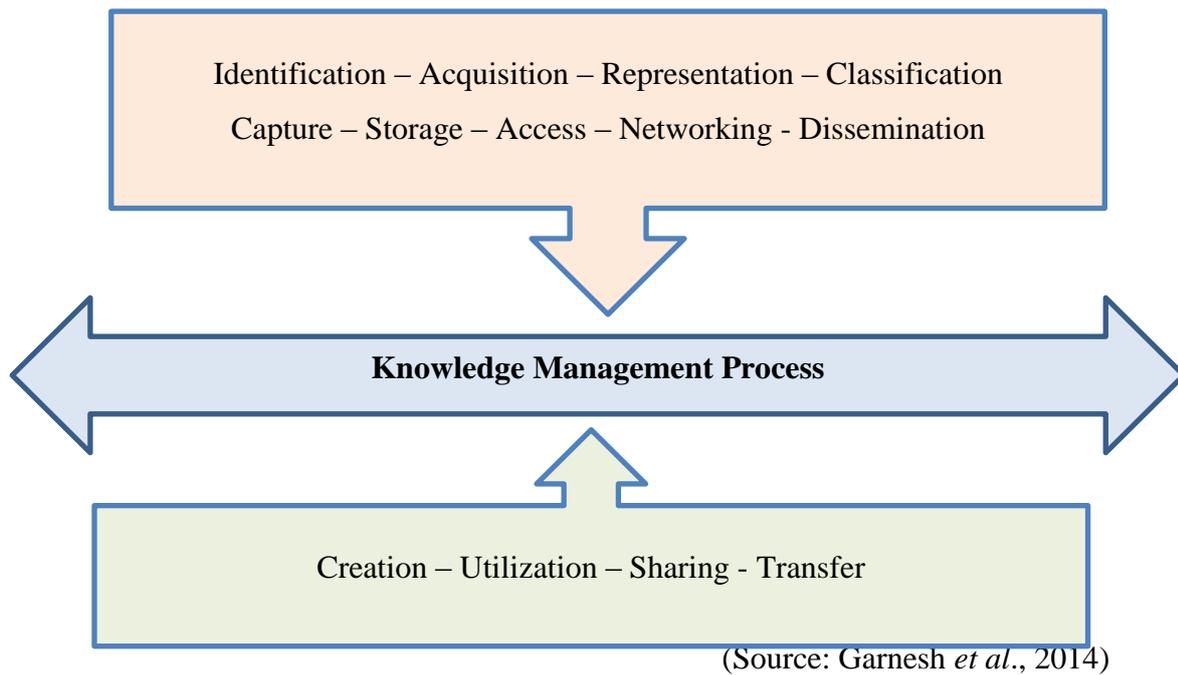
- improved ability to capture and manage intellectual assets;
- effective dissemination of knowledge through collaboration;
- improved agility in responding to market and regulatory change;
- improved knowledge continuity during organisational change;
- learning from past mistakes and successes;
- exploiting existing knowledge assets by re-deploying them in areas where the organisation stands to gain something;
- promotes a long-term focus on developing the right competencies and skills and removing obsolete knowledge;
- enhances the organisation's ability to innovate, and
- enhances the organisation's ability to protect its key knowledge and competencies from being lost or copied. The process used in knowledge management is discussed below:

### **3.3.5.3 The Knowledge Management Process**

According to Ganesh *et al.* (2014:5) the main knowledge management processes are: Knowledge creation, knowledge utilization, knowledge sharing and knowledge transfer.

All other processes such as identification, acquisition, representation, classification, capture, storage, access, dissemination, networking and integration support the above four knowledge management processes (Ganesh *et al.*, 2014:5). The process is shown in Figure 3-17.

**Figure 3-17: Knowledge Management Process**



Implementation of knowledge management includes the identification and analysis of available and required knowledge assets and knowledge asset-related processes and the following planning and control of activities to develop the assets and the processes so as to achieve the objectives of the organisation.

At the strategic level the organisation should be in a position to be able to analyse and plan its business in terms of the existing knowledge and the required knowledge for the future business processes (Garnesh *et al.*, 2014:107).

The concept of strategic intelligence is discussed in the next section.

### **3.3.6 STRATEGIC INTELLIGENCE**

#### **3.3.6.1 Definition of Strategic Intelligence**

Strategic intelligence is about having the right information in the hands of the right people at the right time so that those people are able to make well-informed business decisions about the future of the organisation (Xu, 2007:1).

Wells (2012:3) defines strategic intelligence as the capacity to adapt to changing circumstances, as opposed to blindly continuing on a path when all the signals in the competitive environment suggest the need to change course.

Djekic (2014) defines SI as a systematic and continuous process of gathering, analysing and disseminating intelligence of strategic value in an actionable form to assist in long-term decision-making.

Liebowitz (2006) considers strategic intelligence as the convergence and synergies of knowledge management, business intelligence and competitive intelligence. These different types of intelligence are briefly explained below.

Seitovirta (2011) also situated strategic intelligence as an overarching concept that covers signals coming from all of the levels of intelligence – business intelligence, competitive intelligence and competitor intelligence.

### **3.3.6.2 Benefits of SI**

Strategic Intelligence should provide an organisation with the information it needs about its business environment to be able to anticipate change, design appropriate strategies that will create business value for customers and create future growth and profits for the organisation in new markets within or across industries (Xu, 2007:2).

Thierauf (2001) asserts that the goal of SI is to understand where the organisation is going and how it can maintain its long-term competitiveness in the face of future challenges and changes. SI should act as radar that alerts the company of threats and opportunities in its external environment. Gilad (2004) also emphasizes SI's role in providing early warnings.

The Global Intelligence Alliance (2004) identified the following roles of SI activity on strategic decision-making.

**Describing the competitive environment:** Defining the current competitive environment in which the company operates and assessing the forces and factors that make up the competitive environment.

**Anticipating the future of the competitive environment:** Providing forecasts regarding the competitive environment.

**Challenging the underlying assumptions – asking the right questions:** Identifying and challenging all the underlying assumptions which may impact strategic thinking.

**Identifying and evaluating weaknesses against market opportunities and threats:** SI can be used to identify and assess the organisation's own weaknesses and vulnerabilities.

**Using SI to implement and adjust strategy to the changing competitive environment:** Good intelligence on how the competitor is reacting and adjusting to the strategy's initial implementation is essential, to test its effectiveness and to make necessary adjustments to compensate for any counter-measures the competition is likely to initiate.

**Determining when the strategy is no longer sustainable:** Once a successful strategy has survived the initial phases of implementation, it is important that an ongoing reporting and collection program be established to monitor the competitors' actions and the environment.

All these SI roles inform and give support to strategic management activities in various stages of the strategy development. SI can therefore be viewed as a sonar, searching for underlying opportunities and threats that cannot easily be observed and a radar assisting the organisation on its path to the future, supplying intelligence about turning points (promoting a change in direction, forecasting and developing scenarios) for the organisation (Global Intelligence Alliance, 2004).

### 3.3.6.3 Sources of Strategic Intelligence

Buchel (2010) listed the following different sources of SI which can be used for exploiting growth opportunities:

**Trends:** What are the main existing trends? Managers must ascertain that they understand global developments in areas such as demographics, regulation and consumer markets. Many organisations fail to look further forward than 2 or 3 years, but from a strategic intelligence standpoint they ought to be assessing this on a 5 to 10-year time horizon. The managers need to be aware of what is going to happen in terms of future trends and decide on the actions needed to take advantage of opportunities that emerge.

**Customers:** Organisations must know which of their customers' needs are being met and which are not by constantly listening to customer feedback.

**Benchmarking:** Managers ought to look within and beyond their own industry for best practices that may lead to innovation.

**Category Extension:** Managers have to look again at what the organisation provides and consider the ways in which this could be extended.

**Capabilities:** Organisations should assess their capabilities and consider how they can build on them.

**Technology:** What upcoming technologies lend themselves to new products or services?

To overcome blind spots and obtain higher levels of strategic intelligence, organisations should expand their networks and ensure that they are as diverse as possible; if the main sources of information all have similar backgrounds, one is unlikely to get the breadth and depth of ideas needed to support genuine innovation for growth (Buchel, 2010).

### 3.3.6.4 SI Framework

To establish an environment of SI, Gonzales and Zaima (2008) proposed the high level steps shown below:

**Figure 3-18: High Level Strategic Intelligence Process**



(Source: Gonzales & Zaima, 2008)

1. **Set up a strategic intelligence foundation:** Create a centralized data repository comprising integrated data that is needed to address business analytic projects from across the organisation.
2. **Create Reports:** Produce reports to assist managers in understanding, interpreting and monitoring the state of their organisations. Organisations can produce reports and effective executive dashboards using data gathered from integrated data in the strategic intelligence foundation.
3. **Analyze:** Utilize online analytical processing techniques for a wide-ranging view of the data, and ad-hoc query tools for an in-depth analysis of insight revealed through reports or analyses.
4. **Predict:** Use predictive and probing analytics to forecast next occurrences and advanced analytic techniques to uncover data trends and patterns. The results of these analyses are stored and shared through the strategic intelligence foundation.
5. **Act:** Put strategy and insights into action.

According to Gonzales and Zaima (2008), traditional BI tools and architectures may not be sufficient for those who practice strategic intelligence on a daily basis. While providing essential means for analysis in some instances, standard reporting and OLAP tools represent only a fraction of the techniques and technologies forward-thinking architects consider. The required components of the strategic intelligence tool chest are text mining, exploratory and predictive analytics and advanced visualization and spatial analysis. These expansive analytic competences have to be matched with the best possible computing power in terms of scalability and performance. This will provide the efficiency and effectiveness demanded by modern competitive organisations (Gonzales & Zaima, 2008).

### 3.3.6.5 Strategic Intelligence Quotient

According to Wells (2012), strategic intelligence is the capability to adjust to changing environmental conditions instead of blindly continuing on a path when all the signals in the competitive environment suggest the need for change and Strategic Intelligence Quotient (SIQ) is the measure of strategic intelligence. Measuring or auditing SIQ includes an emphasis on both the strategic direction and its results versus best practices to help the organisation to achieve sustained business performance and superior results. SIQ also focuses on the Strategic Management System and Cycle to produce these results. Measuring SIQ also provides an inclusive approach to planning, people, leadership, and change to deliver sustained customer value. The SIQ measurement is an

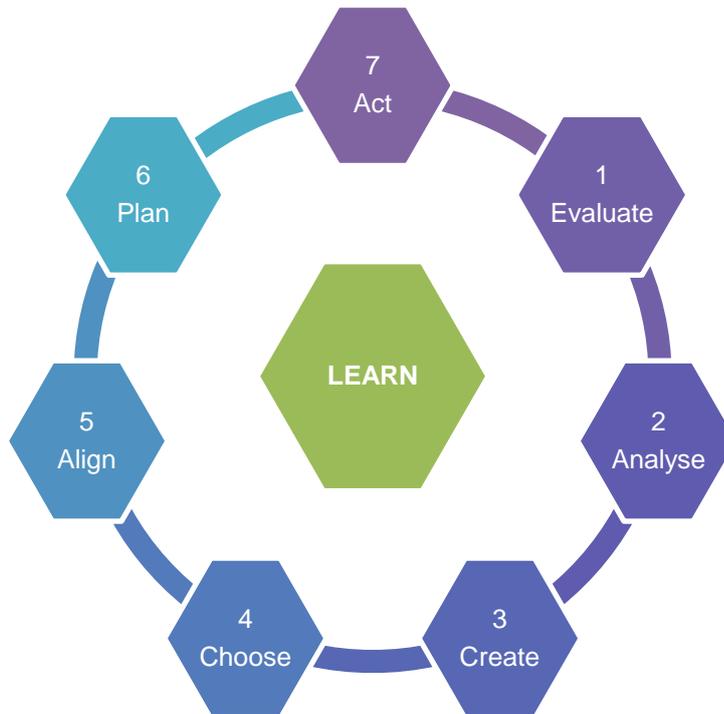
important process for determining the organisation's extent of strategic excellence. Wells (2012) described the following three levels of Strategic IQ.

**Table 3-2: Different Levels of Strategic IQ**

<b>Level of Strategic IQ</b>	<b>Meaning and Implication</b>	<b>Corrective Action</b>
Low Strategic IQ	<ul style="list-style-type: none"> <li>• Organisations that fail to react in a timely fashion to changes in their competitive environment. Reasons for Low SIQ can be as follows:               <ul style="list-style-type: none"> <li>○ Being strategically blind</li> <li>○ Being blissfully ignorant</li> <li>○ Forgetting your strategy</li> <li>○ Strategic incompetence</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Open the eyes and build awareness</li> <li>• Finding out what strategy is</li> <li>• Remembering the actual strategy</li> <li>• Commit to building strategic competence</li> <li>• Learn how to develop and implement strategy</li> </ul>
Moderate Strategic IQ	<ul style="list-style-type: none"> <li>• The term 'moderate' is merely intended to distinguish between the strategically competent and the expert.</li> </ul>	<ul style="list-style-type: none"> <li>• To develop moderate SIQ:               <ul style="list-style-type: none"> <li>○ Learn to review the external environment with a strategic eye</li> <li>○ Identify what it takes to be a long-term winner</li> <li>○ Assess own strategic strengths and limitations to see which opportunities can be exploited</li> <li>○ Develop skills in in building strategic options and making timely and well-informed choices and converting these choices into a sound strategic business model</li> <li>○ Managers must be well trained in strategy and change</li> </ul> </li> </ul>
High Strategic IQ	<ul style="list-style-type: none"> <li>• Organisations with superior strategic intelligence</li> </ul>	<ul style="list-style-type: none"> <li>• Below is what firms with high SIQ do:               <ul style="list-style-type: none"> <li>○ They are always adapting to change</li> <li>○ Always looking for strategic improvement</li> <li>○ Driven by inspiring goals to deliver higher performance</li> <li>○ Generate many strategic options and develop superior decision-making process</li> <li>○ Always prepared to change and learn from experience</li> </ul> </li> </ul>

To move from moderate to high SIQ, organisations ought to drive their strategic review cycle harder by thoroughly testing their present model, identifying more opportunities for change and looking out for innovative new business models as recommended by Wells (2012:104) and shown below. Organisations should refine their strategic change processes to reduce costs and become better, faster and smarter.

**Figure 3-19: Strategy as a continuous learning process**



(Source: Wells, 2012:104)

The mining sector has been selected for this research study. A brief overview of the sector is discussed in the following section.

### **3.4 OVERVIEW OF THE MINING INDUSTRY**

Mining provides the building blocks for human development. The supply of metal and mineral products has been at the centre of human endeavour through many years and will continue to play a critical role in meeting the needs of the societies (International Council of Mining & Minerals, 2012). Minerals in general and metals in particular have specific properties which give them a central role in everyday life and economic development. Some of those properties are their high strength, durability, capacity to conduct heat and electricity, aesthetic appeal, and to date,

reasonable cost with all factors considered. Metals are elements and therefore have the potential to be indefinitely recyclable. While other materials can replace and substitute for metals, the scale and cost generally give metals a significant advantage (International Council of Mining & Minerals, 2012).

Minerals and metals are critical to all services and infrastructure that are used by contemporary society: including shelter, food and water supply, sewage treatment, energy supply for a vast range of needs including heat and light, transportation, construction, manufacturing, education, health, communication, entertainment, the arts, tourism, and the vast range of associated consumer goods and services.

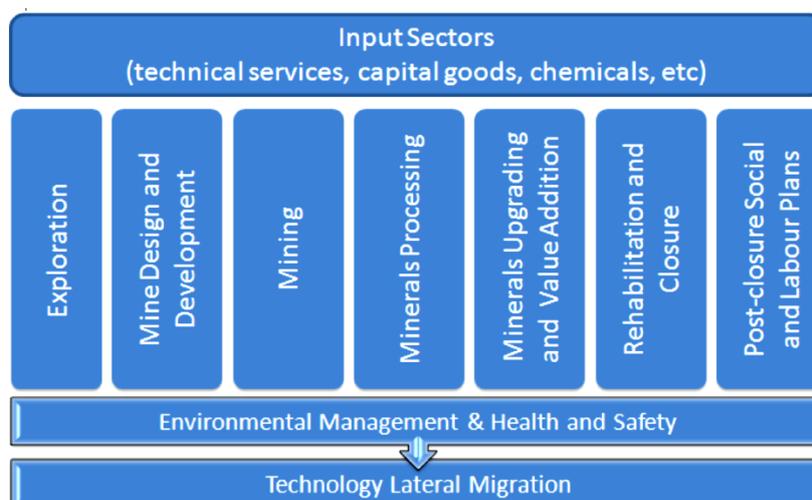
The global mining industry is characterized by the fact that its largest organisations come from a number of countries, both developed and developing. This is expected given the fact that economically viable mineral and metal ore deposits are spread all over the world (International Council of Mining & Minerals, 2012).

A typical mining process is discussed in the next section.

### 3.4.1 TYPICAL MINING PROCESS

A typical mining process consists of several steps starting from the exploration and mining of the ore either on the surface or underground and the subsequent crushing, milling and metallurgical processing to recover the desired metals. The Technology Innovation Agency (2012) summarized a typical mining process as shown in Figure 3-20.

**Figure 3-20: Typical Mining Process**



Source: Technology Innovation Agency (2012)

**Exploration:** First step in the mining process which involves discovering a commercially feasible concentration of minerals.

**Mine Design and Development:** This is the step where it is established if a deposit can be mined economically. Technical assessments, mine plans and infrastructure, regulatory requirements, environmental impact assessments, final project evaluation, construction and commissioning of the mine are all parts of this phase.

**Mining:** Extraction of the desired minerals from the earth or from an ore body through open cast mining or underground mining.

**Minerals Processing:** Mineral processing and extractive metallurgy for the recovery of the desired metals.

**Minerals Upgrading and Value Addition:** This is about beneficiation or mineral value addition

**Rehabilitation and Closure:** Rehabilitation of the environment after the area is mined out.

**Environmental Management, Health and Safety:** Mining affects the environment in different ways through its negative effects on the air, land, water and people.

Different types of minerals and their classification are discussed below. Global production is also summarized.

### **3.4.2 TYPES OF MINERALS AND GLOBAL PRODUCTION**

There are many types of metals of commercial value in the world. These metals are classified into different groups based on physical and chemical properties as well as their use and perceived value.

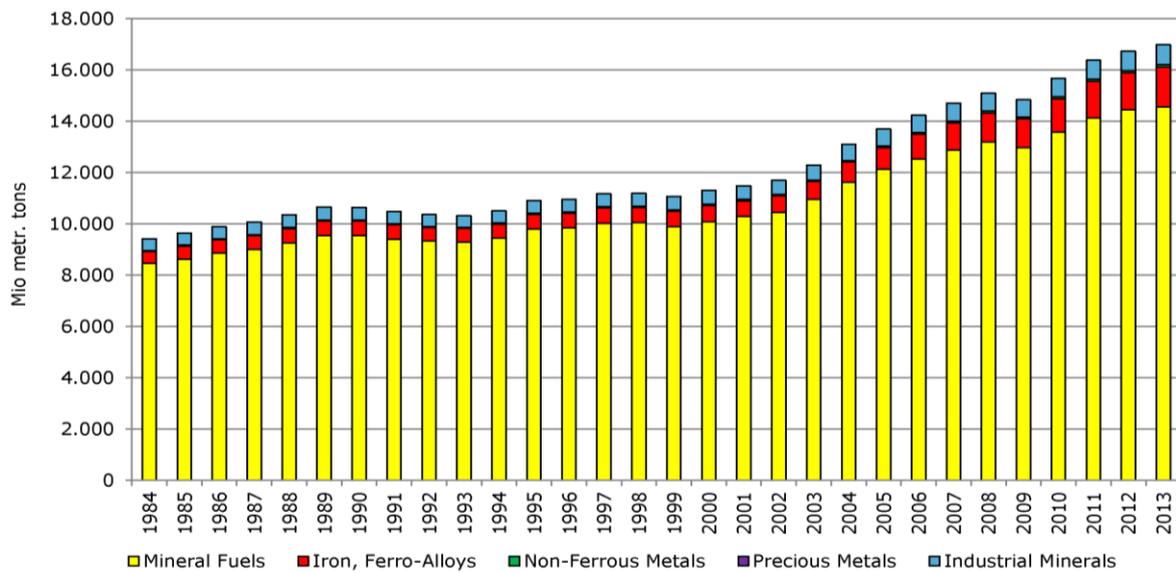
The mineral materials are arranged in five groups (Reichl, 2014) as shown in Table 3-3:

**Table 3-3: Groups of mineral materials**

Group	Metals
Iron and Ferro-Alloy Metals	Iron, chromium, cobalt, manganese, molybdenum, nickel, niobium, tantalum, titanium, tungsten, vanadium
Non-Ferrous Metals	Aluminium, antimony, arsenic, bauxite, bismuth, cadmium, copper, gallium, germanium, lead, lithium, mercury, rhenium, rare earth minerals, selenium, tellurium, tin, zinc
Precious Metals	Gold, platinum-group metals (palladium, platinum, rhodium), silver
Industrial Minerals	Asbestos, baryte, bentonite, boron minerals, diamond (gem/industrial), diatomite, feldspar, fluorspar, graphite, gypsum and anhydrite, kaolin (china-clay), magnesite, perlite, phosphates, potash, salt, sulfur, talc, vermiculite, zircon
Mineral Fuels	Steam coal (incl. anthracite and sub-bituminous coal), coking coal, lignite, natural gas, crude petroleum, oil sands, oil shales, uranium

According to Reichl *et al.* (2015) in International Organizing Committee for the World Mining Congresses, the world mining production from 1984 to 2013 is summarized in the following figures:

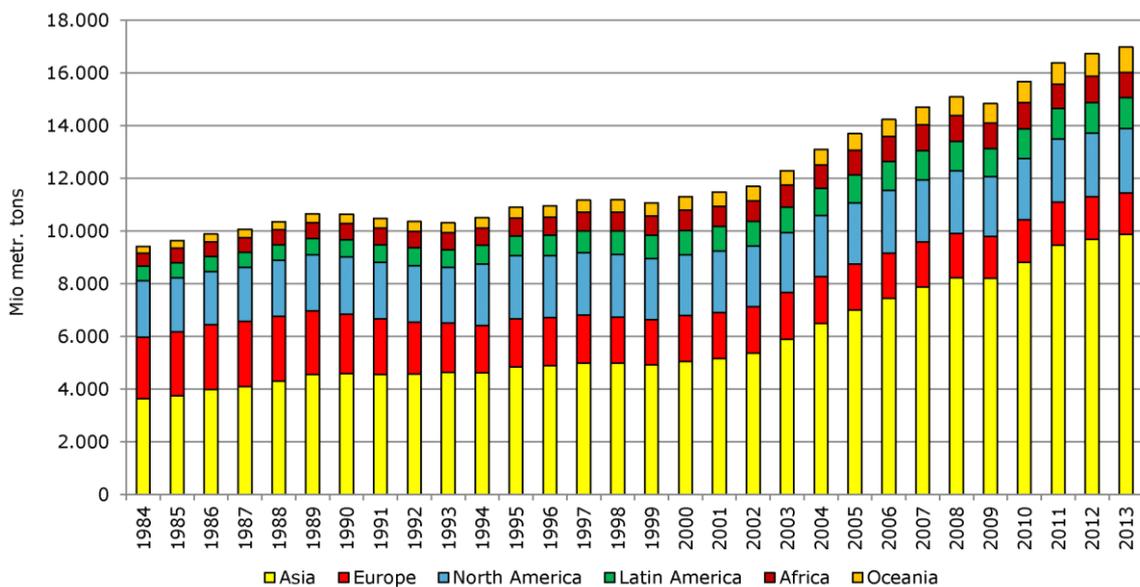
**Figure 3-21: World mining production by group of minerals – in million metric tons**



(Source: (Reichl *et al.*, 2015))

The overall production has increased steadily from 1984 to 2013. Mineral fuels have the highest production figures followed by iron and industrial minerals. The overall historical production for each continent is shown in Figure 3-22.

**Figure 3-22: World mining production by continents – in million metric tons**

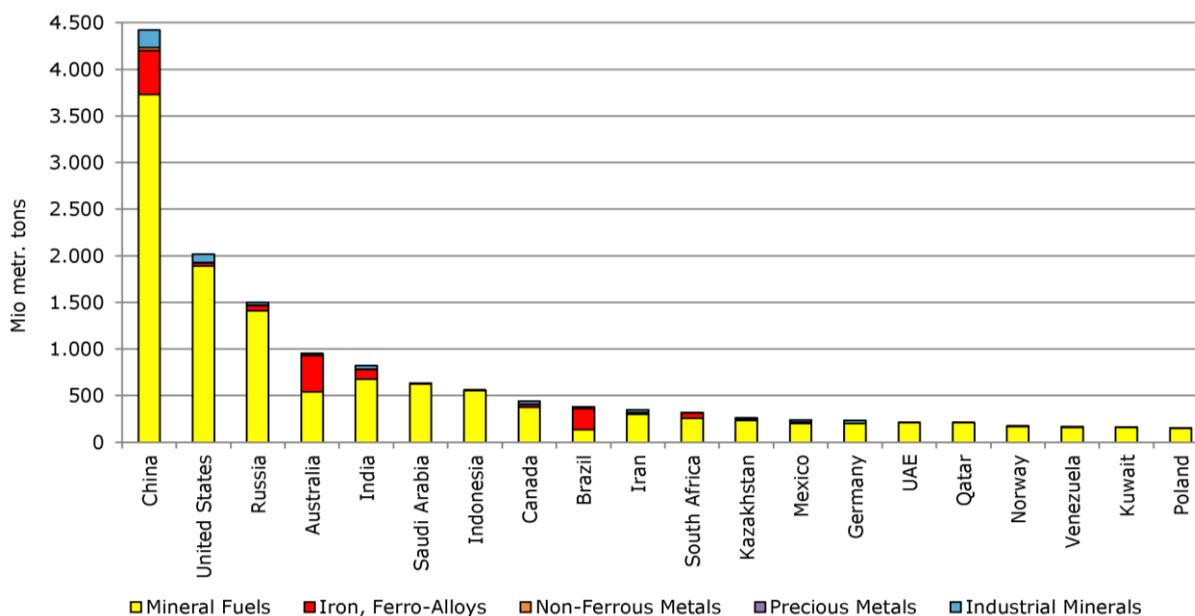


(Source: (Reichl *et al.*, 2015))

The highest growth in terms of production was achieved by Asia whilst Europe showed a steady decline over the years. The overall production from USA appears to be constant over the years whilst Oceania, Africa and Latin America grew slightly.

The top 20 countries that produced the most amount of minerals in 2013 are shown in the figure below.

**Figure 3-23: 20 Largest producer countries in 2013, in Billion US\$**



Source: (Reichl *et al.*, 2015)

China was the largest producer of mineral fuels, iron and industrial minerals in 2013 followed by the USA and Russia. The demand for most of the metals has over the years also been determined by consumption in the countries such as China and USA.

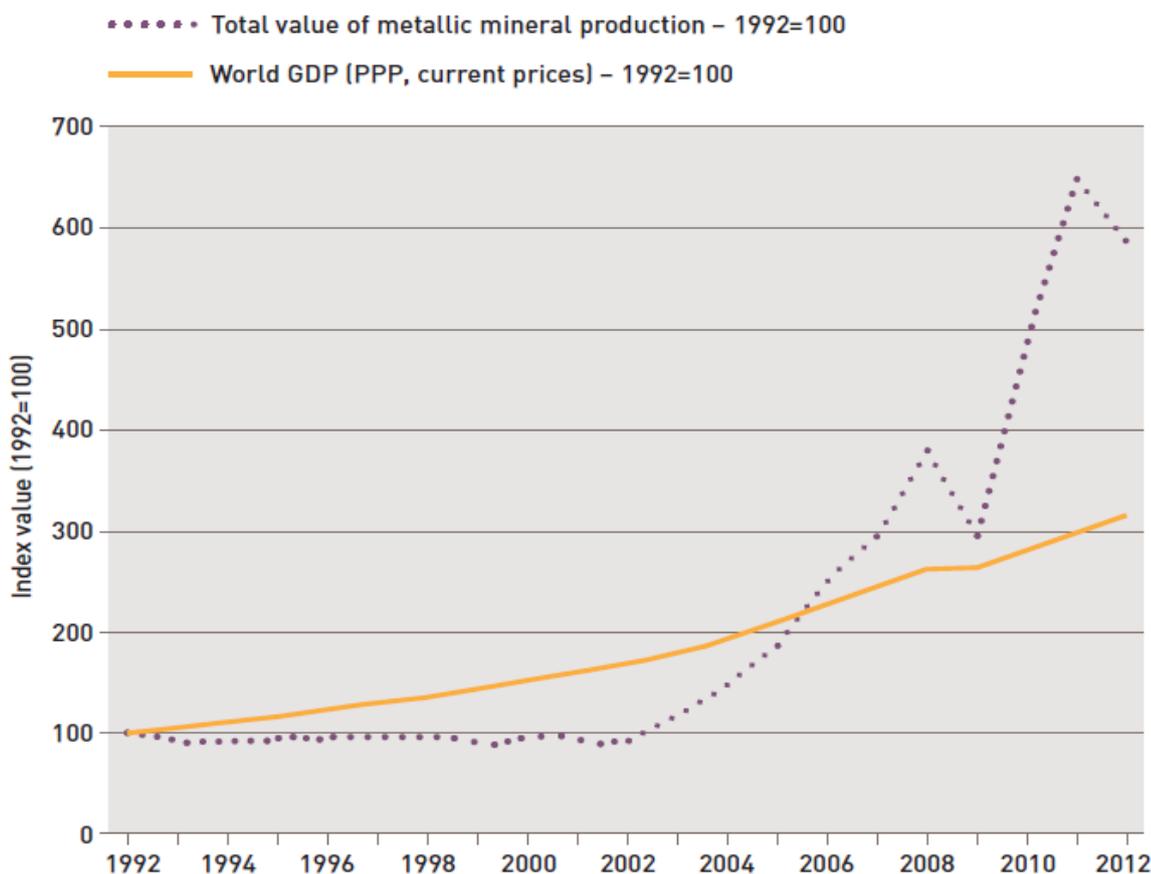
The mining industry contributes to the economy of their respective countries as outlined below.

### 3.4.3 GLOBAL CONTEXT OF MINING INDUSTRY'S CONTRIBUTION

According to the International Council Mining & Metals (2015) the role of mining in the global economy has grown quickly over the last decade. The global value of mineral production has grown a lot over the last decade. In 2012, it was over six times higher than in 2000 and 60 percent higher than at its 2008 peak. The production values remain historically high even though they fell by almost 11 percent in 2012. Growth in world gross domestic product was significantly surpassed by

the growth in mineral production value during this period, showing the growing relative importance of the mining industry in the global economy as shown in Figure 3-24.

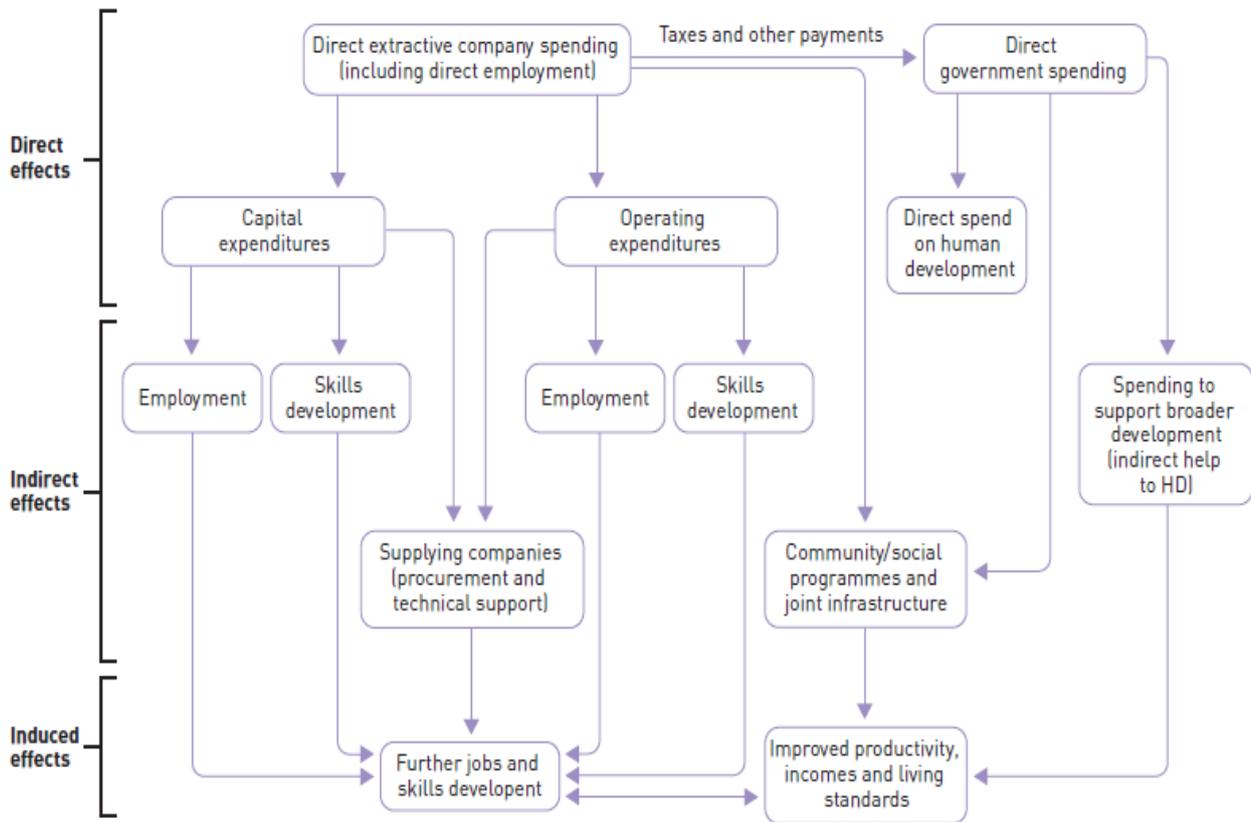
**Figure 3-24: World GDP and mineral production (1992 – 2012)**



(Source: ICMM, 2015)

The mining industry touches many stakeholders including government, investors, contractors and suppliers, service providers, indigenous peoples and their organisations, mining-affected communities, civil society organisations, organised labour, academia and research institutions and downstream users. The resulting impacts of mining and its products ripple across society. Managing social, economic and environmental impacts is very important for many low and middle-income countries whose economies depend on the mining industry. Commercial mining activities produce a series of economic impulses that reverberate across society as shown in Figure 3-25.

**Figure 3-25: Mining activities and development – main channels**



Source: ICMM (2015)

Figure 3-25 shows that some of the economic contributions by the mining industry originate from the spending of the mine itself and others from the spending of the tax and royalty revenues paid to government. These activities can normally be complemented by well-designed social investment initiatives and programs implemented by the mine in partnership with local government and communities. Taken together these impulses have the potential to catalyse longer term sustainable development, through direct, indirect and induced effects.

Below is the time series analysis of cost of production in this industry.

### 3.4.4 TREND IN PRODUCTION COST

According to ICMM (2015), higher prices have not always led to higher profit margins from the standpoint of the mining organisations, as production costs have increased substantially as well. While the cost and price developments vary widely across minerals and metals, it is possible to detect some factors which put upward pressure on prices:

- The prices of mining inputs such as equipment, services, fuels, chemicals and personnel were pushed up because the demand for inputs exceeded supply;
- The grades of the deposits are lowering with more complex mineralogy than was common a few decades ago and led to an increase in the costs of processing the ore bodies;
- Costs of moving materials have also increased for both open pit and underground operations because new mineral deposits are often found deeper underground;
- Regulatory standards and permitting thresholds which are increasingly becoming more rigorous have lengthened licensing time thus adding costs, and
- Increasing labour costs in certain countries contribute to increased production costs.

Below is the discussion of some analysis of the sector using SWOT, PESTLE and Porter's 5 forces techniques.

### **3.4.5 SWOT, PESTLE and Porter's 5 Forces Analysis of the sector**

#### **❖ SWOT Analysis**

SWOT analysis is a technique normally used to show the strengths and weaknesses as well as the opportunities and threats. The internal and external factors were listed for SWOT analysis as follows by Kumar and Rathore (2015):

**Table 3-4: SWOT Analysis of the global mining industry**

<p><b><u>STRENGTHS</u></b></p> <ul style="list-style-type: none"> <li>• Resource abundance</li> <li>• Foreign direct investment</li> <li>• High level expertise in limited areas</li> <li>• Primary processing facilities</li> <li>• Global leader in some technologies</li> <li>• Operational efficiency</li> <li>• Sustainability</li> <li>• Cost savings</li> </ul>	<p><b><u>WEAKNESSES</u></b></p> <ul style="list-style-type: none"> <li>• Risk management</li> <li>• Poor communication across the stakeholders</li> <li>• Schedule constraints</li> <li>• Regulatory constraints</li> <li>• Business interruptions</li> <li>• Current innovation deficit</li> </ul>
<p><b><u>OPPORTUNITIES</u></b></p> <ul style="list-style-type: none"> <li>• Focus on innovation</li> <li>• Technology development</li> <li>• Capability development</li> <li>• Local joint ventures</li> <li>• Merger and acquisitions</li> <li>• Downstream beneficiation</li> <li>• Employment creation</li> <li>• Wealth creation</li> <li>• Development of sustainable livelihoods</li> </ul>	<p><b><u>THREATS</u></b></p> <ul style="list-style-type: none"> <li>• Energy and water usage</li> <li>• Commodity price volatility</li> <li>• Transportation and infrastructure</li> <li>• Less focus on research and development</li> <li>• Import and export of minerals</li> <li>• Local politics</li> <li>• Unstable economy</li> <li>• Resource nationalism</li> <li>• License to operate</li> <li>• Natural disasters</li> </ul>

Some of the threats which may negatively affect the industry include commodity price volatility, increasing resource nationalism and labour issues in certain countries. The main opportunities include beneficiation and technology developments which can be used to access difficult and deep mining areas and also improve the safety of the workers. Resource abundance and high level expertise are the main strengths for some of the mines. Regulatory constraints and lack of innovation are some of the main weaknesses in certain areas.

## ❖ PESTLE

The Technology Innovation Agency (2012) listed the following macro-environmental factors that have a direct impact on the mining industry.

**Table 3-5: PESTLE Factors impacting the mining and minerals sector**

<b>Political</b>
<ul style="list-style-type: none"><li>• At a policy level, the mining and minerals industry sector is underpinned by a number of legislative provisions.</li><li>• Other political issues include continued debate on resource nationalisation and uncertain licensing environment which may undermine investor confidence</li></ul>
<b>Economical</b>
<ul style="list-style-type: none"><li>• The global economic factors place increased pressure on the mining industry to be more responsive in order to remain competitive and productive</li><li>• Performance is influenced by factors such as energy supply constraints, uncompetitive labour productivity and currency exchange rate.</li></ul>
<b>Social</b>
<ul style="list-style-type: none"><li>• Increased emphasis on social licence to mine, which includes commitment to the development and implementation of social and labour plan</li><li>• Skills shortages</li></ul>
<b>Technological</b>
<ul style="list-style-type: none"><li>• Limited innovation is a constraint in the development of the sector</li><li>• Mechanisation possibilities</li></ul>
<b>Environmental</b>
<ul style="list-style-type: none"><li>• The extraction and processing of minerals is closely linked with other natural resources like land, water, air and vegetation. Hence, the management of these natural resources and its optimal and economic exploitation are matters of national importance.</li></ul>
<b>Legal</b>
<ul style="list-style-type: none"><li>• Numerous countries have taken steps to protect their sovereign assets by imposing new resource taxes and royalties, forming national resource entities and tightening their licensing practices</li></ul>

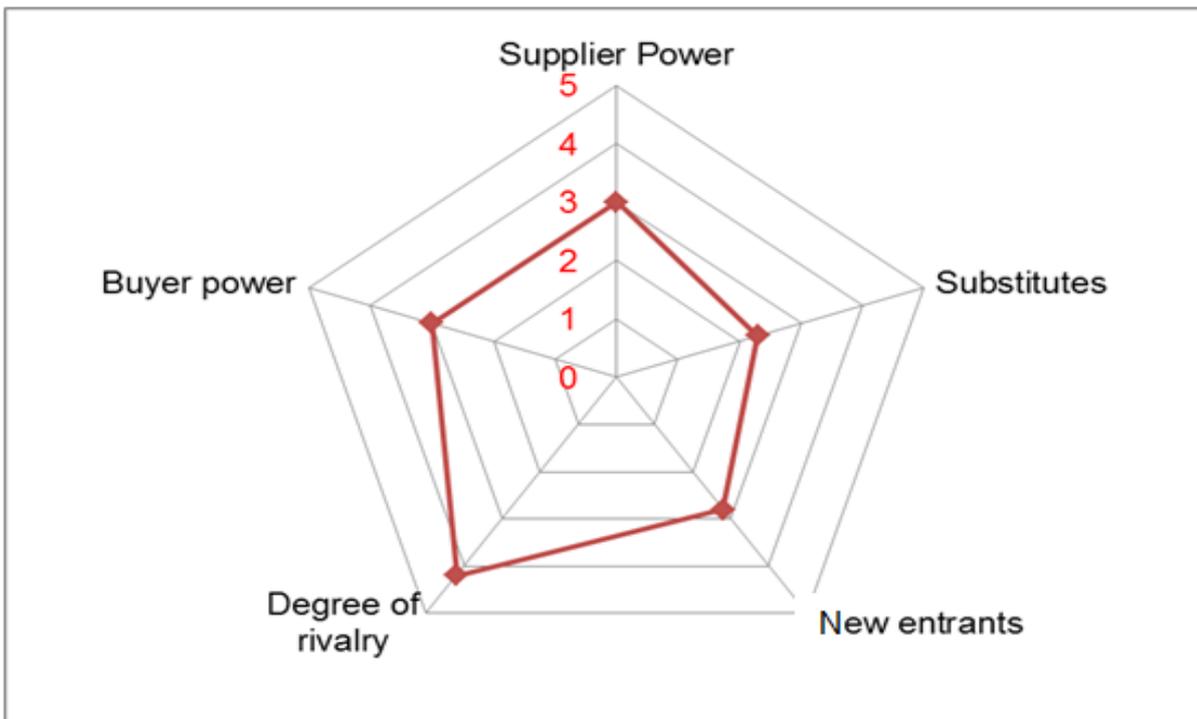
Increasing resource nationalism and uncertain regulatory environments are some of the political factors faced by the organisations. Utility constraint is also a concern in certain countries. Skills shortage and low productivity are also affecting certain organisations. Innovation in terms of technology has now become a necessity in order to access difficult areas. The supply-demand dynamics of the commodities are also bringing a lot of uncertainty in terms of prices.

The Porter's 5 Force of the industry is discussed below.

❖ **Porter's 5 Force Analysis of global mining**

Marketline (2014) did a Five Force analysis taking organisations involved in primary metal production and mining as players. The key buyers were deemed to be industrial consumers, and producers of equipment, its providers, and suppliers of raw materials as the key suppliers. The summary of the analysis is shown below:

**Figure 3-26: Forces driving competition in the metals & mining industry**



1	2	3	4	5
Weak	→			Strong

(Source: Marketline, 2014)

According to Marketline (2014), mining industry is cyclical and mainly affected by macro-economic conditions. Growth cannot always be sustained and the rivalry of competition tends to increase in a decreasing market that is hard to exit.

Metals and minerals are broadly used and have different uses. Mining organisations may sell to dealers and traders or directly to end-users through bilateral contracts. Buyers may be from various industries, but mainly include construction, automotive and engineering organisations using metals

in the manufacturing of their goods. The power of buyers tends to be diluted by the importance and necessity of these products.

Any individual producer of precious metals does not have much power to control the global price of the metals which depends on some factors such as investor's speculative actions, demand and global supply. Nonetheless, players can attempt to protect themselves from low prices by having bilateral agreements which can include negotiated floor and ceiling prices for the metals. Some players can differentiate their products by focusing on added-value, specialty products especially when selling in the mature markets.

Manufacturers are very sensitive to any shifts in their cost base. Many leading players are employing alternative protection measures by looking to pursue mine investments, as rising costs of raw materials squeeze margins.

There is a possibility to enter some segments of this industry on a small scale, including artisanal production. Cross-border mergers have also been occurring for several years, with the focus on new products and technological improvements.

Capital requirements and operating costs are in some cases substantially increased by environmental compliance requirements. Governments use strategies, such as tariffs subsidies, loans and import restrictions to ensure that their domestic market remains competitive.

There are possible substitutes for different metals with certain metals usually used as substitutes for each other. The benefits of substitution may include better fuel consumption, sometimes a reduction in manufacturing costs. Nevertheless, not all buyers will replace metals with these alternatives, as they do not provide all of the same physical or chemical properties and are barely direct substitutions (Marketline, 2014).

Some of the main challenges are discussed in the next section.

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### **3.4.6 CHALLENGES FACED BY MINING ORGANISATIONS**

Mining organisations are unavoidably affected by global developments, with macro-economic growth and international markets strongly influencing both the demand for resources and mining organisations' profitability. According to Bosman (2013), the industry has had to deal with a

different issues, including: depressed shareholder value, volatile commodity pricing, aggressive stakeholders evicting management (most conspicuously in South Africa and Canada), violent labour unrest (most conspicuously in South Africa and Australia), continuing consolidation in the industry through mergers and acquisitions and high profile community opposition to advanced projects across the globe, most recently in South Africa around ‘fracking’ and in Malaysia around supposed radiation poisoning.

According to the Grant Thornton International Mining Report (2013), mining executives face numerous of the following challenges around the globe:

- slow economies keep risk-averse investors on the side-lines;
- many miners seek options to traditional equity funding due to depressed share prices;
- producing organisations are challenged by rising input costs that outpace generally high commodity prices;
- governments look for additional taxes from the mining industry while increasing regulatory burdens;
- uncertainties concerning asset ownership lead to a delay in projects and worry hesitant investors, and
- concerns about environmental effects and business ethics damage the industry’s image among the general public and investors.

The Top Ten Issues Deloitte (2013) identified also included the following:

- The cost of doing business: What goes up does not always come down.
- Commodity price chaos: No price stability without great transparency.
- The battle to keep profits: Government taxes target the mining sector.
- Restless stakeholders: The demand for heightened corporate social responsibility.
- Labour pains: Bridging the precarious talent gap.
- Capital project quandaries: Project risk rises as the supply/demand gap widens.
- Non-traditional financing: New sources of funding require new levels of knowledge.
- The big get bigger: Risk multiplies as organisations diversify.
- Volatility is the new stability: Planning for the unforeseeable.
- Legislative Olympics: Countries compete to become the world’s toughest regulators.

### **3.5 SUMMARY**

This chapter set out to review the theoretical aspects regarding strategy, strategic management and different constructs of intelligence.

Strategy is key in building organisational resilience and achieving both near-term profit making and long-term market leadership. It pays off handsomely to review and renew the strategies in both good and challenging times.

Managers need to have excellent grasp of their business operational fundamentals and in-depth understanding of Strategic fundamentals that will give them the extra edge. Their role is to take upon themselves a never-ending Strategic Journey in “Strategic Planning”, “Strategic Implementation” and “Strategic Learning”. They must provide the leadership to effectively adapt and renew their organisation to align with the ever-changing market environment for today’s profit making and tomorrow’s growth. Each successful renewal and rediscovery brings about a breakthrough performance, greater success and rewards.

Specific analytical tools and techniques used in strategic management process, including the evaluation of all internal and external factors, were also discussed.

Key concepts and related research relevant to strategic intelligence and its role as a strategic management tool were outlined. The contextual definitions and differences of business intelligence, competitive intelligence, marketing intelligence, knowledge management and strategic intelligence were discussed. The strategic intelligence framework and systems and their utilization in strategic decision-making and management were discussed.

The mining sector was discussed in general. The role of this sector on South Africa’s and the global economy was highlighted. Challenges faced by the sector as well as some strategic interventions were also discussed.

The following four chapters are made up of the four academic articles with each article addressing a different research problem and objective(s) as set out earlier in Chapter 1.

## CHAPTER 4: RESEARCH ARTICLE 1

### Title: INVESTIGATING THE USE OF STRATEGIC MANAGEMENT PROCESS IN THE MINING INDUSTRY

The reader is requested to take note of the following:

The article was *submitted* for peer-review and possible publication in the following IBSS indexed, internationally peer-reviewed academic journal as follows:

- ❖ Boikanyo, D.H., Lotriet, R. & Buys, P.W. Investigating the use of strategic management process in the mining industry. *Strategic Management Journal*. (ISSN: 1097-0266)

**Submission notification** is shown in APPENDIX D on page 226. The article was written in line with the journal's submission guidelines, which are included in **Appendix H: Strategic Management Journal author guidelines** on page 231. Tables and figures are located in the text for easy following.

The article was researched and written by the first author (D. H. Boikanyo) as the PhD candidate and primary author, while the co-authors (R.A Lotriet and P.W. Buys) fulfilled a reviewer function thereto as the PhD project's promoters.

# INVESTIGATING THE USE OF STRATEGIC MANAGEMENT PROCESS IN THE MINING INDUSTRY

## ABSTRACT

The objective of this study is to investigate the extent to which Strategic Management process is utilised within the mining industry. Strategic planning is an organizational management activity that is used to set priorities, focus energy and resources, strengthen operations, ascertain that employees and other stakeholders are working toward common goals, establish agreement around intended outcomes, and assess and adjust the organization's direction in response to a changing environment. A typical strategy management process has the following steps: initial assessment, situation analysis, strategy formulation, strategy implementation, monitoring and evaluation. The other objective was to determine which analytical tools are commonly used for situational, internal and external assessment as input to the strategic management process. A structured questionnaire was used for the study. A total of 300 mines were randomly selected from a research population of mining organizations in South Africa, Africa and globally. The respondents were all part of senior management. A response rate of 64% was achieved. The results indicated that about 20% of the organizations did not institutionalize their strategic planning functions and did not have a good strategic foundation. The results also showed that 60% were not satisfied with their productivity and 30% indicated that their cash flows were not stable at all. There was a significant number of organizations who do not use strategic analytical tools. A statistically and practically significant positive relationship was found between Strategic Management dimensions and Business Performance implying that the use of strategic management process can lead to improved business performance.

**Keywords:** Strategy, Strategic Management, Strategic Planning, Mining Industry, Strategic Analytical Tools

## 1. INTRODUCTION AND BACKGROUND

This study focuses on investigating the use of strategic planning and management processes in the mining industry. The supply of mineral and metal products has underpinned human endeavour through millennia and will carry on playing its role in meeting the needs of societies (International Council of Mining & Minerals, 2012). The global mining industry is characterized by the fact that its companies come from a number of countries, both developed and developing. Tracing the centre of gravity of global mining over the past two centuries demonstrates its role as a foundation of society throughout history (International Council of Mining & Minerals, 2012).

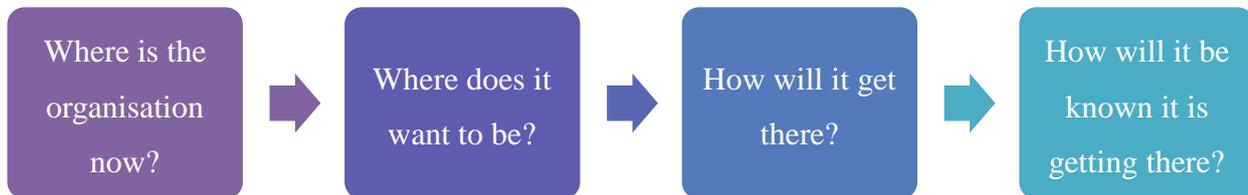
According to Wells (2012:3), the goal of any organization, including the mining organizations, is to deliver superior sustainable performance. “Performance” means some form of return on investment. “Sustainable” means profit over the long term rather only a short-term burst of profits and failing to invest for the future. “Superior” means better than competitors; organizations which always do their utmost to win are less likely to be blindsided by competition and are more likely to succeed.

To deliver superior sustainable performance, organizations need a good strategy. Thompson *et al.* (2012:63) summarised the definition of strategy as the game plan that management is using to stake out a market position, conduct its operations, attract and please customers, compete successfully and achieve the desired performance targets. According to Kumar and Rathore (2015), mining strategy is defined as the connection between the mining organization and its current and forthcoming business facets; it also determines the long-term goals and objectives of the mining industry and management of resources as well as actions required for carrying the defined goals. There are three levels of strategy. Corporate strategy involves the scope of a mining organization and markets in which it competes and also comprises the new acquisitions, allocation of resources and vertical integration between the business units. Business strategy outlines how the organization competes within the mining industry or market and focuses on attaining competitive advantage over its competitors. Functional strategy puts emphasis on resource management at the operational level.

The central thrust of a strategy is therefore undertaking moves to build and strengthen the long-term competitive position and financial performance by competing differently from rivals and gaining a competitive advantage (Thompson *et al.*, 2012). This requires a sound strategic management, which according to Wheelen and Hunger (2011) is a broader term than strategy and can be interpreted as a set of managerial decisions and actions of an organization that can be used to facilitate competitive advantage and long-run superior performance over other organizations. The basic building blocks of

strategic management are concerned with answering four questions shown in Figure 1 (Wilkinson, 2013)

**Figure 1: Basic questions for strategic management**



(Source: Wilkinson, 2013)

The questions show that strategic management essentially has planning, execution and review/control components. There are many components of the process which are spread throughout strategic planning stages. Most often, the strategic management process has four common phases (David & David, 2013; Rothaermel, 2012; and Thompson & Martin, 2010):

- **Strategic Analysis:** Process of gathering, examining and providing information for strategic purposes. This phase involves examining the internal and external factors affecting an organization.
- **Strategy Formulation:** The process of determining the best course of action for realizing organizational objectives and hence achieving organizational purpose. Managers formulate corporate, business and functional strategies after conducting strategic analysis.
- **Strategy Implementation:** Putting the organization's selected strategy into action. Strategy implementation entails designing the organization's structure, allocating resources, developing the decision-making process and human resource management.
- **Strategy Evaluation:** Final phase of strategy management process. The main strategy evaluation actions are: assessing external and internal factors from which the current strategies are based, evaluating performance, and taking remedial actions. Evaluation ascertains that the organizational strategy as well as its implementation meets the organizational objectives.

Strategic management is an ongoing process. Therefore, it must be realized that each component interacts with the other components and that this interaction often happens in chorus (Hill & Jones, 2012:12).

Formalized strategic management does lead to superior performance by organizations (Fred, 2011:48). Studies have been able to provide substantial evidence of the profitability of strategy formulation and implementation. The formalized strategic management process makes a difference in the recorded measurements of return on assets, sales and profits. Organizations that adopt a strategic management approach can expect that the system will lead to improved financial performance. The main point is that strategic management enables an organization to orient itself to its market and ensure that it is actualizing the right strategy. In recent years, many organizations have realized the importance of strategic management. However, the key difference between those who fail and those who succeed is the manner in which strategic management is done and how strategic planning is carried out (Wells, 2012). Organizations need to ensure their longer-term viability and success in the marketplace by realizing the benefits of strategic management.

The problem statement is discussed below.

## **2. PROBLEM STATEMENT**

Mines currently face tough choices around their profitability, attracting and developing key skills, capital raising, capital allocation and stakeholder engagement. The complex nature of the environment within which these organizations operate requires increased strategic flexibility, speed and innovation to manage environmental discontinuities and unpredictable changes for the creation or maintenance of any competitive advantage (Thornton, 2013). Even in tough times, mining companies should use strategic thinking and analytical tools to face their tough choices.

According to analysts such as Deloitte (2013b) and PWC (2014), mining companies need to focus on key aspects of their high-level and operational strategies which collectively form the basis for long-term strategic planning and short-term prioritisation. They should be able to clearly define both the financial and non-financial objectives which should be aligned with the company's overall vision, as they will guide investment decisions. They should identify sources of sustainable advantage and use this as the basis for business model development. These choices generally include the mining method, mine design, technology and sustainability choices. They should ascertain that they have the capabilities and skills in place and that they are configured properly to implement these strategies successfully. The fundamental challenge facing mining organizations is how to create sustainable value while operating within mandated strategic boundaries, identified constraints, and variable market and economic conditions. According to the White Paper about the

future of mining from IBM Global Services (2014), mining organizations have serious choices to make about every aspect of their business. They can either stagnate or innovate. The most fundamental change is in changing the approach to the supply chain, where the goal is not to push product out of the ground and just flood the market, but to respond quickly to complex customer relationships and market dynamics.

*According to Deloitte (2013a); ‘During challenging times such as these, mining companies can choose to pursue a ‘survival strategy’ or a ‘leadership strategy’. Those pursuing a survival strategy will cut costs to the bone while adopting a risk-averse posture and focus on defending their core business. Other companies adopt a leadership strategy, looking to identify unusual opportunities, enabling the mining company to gain ground during the downturn and to make step changes in performance.’*

The researcher was prompted to investigate the use of the strategic management processes in the mining sector and how it affects overall perceived business performance. The researcher was also prompted to investigate the use of strategic analytical tools and techniques in the crafting and implementation of strategies. It has also been noted that there is also still a void in academia and in practice about the use of strategic management processes and analytical tools in the mining sector for strategy formulation and implementation.

The research objectives of the study are outlined below.

### **3. RESEARCH OBJECTIVES**

The primary aim of this research study is to investigate the extent to which Strategic Management process is utilised within the mining industry and whether it is used to achieve competitive advantage and business performance. The secondary objectives are:

- To conceptualize Strategic Management by conducting a literature study.
- To determine to what extent Strategic Management process is used within the mining industry.
- To determine the relationship between the dimensions of strategic management and perceived business performance.
- To identify the tools and techniques which are commonly used in strategy analysis.
- To compare the findings based on the demographic profile.

#### **4. RESEARCH METHODOLOGY**

A survey design was used in which a selected sample was studied to make inferences about the population (Saunders *et al.*, 2009). The survey involved selecting a representative and unbiased sample of subjects drawn from senior management in the mining organizations in South Africa, Africa and globally. The researcher used a simple random sampling technique to select participants. Saunders *et al.* (2009) state that simple random sampling involves the selection of a sample at random from the sampling frame using either random number tables or a computer. A total of 300 mines were randomly selected from a population of 850. A response rate of 64% was achieved.

The survey questions were developed based on the existing literature with some questions adopted from a questionnaire by Strategic Futures Consulting (2009). The questions about different analytical tools used in the strategic management process were also developed based on the extant literature. The structured questionnaire which was used and shown in Appendix A on page 214 was divided into sections comprising the biographic information, items of strategic management and business performance which were measured using a 4-point Likert-type scale. The respondents were also requested to indicate with a Yes or No on the questionnaire if their organization was using specific strategic analytical tools.

##### **4.1 Statistical Analysis**

The data received from the completed questionnaires was captured and analysed with the use of the statistical software program SPSS and STATISTICA with the assistance of the Statistical Consulting Services of the North-West University. Descriptive statistics and effect sizes were used to decide on the significance of the findings. The results are to be compared by way of mean and standard deviations. Confirmatory Factor Analysis (CFA) was used to verify the factor structure of the set of variables. Cronbach Alphas were computed to assess the reliability of the measuring instrument. Pearson product-moment correlation coefficients were calculated to identify the relationships between the variables. The statistical significance level is set at a 95% confidence interval ( $p \leq 0.05$ ). The cut-off point of 0.30 is used to determine practical significance of a medium effect. T-tests and ANOVA are employed to determine differences between the groups in the sample.

## 5. PRESENTATION AND DISCUSSION OF RESULTS

The results of the empirical study are reported and discussed below. Firstly, the results from the biographical questionnaire will be discussed and secondly, an interpretation of the data from the instrument used will be presented.

### 5.1 Biographical Profile

Biographical information was reported for a number of employees in the organization, level of employment, type of metal mined or processed, number of years the organization has been operating and the geographic location (see Table 1).

A total of 193 questionnaires were received representing a response rate of 64%.

*Size:* The majority of the respondents were working for the mines with more than 1000 employees (66%) followed by those in smaller operations with less than 499 employees (18%). The respondents from medium-sized mines with 500 to 999 employees were about 16%.

*Level of management:* The majority of respondents were managers (57%) followed by directors (34%) and CEOs (9%).

*Types of mines:* About 51% of the respondents were from the mines producing precious metals such as gold and platinum group metals. About 17% were from coal mining organizations while about 11% were from the steel industry. A total of 12% were from the mines producing non-ferrous metals such as copper and only 8% were in the industrial metal mines.

*Tenure of the mine:* The majority of the respondents were from the mines with more than 20 years in operation (87%) which serves as a confirmation that most of the mines in the world have been operating for decades.

*Geographic location:* Most of the respondents were from the South African mining operations (55%), other respondents were from the rest of Africa (23%) while the respondents from other continents such as USA and Australia formed 21% of all the respondents.

**Table 1: Biographic Profile of the Respondents**

Item	Category	Frequency	Percentage
<b>Number of employees in the organization</b>	<499	35	18.1
	500 – 999	30	15.5
	>1000	128	66.3
<b>Level of employment</b>	CEO	17	8.8
	Director	66	34.2
	Manager	110	57.0
<b>Type of metal mined or processed</b>	Iron and Ferro Alloys	22	11.4
	Non-Ferrous Metals	24	12.4
	Precious Metals	99	51.3
	Mineral Fuels	32	16.6
	Industrial Metals	16	8.3
<b>Number of operating years</b>	< 10	2	1.0
	11 – 20	23	11.9
	> 20	168	87.0
<b>Geographic location of the operations</b>	South Africa	107	55.4
	Africa (Not SA)	45	23.3
	Others	41	21.2

(Source: Compiled by authors from survey results)

The results of descriptive statistics are presented in the next section.

## 5.2 Descriptive Statistics

### 5.2.1 Strategic Planning and Management

One of the main objectives of this study was to measure the extent of the use of the strategic planning and management processes by the mining organizations. The results are presented in Table 2.

#### ❖ Institutionalizing the Planning Function

The mean scores above 3 in Table 2 indicate that the majority of the mining organizations have institutionalized their strategic planning functions. The standard deviations for the questions were also relatively low indicating their agreement to the statements. This implies that most of the mining organizations have formal strategic planning processes and they allocate resources ear-marked for this function. About 20% of the participants responded negatively, indicating that some of the mining organizations do not have any formal strategic planning processes at all. Most of those mines are based in Africa, excluding South Africa.

## ❖ Establishing the Strategic Foundation

The aim of the following set of questions (C5 – C10) was to determine if the mining organizations had well-established strategic foundations. Based on a mean score above 3 and a low standard deviation, most of the participants responded positively to these questions implying that most of the mining organizations had established their own strategic foundation. The organizations have well-understood mission statements, strategic goals and systematically measured their performance against their goals on a regular basis. However there were about 12% of the mining organizations that had not established their strategic foundation.

**Table 2: Results of the questionnaire on Strategic Planning and Management**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree	Mean	Std Deviation
<b>Institutionalizing the Planning Function</b>							
<b>C1</b>	Management team takes formal responsibility for the organization's strategic planning.	0	26	59	108	3.42	0.72
<b>C2</b>	The organization has a formal strategic planning process that is performed regularly.	14	33	37	109	3.25	0.98
<b>C3</b>	The organization provides resources ear-marked specifically for strategic planning.	16	36	45	96	3.15	1.00
<b>C4</b>	The organization follows a defined set of procedures in its strategic planning process.	15	25	53	100	3.23	0.95
<b>Establishing the Strategic Foundation</b>							
<b>C5</b>	The organization has a written mission statement.	1	5	65	122	3.61	0.54
<b>C6</b>	All management and senior staff understand the mission.	0	18	75	100	3.43	0.65
<b>C7</b>	The organization has written strategic goals.	0	23	71	98	3.38	0.69
<b>C8</b>	The goals list measurable targets (e.g., volume, profitability).	5	8	78	102	3.43	0.70
<b>C9</b>	The organization systematically measures actual performance versus goals.	2	10	93	88	3.42	0.58
<b>C10</b>	The current vision for the future represents the "best thinking" from the leadership team.	5	14	73	101	3.40	0.73
<b>Developing Strategic Plans</b>							
<b>C11</b>	The organization uses the strategic (situational) diagnosis to formulate strategic plan options.	4	27	66	96	3.31	0.80
<b>C12</b>	It considers business performance options, (e.g., cost reduction, alternative suppliers or production improvements).	2	3	79	109	3.54	0.59
<b>C13</b>	It considers market penetration options, (e.g., pricing/ promotion, market expansion and segmentation)	12	9	79	93	3.31	0.84
<b>C14</b>	It considers management options, (e.g., restructuring, purchasing competitive businesses).	2	9	79	103	3.48	0.64
<b>C15</b>	The organization considers product enhancement options.	11	28	51	103	3.28	0.92
<b>C16</b>	The planning process is based on criteria by which options can be compared.	7	32	55	99	3.28	0.86
<b>C17</b>	The organization decides its strategic plan(s) based on risk/return criteria.	22	22	43	105	3.20	1.06
<b>C18</b>	It takes into account unavoidable uncertainties about the future.	18	20	59	87	3.17	0.97
<b>Managing Strategic Plan Implementation</b>							
<b>C19</b>	The organization makes strategic decisions based upon the strategic plan.	1	21	60	108	3.44	0.71
<b>C20</b>	The organization assigns lead responsibility for the implementation of the action plan to a person or, alternately, to a team.	2	26	61	104	3.40	0.73
<b>C21</b>	Sufficient resources are allocated for implementation.	3	30	85	75	3.21	0.74
<b>C22</b>	The organization sets performance standards for each plan element.	4	43	67	75	3.15	0.83
<b>C23</b>	The organization develops an organized system for monitoring how well those performance standards were met.	8	50	58	77	3.09	0.88
<b>C24</b>	The organization reviews monitoring data regularly.	3	41	77	71	3.14	0.79
<b>C25</b>	Managers are updated regularly about how the organization is progressing towards its future vision.	10	36	69	78	3.14	0.87
<b>C26</b>	The organization's vision for the future has been clearly communicated to all levels	9	50	54	80	3.09	0.93
<b>C27</b>	<b>Strategic Planning is used for the following Organizational Purposes:</b>						
<b>A</b>	Achieving sustainable competitive advantage.	6	28	71	87	3.25	0.82
<b>b</b>	Motivating innovation.	11	53	82	45	2.85	0.86
<b>c</b>	Implementing productive action plans.	2	8	91	90	3.41	0.63
<b>d</b>	Ensuring ongoing success.	3	7	78	104	3.48	0.65
<b>e</b>	Identifying various types of risks facing the organization.	7	10	63	112	3.47	0.77
<b>f</b>	Scanning business environment.	7	16	81	87	3.30	0.79
<b>g</b>	Ensuring the existence of proactive business continuity planning.	9	10	73	99	3.38	0.80
<b>h</b>	Ensuring effective recovery after a disaster or crisis.	10	24	76	82	3.22	0.85

### ❖ **Developing Strategic Plans**

Questions C11 to C18 were meant to determine how the organizations develop their strategic plans. A mean score of above 3 with a relatively low standard deviation indicate that most of the participants responded positively to these questions. About 80% of the organizations use situational diagnosis and consider different strategic options to formulate their strategic plan. This also implies that there are almost 20% of the organizations who do not develop their strategic plans properly.

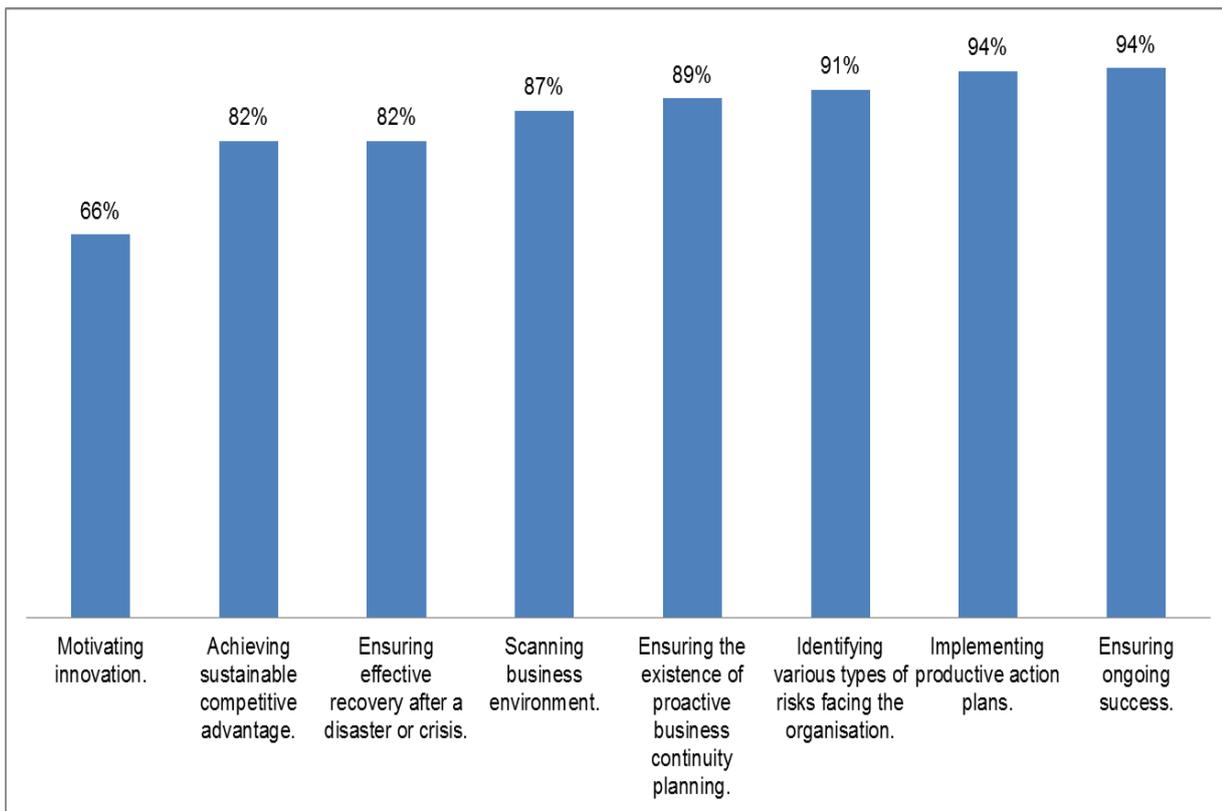
### ❖ **Managing Strategic Plan Implementation**

The majority of the mines also follow the prescribed steps in the implementation of their strategic plans. They allocate sufficient resources for the implementation phase and monitor the progress with regular feedback given to other managers. There is also a significant number of mines who do not use the process. About 24% do not allocate sufficient resources while almost 30% do not have any organized systems of monitoring their performance. About 31% of the respondents also indicated that there is a lack of communication to all the levels about the vision for the future.

### ❖ **Organizational Purpose for using Strategic Planning Process**

The other objective of the study was to determine the purposes which the strategic planning process is used for by the mining organizations. The results are shown in Figure 2. More than 90% of the participants use strategic planning processes to ensure ongoing success; implement productive action plans and do risk analysis. More than 80% use the process to achieve sustainable competitive advantage with only 66% using it to motivate some innovation. About 44% do not use the strategic planning process to motivate innovation and about 18% do not use the process to achieve sustainable competitive advantage. This is a significant number of organizations with negative responses to these questions.

**Figure 2: The purposes of the strategic planning process**



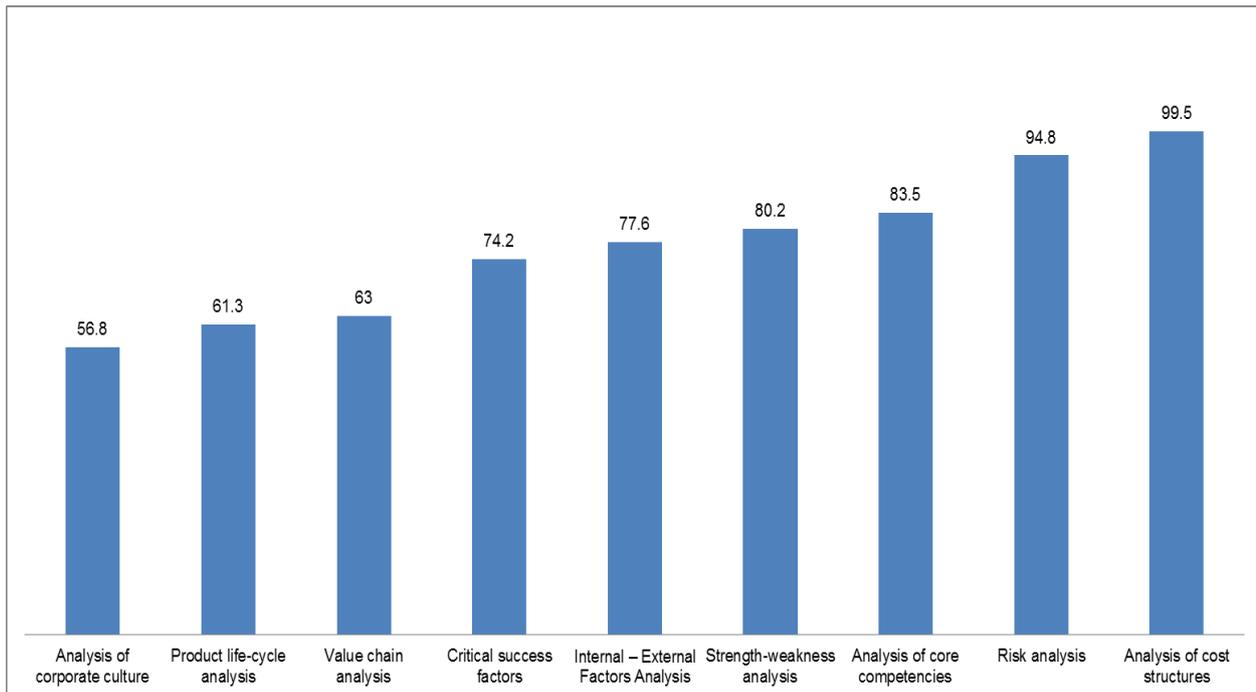
(Source: Compiled by authors from survey results)

The other objective of the study was to determine which analytical tools or techniques are used as part of strategic management. A number of techniques was listed and the respondents were asked to indicate by Yes or No whether their specific organizations use the technique or not. The results are presented and discussed below.

### **5.2.2 Analytical Tools and Techniques in Strategic Management**

A summary of the tools used for the analysis of the internal resources such as financial, human, technical and both internal and external informational resources which the organization can exploit to apply and consolidate its strategy is shown graphically in Figure 3.

**Figure 3: Summary of the tools used in analysis of the internal resources (%)**



(Source: Compiled by authors from survey results)

The analysis of the cost structure is done by almost all the mines. The mines do cost analysis to monitor the cost of their inputs and operations in their quest for survival. Risk analysis is carried out by about 95% of the mines. More than 80% of the mines analyse their core competencies which, according to Deac and Duna (2012:27) can allow the organizations to determine their specific skills that will give them a true competitive advantage. About 80% of the organizations determine their strengths, based on which they would have to consolidate their positions or craft their strategies. The organizations also determine their weaknesses which they would have to overcome in an effort to achieve competitive advantage. About 74% of the organizations determine the critical success factors which should improve their chances of crafting a sound strategy according to Thompson *et al.* (2012:133). Value chain analysis which allows the systematic identification of the sources of competitive advantage and of its activities is done by only about 63% of the respondents. About 61% of the mining organizations use the product-life cycle technique to identify distinct stages affecting the sales of products, from the products' inception until its retirement. Only 57% of the mines analyse their corporate culture which is essential in the implementation phase of strategy.

It is worth noting that a significant number of the organizations do not use these tools:

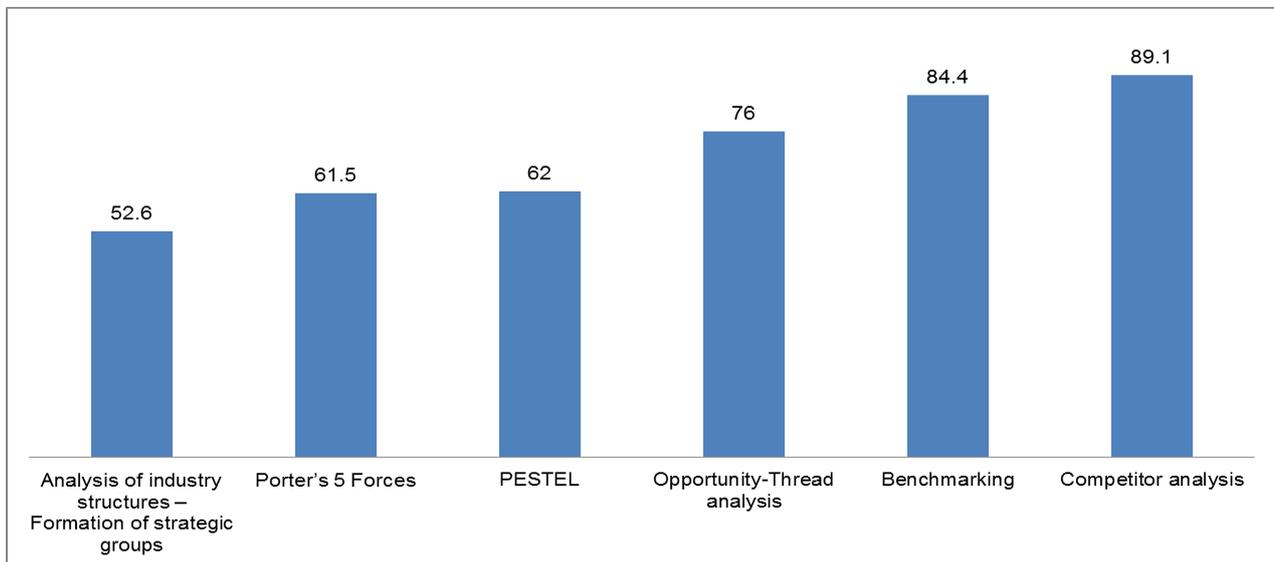
- about 20% do not analyze their core-competencies and determine their strengths and weakness;

- about 26% do not determine the critical success factors while about 37% do not carry out value chain analysis;
- about 39% do not do product life-cycle analysis while more than 40% do not even do an analysis of their corporate culture.

A summary of the tools used in the analysis of the external market forces is shown graphically in Figure 4.

More than 80% of the organizations do competitor analysis and benchmark themselves to learn the best practices in the industry. About 76% scan for the opportunities that they can pursue and the threads which could place their operations at risk. Scanning of the political, economic, societal, technological, ecological or environmental and legal factors in the macro-environment as well as the global forces is only done by 62% of the respondents. About 38% of the respondents do not use Porter’s 5 Forces technique to assess and evaluate their competitive position. Almost half of the organizations do not assess their industry structure using the strategic group maps’ technique.

**Figure 4: Summary of tools used for analysis of external market forces (%)**



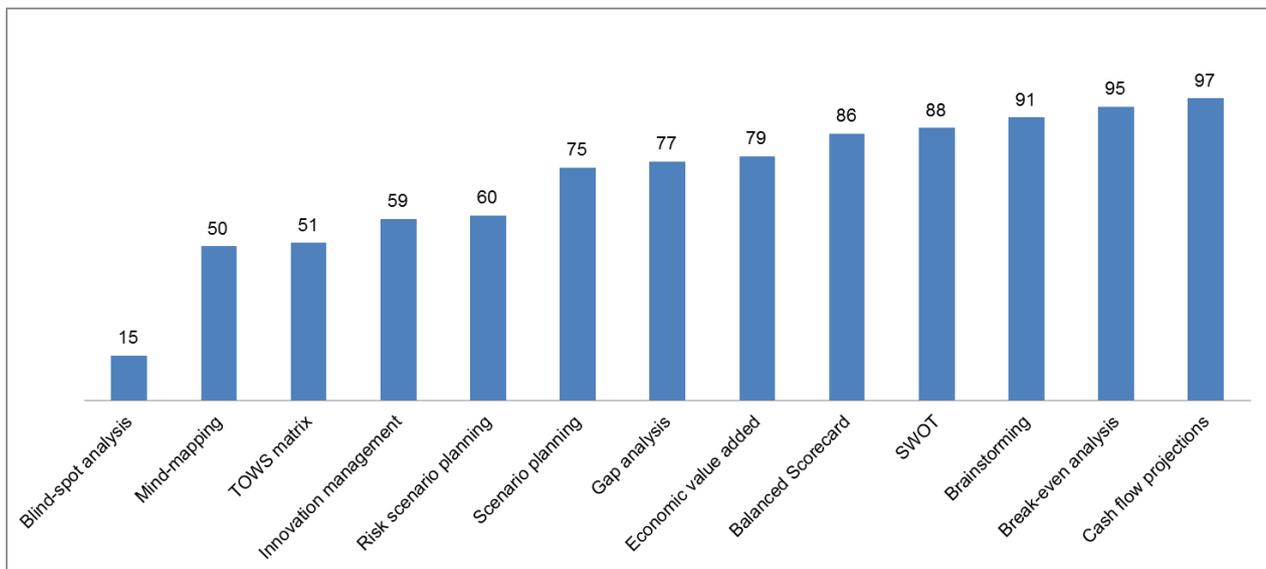
(Source: Compiled by authors from survey results)

The BCG matrix and industry attractiveness technique are not widely used in the sector with more than 65% of the participants responding negatively to their use. About 90% of the organizations have a mission statement which should define their current business and purpose. About half of the

organizations use generic strategies as a tool for strategic positioning. The Ansoff matrix is not a commonly used technique with only 13% of the participants responding positively to its use within their organizations.

A summary of the tools used generally for strategic planning and evaluation are shown in Figure 5.

**Figure 5: Summary of the tools used in strategic planning and evaluation (%)**



(Source: Compiled by authors from survey results)

More than 90% of the organizations do break-even analysis and cash flow projections which are financial tools essential to analyse and monitor the performance of the organizations. Brainstorming is used by more than 90% of the respondents to generate ideas. SWOT analysis, which is a structured method to determine the internal strengths and weaknesses as well as the external opportunities and threats, is used by the majority of the mines (88%).

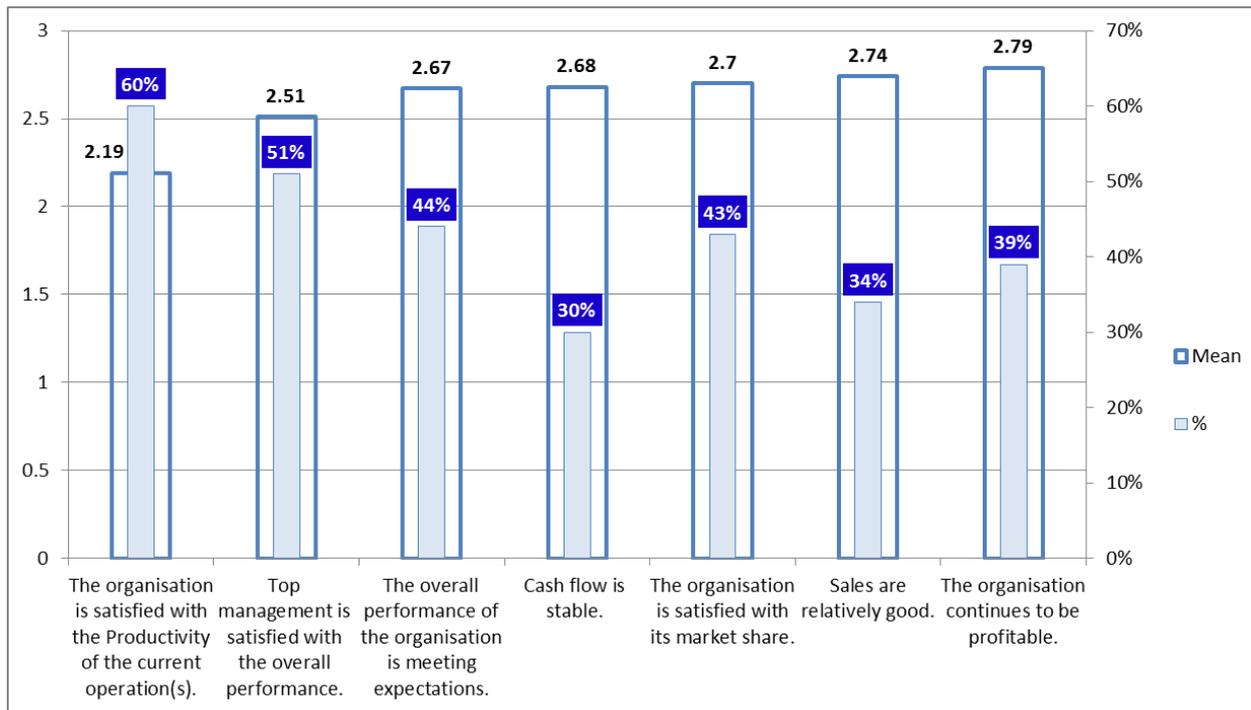
About 86% of the mines have a balanced scorecard which is essential for performance management. Gap analysis and scenario planning are used by about 75% of the mines. The TOWS matrix is an essential tool which should be carried out as a follow-up to SWOT analysis to assist organizations in determining strategic alternatives. This technique is only used by almost half of the organizations. About 85% of the participants responded negatively to the use of the blind-spot analysis technique. This technique is essential to assist organizations in preventing the misjudging of industry boundaries, market trends and customer behaviour.

The next section shows the results of the overall perceived business performance of the mines which were measured.

### 5.3 Perceived Business Performance

The results for the overall perceived business performance are summarized in Figure 6.

**Figure 6: Mean scores in ranking order for perceived business performance**



(Source: Compiled by authors from survey results)

About 60% of the organizations were not satisfied with the productivity of their current operations. The mean score for this question was the lowest at 2.19 indicating that the majority of the responses were negative. About half of the respondents indicated that their top management were not satisfied with the overall performance of their mining organizations. The mean score was 2.51 with a relatively high standard deviation of 1.13. The high standard deviation indicates that the respondents did not concur and provided a large spread of the results.

The overall performance of 44% of the mines was not meeting expectations with a mean score of 2.67 and a high spread shown by a high standard deviation of 1.19. This is in agreement with the 39% whose organizations were not reported as profitable. About 43% of the mines were also not

satisfied with their current market share. A significant number (30%) of the mines indicated that their cash flows were not stable at all.

The results for factor analysis are shown below.

#### 5.4 Factor Analysis

Reliability, according to Easterby-Smith *et al.* (2008), is concerned with the consistency of the instrument. An instrument is said to have high reliability if it can be trusted to give an accurate and consistent measurement of an unchanging value. Reliability was calculated and evaluated by means of Cronbach Alpha. Sekaran and Bougie (2010) suggest that the Cronbach alpha co-efficient should be greater than 0.70, for the data to be regarded as reliable and internally consistent. Factor reliability of the identified dimensions is presented in Table 3. All the factors display satisfactory levels of reliability with alpha coefficients ranging from 0.91 to 0.96.

**Table 3: Results of factor reliability**

#	Factor	Cronbach Alpha	Cronbach Alpha Based on Standardized Items	N of items	Mean	Minimum	Maximum	Range	Variance
1	Institutionalizing the Planning Function	0.954	0.959	4	3.263	3.145	3.425	0.28	0.014
2	Establishing the Strategic Foundation	0.914	0.913	6	3.444	3.384	3.605	0.221	0.007
3	Developing Strategic Plans	0.907	0.911	8	3.320	3.175	3.536	0.361	0.016
4	Managing Strategic Plan Implementation	0.959	0.961	8	3.206	3.091	3.441	0.349	0.019
5	Business Performance	0.946	0.946	7	2.613	2.192	2.788	0.596	0.042

(Source: Compiled by authors from survey results)

The number of items that loaded on each factor is shown in the table. The average mean scores for each factor are also shown. Factors 1 to 4 had mean scores above 3.2 indicating that the majority of the participants responded positively to the items in these factors. Factor 5 has a mean score of 2.613 with a high range of 0.596 indicating a relatively more negative response and a high spread in the response values.

The other objective of this study was to determine if there were any relationships among the dimensions of strategic management and the performance of those organizations. The results of the correlations between the identified factors are shown below.

## 5.5 Correlations

The results of the product-moment correlation coefficients between the constructs are reported in Table 4.

**Table 4: Correlation coefficients between Strategy Management and Perceived Business Performance Dimensions**

	<b>Institutionalizing the Planning Function</b>	<b>Establishing the Strategic Foundation</b>	<b>Developing Strategic Plans</b>	<b>Managing Strategic Plan Implementation</b>	<b>Business Performance</b>
<b>Institutionalizing the Planning Function</b>	1.000	.815**	.868**	.881**	.685**
<b>Establishing The Strategic Foundation</b>	.815**	1.000	.790**	.839**	.635**
<b>Developing Strategic Plans</b>	.868**	.790**	1.000	.869**	.790**
<b>Managing Strategic Plan Implementation</b>	.881**	.839**	.869**	1.000	.793**
<b>Business Performance</b>	.685**	.635**	.790**	.793**	1.000

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

(Source: Compiled by authors from survey results)

As shown in Table 4, there is a strong statistical and practical significant correlation among *Institutionalizing the Planning Function*; *Establishing the Strategic Foundation*; *Developing Strategic Plans* and *Managing Strategic Plan Implementation* as the dimensions of strategic planning and management process. The table shows that *Institutionalizing the Planning Function* dimension is positively correlated to *Business Performance* (practically significant, large effect). *Establishing the Strategic Foundation* is positively correlated to perceived *Business Performance* (practically significant, large effect). *Developing Strategic Plans* is positively correlated to perceived *Business Performance* (practically significant, large effect). *Managing Strategic Plan Implementation* relates positively to the perceived *Business Performance* (practically significant, large effect). All the dimensions of strategic planning and management processes are positively correlated to the overall perceived business performance of the organization (practically significant,

large effect). Developing the strategic plans and Managing the implementation of strategy are the most highly correlated to perceived performance.

The other objective of this study was to compare the findings based on the demographic differences. This was achieved by using the T-test and ANOVA tools to establish if there were any significant differences in the responses based on the biographical information of the participants. The results are discussed below.

## **5.6 Differences based on demographic profile**

### **5.6.1 Number of employees**

Most of the organizations with 500 – 999 employees had negative responses in terms of their performance with a mean of 1.933. The larger mining organizations with more than 1000 employees had a mean score of 2.718 which was close to the mean score of 2.812 obtained for the smaller organizations with less than 500 employees. The large organizations with more than 1000 employees had the highest mean scores in the responses to the items related to strategic planning and management processes. This implies that most of the large mines have well-established strategic management processes compared to the smaller and medium-sized organizations.

### **5.6.2 Level of employment**

The directors responded more positively to the items of strategic management than the CEOs and the managers. The standard deviation for the responses by the CEOs to the items about the planning function being institutionalized was relatively high, indicating a high spread in the way they responded.

### **5.6.3 Type of metal**

The organizations producing precious metals such as gold and platinum group metals had the lowest mean score for business performance indicating that the most negative responses were received from these miners. Those in the industrial and non-ferrous metals gave more positive responses compared to those producing precious metals; however they showed the highest spread in terms of

their responses. Mines producing mineral fuels such as coal had the highest mean score for business performance indicating that the participants from these miners responded the most positively.

#### **5.6.4 Geographic Location**

The lowest mean score for business performance was obtained for the organizations in Africa. Their standard deviation was also relatively high indicating a high spread in terms of their responses. This implies that the participants from the mines in Africa responded the most negatively compared to those in South Africa and the other continents such as USA and Australia. The performances of the mining companies in South Africa were also more negative compared to those from other continents. The lowest mean scores were also observed from the respondents from the mines in Africa in response to the items of strategic planning and management process

## **6. CONCLUSION**

Conclusions regarding the specific theoretical objectives and the results of the empirical study are made.

### **6.1 Conclusions regarding the specific theoretical objectives**

To answer the first objective of the study with regard to the conceptualisation of strategic management, from the literature study, it emerged that the strategic management process is the full set of commitments, decisions, and actions required for an organization to achieve competitiveness and get good returns. The organization's initial steps include the process of analysing its external macro- and micro-environment and internal analysis to determine its resources, capabilities, and core competencies which are the sources of its strategic inputs. It was evident from literature that clear and insightful diagnosis of the organization's internal and external situations is an essential step in crafting strategies that are well matched to industry and competitive conditions. Effective strategic actions that take place in the context of carefully integrated strategy formulation and implementation efforts result in positive outcomes and superior performance. Studies have been able to provide convincing evidence of the profitability of strategy formulation and implementation. Research has also indicated that organizations using strategic-management concepts are more profitable and successful than those that do not.

A competently done evaluation of a company, capabilities and competitive strengths can help to expose the strong and weak points in the present strategy and show how attractive or unattractive

the organization's competitive position is. To do cutting-edge strategic thinking about the external macro- and immediate environment as well as the internal situation, managers must know what questions to pose and which analytical tools to use in answering those questions.

Strategic management in the mining organization is a process that acknowledges the nature of the depleting mineral asset base, the importance of a defined but flexible project pipeline, variability in market conditions and the requirements of the operating legislative environment. It is a logic construct that translates into a defined outcome. Thus the philosophy of strategic planning in the mining organizations is an integration of logic, process, and methodologies to facilitate long-term planning of mineral asset exploitation, within a strategic and market context. The strategic plans create the link between the market requirements, business strategy, and tactical planning activities. They also form the basis for the development of a portfolio of operations, current and future, that ensures optimal resource exploitation and creates the flexibility to respond to changing economic and market conditions while operating within legislative and mandated strategic constraints.

## **6.2 Conclusions regarding the specific empirical objectives**

Results of the factor analysis showed that all the factors displayed satisfactory levels of reliability with alpha coefficients ranging from 0.91 to 0.96. The mean scores above 3 indicate that majority of the mining organizations use the strategic management process. About 20% of the mining organizations do not have any formal strategic planning processes at all. The results also indicated that some of the mines are struggling with their cash flows and are not profitable. Some were not satisfied with their current low productivity. The results also confirmed that a statistically and practically significant positive relationship with a large effect exists between Strategic Management dimensions and Business Performance.

Some of the tools such as SWOT analysis and cost structure analysis were used by many mining organizations whereas some tools were not used to the same extent.

Most of the large mines have well-established strategic management processes compared to the smaller and medium-sized organizations. The lowest mean score for business performance was obtained for the organizations in Africa.

## **7. RECOMMENDATIONS**

Mining organizations should make conscious decisions about their overhead ratios. With limited revenue potential because of low commodity prices, mining organizations may seek to defend their profits by managing costs and streamlining their overhead portfolio to focus on cost categories that drive growth. Business decision-making should be forward looking, based on smarter plans and advanced business analytics. It is recommended that all the mining organizations should use formalised strategic management process and also use appropriate analytical tools for the continuous analysis of the external environment and internal resources, competencies and capabilities in order to continually review their strategic positions and remain competitive.

Using strategic management process is not the only factor that leads to business performance of the mining organizations; other contributory factors may be identified with further research. A measure of the critical success factors for this industry is recommended. An investigation is recommended about the effect of the geographic locations of these organizations and the regulatory framework in those areas on their performance.

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## CHAPTER 5: RESEARCH ARTICLE 2

### **Title: INVESTIGATING THE USE OF BUSINESS, COMPETITIVE AND MARKETING INTELLIGENCE AS MANAGEMENT TOOLS IN THE MINING INDUSTRY**

The reader is requested to take note of the following:

The article **was *accepted*** for publication in the following IBSS indexed, internationally peer-reviewed academic journal as follows:

- ❖ Boikanyo, D.H., Lotriet, R. & Buys, P.W. Investigating the use of business, competitive and marketing intelligence as management tools in the mining industry. *Problems and Perspectives in Management Journal* (submitted). (ISSN: 1727-7051)

**Acceptance letter** is shown in APPENDIX B on page 224. The article was written in line with the journal's submission guidelines, which are included in **Appendix G: Problems and Perspectives in Management Journal author guidelines** on page 229.

The article was researched and written by the first author (D.H. Boikanyo) as the PhD candidate and primary author, while the co-authors (R.A Lotriet and P.W. Buys) fulfilled a reviewer function thereto as the PhD project's promoters.

# **INVESTIGATING THE USE OF BUSINESS, COMPETITIVE AND MARKETING INTELLIGENCE AS MANAGEMENT TOOLS IN THE MINING INDUSTRY**

## **ABSTRACT**

The main objective of this research study was to investigate the extent to which business intelligence, competitive intelligence and marketing intelligence are used within the mining industry. Business intelligence is a management tool used to mine business information and to produce up-to-date intelligence and knowledge for operative and strategic decision-making. Competitive intelligence is the process of collecting actionable information about rivals and the competitive environment, use it in the planning processes and decision-making to improve performance. Marketing intelligence is the information related to the organization's markets, evaluated specifically for decision-making in determining market opportunity, marketing strategy and market development metrics.

A structured questionnaire was used for the study. A total of 300 mines were randomly selected from a research population of mining organizations in South Africa, Africa and globally. The respondents were all part of senior management. A response rate of 64% was achieved. The results indicated that more than half of the respondents do not have real-time intelligence and do not have proper data mining tools to identify patterns and relationships within a data warehouse. Although a large proportion agreed that their organizations have systematic ways of gathering these different types of intelligence and use them for strategic decision-making, there was a significant proportion that did not have any systems.

Statistically and practically significant positive relationships with a large effect were found among the dimensions of business intelligence, marketing intelligence, competitive intelligence and perceived business performance.

**Keywords:** Business Intelligence, Competitive Intelligence, Marketing Intelligence, Mining Industry

**JEL Classification:** M10, M15

## **1. INTRODUCTION**

This study focuses on investigating the use of business intelligence, competitive intelligence and marketing intelligence in the mining industry. A background to the research study will be provided to enable the framing of the research focus. Subsequently, the research objectives and an overview of the research methodology will be presented. The results of the empirical study will thereafter be reported. Finally the conclusion resulting from the study will be discussed as well as any recommendations that can be made to management and for future studies.

## **2. BACKGROUND**

According to Igbaekemen (2015), reliable data and information form the basis of any strategic management decision and also form the basis for all the investigative and analytical efforts of managers. Obtaining accurate and reliable, relevant information promptly from both external and internal sources can assist in anticipating, identifying, analysing and resolving or preventing problems. The environment within which organizations operate is also changing at an accelerating rate, so there is a pressing need for real time intelligence and information. This research focuses on three constructs of intelligence which are defined below.

According to Troy Media (2015), business intelligence (BI) is the analysis of the organization's internal data. BI is about gathering large amounts of raw data concerning all aspects of business, from profits and losses to productivity and converting it into actionable insights. Organizations use business intelligence to make improvements to current processes, products and services as well as identify and develop new opportunities. Coker (2014) views business intelligence as the means by which an organization collects its own information about customers, returning clients, sales or website hits and transforms the numbers into measurable metrics to ascertain that the organization is performing efficiently. BI depends mainly on technology, using applications and processes to analyze the (mostly internal) data. One of the main benefits of BI is that it enables the organizations to contextualize both historical and current data, which enables them to make better and informed predictions. It is also critical to effective measurement of benchmarks or performance metrics. Organizations have also realized that BI gives them an opportunity to gain insight and enhance decision-making capabilities to assist the organizations in uncovering new opportunities, improving efficiency and achieving strategic goals (Gartner, 2013). BI has applications across all levels of an

organization, from research and development, product development and pricing to staffing and strategic planning process improvement (Troy Media, 2015).

While business intelligence focuses to a large extent on the organization's internal data, competitive intelligence focuses mainly on the external factors that affect the operation. Competitive intelligence (CI) means investigating the state of the competitive environment in which the organization operates to identify trends and detect potential threats as well as points of possible differentiation (Pellissier & Nenzhelele, 2013:5).

According to Anica and Cucui (2009) and Troy Media (2015), competitive intelligence usually involves looking thoroughly at the competitors, and assessing their strengths and weaknesses to identify possible opportunities. CI involves taking the information that has been gathered and converting it into actionable insights to gain competitive advantage; for example, analyzing poor performance of a rival in a certain market can provide information about what not to do and generate some ideas for a successful market penetration strategy. CI practitioners emphasize that in order for data to be considered as a real and true competitive intelligence, it has to be actionable. It is also of utmost importance to differentiate between competitive intelligence and corporate or competitive espionage. Competitive intelligence is completely legal and is collected using publicly available information. Corporate espionage or collecting information about the rivals via questionable ways (such as hacking, posing as a potential customer or poaching employees) is not only unethical, but illegal in most instances.

According to Kotler *et al.* (2009), marketing intelligence (MI) is industry-targeted intelligence which is developed on real-time dynamic features of competitive developments happening among the 4Ps of the marketing mix (pricing, place, promotion and product) in the marketplace to assist in understanding the attractiveness of the market. MI is the information related to an organization's markets, collected and examined specifically for correct and well-informed decision-making in formulating strategy in areas such as market opportunity, market penetration strategy and market development.

The problem statement is discussed below.

### 3. PROBLEM STATEMENT

Mining organizations across the globe face significant challenges, putting the industry at a crossroad. The pressure on these mining organizations is great for them to be efficient, productive and remain profitable in spite of challenges such as volatile commodities market (Deloitte, 2014). Lack of credible information and knowledge of decisions taken by all stakeholders within the mining organizations has led to the weakening and even failure of some of these mines. A great deal of data is produced continuously at a site of the mine. Without a proper and systematic way to organise this data and present it in a timely, simplified, easily accessible and accurate manner, tactical and strategic decisions regarding the operations and long-term sustainability of a mine site becomes very challenging (Mining Weekly, 2013). Some mining organizations are still not capable of reading the competitive trends and forces affecting the industry. Some mines cannot benefit from any form of intelligence because it is not integrated, organised, processed and available to the right people in a format for decision-making. There are isolated pools of data which are mainly influenced by the functional view of the business units rather than a broader, general-management view of the whole mining organization. Some managers have limited access to corporate-wide data and mental models transformed into information and knowledge upon which they can effectively act upon with agility. Decisions are in some cases made on an event-by-event basis as opposed to being made within a set of strategic parameters (Buthelezi, 2013).

According to Kumari (2013), business intelligence is needed to evaluate the cost-benefit of existing and new operations and technologies as well as to forecast future technological and operational discontinuities. Competitive intelligence is required to assess the development of competitive strategy over time through changes in competitors' structure, new product substitutes and new industry. Marketing Intelligence is also needed by mine managers to provide the means of assessing the current and future trends in customers' preferences and needs, new markets and creative segmentation opportunities together with the main shifts in marketing and distribution.

There is scarcity in empirical literature about the use of different types of intelligentsia in the mining sector. This prompted the research to investigate the use of business intelligence, marketing intelligence and competitive intelligence and how they contribute to business performance in the sector. This study will not only aim to improve understanding of these different types on intelligentsia, but also produce findings of practical relevance and value for the mining and other

sectors. Therefore, this research seeks to contribute to both management practitioners and academics alike.

The research objectives of the study are outlined below.

#### **4. RESEARCH OBJECTIVES**

The primary aim of this research study is to investigate the extent to which business intelligence, competitive intelligence and marketing intelligence are utilised within the mining industry. The secondary objectives are:

- To determine the relationship between the dimensions of business intelligence, competitive intelligence plus marketing intelligence and perceived business performance, and
- To compare the findings based on the demographic differences.

The research methodology used for this study is discussed below.

#### **5. RESEARCH METHODOLOGY**

##### **5.1 Research Design and Sample**

A survey design was used in which a selected sample was studied to make inferences about the population. The survey involved selecting a representative and unbiased sample of subjects drawn from senior management in the mining organizations in South Africa, Africa and globally. The researcher used a simple random sampling technique to select participants. Saunders *et al.* (2009) states that simple random sampling involves the selection of a sample at random from the sampling frame using either random number tables or a computer. A total of 300 mines were randomly selected from a population of 850. A response rate of 64% was achieved.

The survey questions were developed based on the existing literature with some questions adopted from a questionnaire from a study by Kruger (2010). The structured questionnaire which was used was divided into sections comprising the biographic information, items of business intelligence, competitive intelligence, marketing intelligence and perceived business performance which were measured using a 4-point Likert-type scale.

## **5.2 Statistical Analysis**

The data received from the completed questionnaires was captured and analysed with the use of the statistical software program SPSS and STATISTICA with the assistance of the Statistical Consulting Services of the North-West University. Descriptive statistics and effect sizes were used to decide on the significance of the findings. The results are to be compared by way of mean and standard deviations. Confirmatory Factor Analysis (CFA) was used to verify the factor structure of the set of variables. Cronbach Alphas were computed to assess the reliability of the measuring instrument. Pearson product-moment correlation coefficients were calculated to identify the relationships between the variables. The statistical significance level is set at a 95% confidence interval ( $p \leq 0.05$ ). The cut-off point of 0.30 is used to determine practical significance of a medium effect. ANOVA was employed to determine differences between the groups in the sample.

## **6. PRESENTATION AND DISCUSSION OF RESULTS**

The results of the empirical study are reported and discussed below. Firstly, the results from the biographical questionnaire are discussed and secondly, an interpretation of the data from the instrument used is presented.

Biographical information was reported for a number of employees in the organization, level of employment, type of metal mined or processed, number of years the organization has been operating and the geographic location.

A total of 193 questionnaires were received representing a response rate of 64%.

The majority of the respondents were working for the mines with more than 1000 employees (66%) followed by those in smaller operations with less than 499 employees (18%). The respondents from medium-sized mines with 500 to 999 employees were about 16%.

The majority of respondents were managers (57%) followed by directors (34%) and CEOs (9%).

About 51% of the respondents were from the mines producing precious metals such as gold and platinum group metals. A number (17%) of the respondents were from coal mining organizations while about 11% were from the steel industry. About 12% were from the mines producing non-ferrous metals such as copper and only 8% were in the industrial metal mines.

The majority of the respondents were from the mines with more than 20 years in operation (87%) which serves as a confirmation that most of the mines in the world have been operating for decades. Most of the respondents were from the South African mining operations (55%), other respondents were from the rest of Africa (23%) while the respondents from other continents such as USA and Australia formed about 21% of all the respondents.

The results of descriptive statistics are presented in the next section.

## **6.1 Descriptive Statistics**

### **6.1.1 Business Intelligence**

One of the main objectives of this study was to measure the extent of the use of the Business Intelligence by the mining organizations. The results are presented in Table 1. The mean score for item F1 is above 3 indicating that about 75% of the mining organizations systematically collect information to assist in strategic decision making. The standard deviation for the question was relatively high indicating a high spread in terms of the responses. A significant number (25%) responded negatively to this question.

The mean score for responses to item F2 was also above 3 indicating that the majority (72%) of the participants agree that the availability of business intelligence has to a certain extent increased the effectiveness of decision-making by the managers. A high standard deviation is also found for this item indicating a relatively large spread in terms of the responses. 28% of the participants responded negatively to this question. The mean scores for questions F3 and F4 are 2.96 and 2.98 respectively. These mean scores are close to 3 and also indicate that most of the participants responded positively to these questions. Thus the majority of the mining organizations have business intelligence tools which are used to manipulate data and also have some form of forecasting capabilities. About 20% of the organizations do not have such business intelligence tools or use them for these specific functions.

**Table 1: Results of the questionnaire on Business Intelligence**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree	Mean	Std Deviation
<b>F1</b>	Information is systematically collected to assist in strategic decision making.	13.5	11.9	32.1	42.5	3.04	1.043
<b>F2</b>	The availability of Business Intelligence has increased the effectiveness of managerial decision making.	8.8	19.2	25.9	46.1	3.09	1.001
<b>F3</b>	Business Intelligence tools are used to manipulate data, e.g. operational or/and historical data.	9.3	14.0	47.7	29.0	2.96	.898
<b>F4</b>	The Business Intelligence tools have forecasting capabilities.	7.3	10.4	59.1	23.3	2.98	.794
<b>F5</b>	Data gathered from Business Intelligence deployment is reliable.	7.8	1.6	70.5	20.2	3.03	.728
<b>F6</b>	Knowledge generated from successful Business Intelligence deployment can be used to sustain competitive advantage.	3.1	10.4	57.5	29.0	3.12	.711

(Source: Compiled by authors from survey results)

About 91% of the respondents agree that the data they gathered from BI deployment is reliable. However about 9% completely disagrees and believe that the data is not reliable. The mean score of 3.12 for the last question indicate that most (87%) of the participants agree that the knowledge generated from the deployment of BI systems can be used to sustain competitive advantage.

In general, a large proportion of the participants responded positively to the questions about business intelligence. This indicates that most of the mining organizations are using some form of business intelligence in their strategic decision-making.

The other objective of this study was to measure the extent of the use of Competitive Intelligence by the mining organizations. The results are presented and discussed below.

### **6.1.2 Competitive Intelligence**

The results of the questionnaire which was measuring responses for Competitive Intelligence in the mining organizations are presented in Table 2.

**Table 2: Results of the questionnaire on Competitive Intelligence**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree	Mean	Std Deviation
<b>G1</b>	The company collects useful information about the competitors.	3.6	7.8	65.3	23.3	3.083	0.674
<b>G2</b>	The company collects useful information about the competitive environment.	3.6	7.8	47.2	41.5	3.266	0.757
<b>G3</b>	Competitive analysis is conducted in a coordinated manner by various units.	14.0	39.4	29.0	17.6	2.505	0.943
<b>G4</b>	Competitive Intelligence is used in decision-making processes to improve performance.	4.7	11.9	65.3	18.1	2.974	0.697
<b>G5</b>	The company has the ability to determine the future intent of a competitive force on which the strategies are based.	18.7	13.0	62.7	5.7	2.563	0.854
<b>G6</b>	Competitive analysis is used to create a competitive advantage.	9.8	14.0	58.5	17.6	2.839	0.831
<b>G7</b>	Competitive analysis is focused upon the strategic requirements of the company.	5.7	8.3	64.8	21.2	3.026	0.712
<b>G8</b>	The Competitive Intelligence is distributed to management in a timely fashion	17.6	30.6	36.8	15.0	2.49	0.954
<b>G9</b>	Management is up to date with emerging technologies in their field of business.	8.8	11.9	57.0	22.3	2.938	0.823
<b>G10</b>	The organization is cognisant of government legislation and legislative trends that impact it.	4.2	2.6	38.5	54.7	3.438	0.742
<b>G11</b>	There is an organised effort to channel all information about competitive forces to a central repository.	14.0	22.8	50.3	13.0	2.625	0.883

(Source: Compiled by authors from survey results)

The mean score for question G1 is above 3 with a relatively low standard deviation. This implies that a large proportion (89%) of the respondents agree that their mining organizations collect useful information about their competitors. A similar number (89%) of the respondents also agreed that their organizations collect useful information about the competitive environment. The mean score for question G3 is 2.5 with a relatively high spread. This is because 53% of the participants responded negatively to this question. Thus more than half of the respondents do not agree that various units do competitive analysis in a coordinated manner.

In spite of a mean score of 2.9 for question G4, a large proportion (83%) agrees that CI is used in decision-making processes to improve the performance of their organizations. This is in agreement with 76% who agree that competitive analysis is used to create some form of competitive advantage for their organizations. The majority of the participants also agreed that competitive analysis is focused on the strategic requirements of their organizations. The mean score for question G8 is 2.49 with a relatively high spread of the response values. This is due to the fact that 48% of the

participants responded negatively to this question. This implies that almost half of the respondents do not agree that CI is delivered to management in a timely fashion. Thus they believe that managers do not receive information as quickly as they should. A large proportion (79%) of the respondents agreed that their managers are up to date with emerging technologies in their field of business. The responses also imply that 21% of the managers are not up to date.

About 93% of the mining organizations are cognizant of government legislation and legislative trends that affect their businesses. The mean score for question G11 is relatively low (2.6). In spite of this, the majority (63%) of the participants agreed that there is an organised effort within their organizations to channel all the information about the competitive forces to a central repository. However a significant number (37%) responded negatively to this question.

The other objective of this study was to measure the extent of the use of Marketing Intelligence by the mining organizations. The results are presented and discussed below.

### **6.1.3 Marketing Intelligence**

The results of the questionnaire which was measuring responses for Marketing Intelligence in the mining organizations are presented in Table 3.

About 70% of the participants responded positively to question H1 with a mean score of 2.788. This means that a large proportion of the respondents agree that their organization has a systematic way of gathering marketing intelligence. About 30% responded negatively implying that their organization have no systematic way of gathering marketing intelligence. A large proportion (79%) of the respondents also agreed that market analysis is used to identify key threats and opportunities.

The majority of the respondents also agreed that marketing intelligence is used to understand the nature of the market requirements and also helps their organizations to keep abreast of the ongoing emerging circumstances. Almost 20% of the respondents did not agree. The resulting information of the marketing intelligence contributes to the decision-making process according to about 74% of the respondents who responded positively to this question. However 26% of the participants responded negatively.

**Table 3: Results of the questionnaire on Marketing Intelligence**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree	Mean	Std Deviation
<b>H1</b>	The organization has a systematic way of gathering of marketing intelligence.	7.3	22.8	53.9	16.1	2.788	0.798
<b>H2</b>	Market analysis is used to identify key threads or opportunities.	7.8	13.0	35.8	43.5	3.15	0.926
<b>H3</b>	Marketing intelligence is used to help the company grow (to increase revenue, profit, or market share).	9.8	6.7	55.4	28.0	3.016	0.863
<b>H4</b>	Marketing intelligence is used in understanding the nature of the market requirements.	9.8	8.8	34.2	47.2	3.187	0.961
<b>H5</b>	Marketing intelligence helps the organization to keep abreast of the ongoing emerging circumstances.	5.7	17.6	28.5	48.2	3.192	0.924
<b>H6</b>	The resulting information of the marketing intelligence contributes to the decision-making process.	6.7	19.7	30.1	43.5	3.104	0.946
<b>H7</b>	The Marketing Intelligence is distributed to management in a timely fashion.	13.0	25.4	43.5	18.1	2.668	0.921
<b>H8</b>	There is an organised effort to channel all information about the markets to a central repository.	20.2	24.9	34.7	20.2	2.549	1.03

(Source: Compiled by authors from survey results)

The mean score for question H7 is relatively low with a large spread. This is due to the fact that 38% of the participants responded negatively to this question and disagreed that MI is distributed to management timeously. The mean score for question H8 is also low with a high spread of the response values. About 45% of the participants responded negatively to this question and disagreed that there is an organised effort to channel all the information about the markets to a central repository.

The other objective of this study was to measure the extent of the use of Information Systems by the mining organizations. The results are presented and discussed below.

#### **6.1.4 Information Systems**

The results of the questionnaire which was measuring responses for Information Systems in the mining organizations are presented in Table 4.

**Table 4: Results of the questionnaire on Information Systems**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree	Mean	Std Deviation
<b>M1</b>	The company's management information system provides easy access to data.	1.0	11.9	70.5	16.6	3.021	0.571
<b>M2</b>	Intelligence Data is integrated across various corporate applications.	10.9	22.8	60.6	5.7	2.613	0.759
<b>M3</b>	Technical abilities of the IT staff related to Intelligence are good.	11.4	19.2	47.2	22.3	2.801	0.919
<b>M4</b>	There are Extraction-Transformation-Load (ETL) tools for data transfer.	23.3	16.6	56.0	4.1	2.408	0.895
<b>M5</b>	Data Warehouses are used as repository for all data relevant to an organization.	21.2	15.5	61.7	1.6	2.435	0.843
<b>M6</b>	On-Line Analytical Processing (OLAP) techniques are used to analyse and report data from huge data sources.	15.5	14.5	69.4	.5	2.550	0.758
<b>M7</b>	The organization has data mining tools to identify patterns and relationships within a data warehouse and create detailed reports.	17.1	29.0	43.5	10.4	2.476	0.899
<b>M8</b>	The organization has Real-Time Intelligence capabilities.	27.7	25.1	38.2	8.9	2.283	0.970

(Source: Compiled by authors from survey results)

A mean score of 3.02 with a standard deviation of 0.57 was obtained for question M1. About 87% of the respondents agreed that the information system in their organization provides easy access to data. Only 13% responded negatively to this question. The mean for question M2 was relatively low due to the fact that almost 34% of the participants responded negatively indicating that the intelligence data is not integrated across various corporate applications in their organizations. About 69% of the respondents believed that the technical abilities of their IT staff related to intelligence are good whereas 31% believed their skills were not good enough. The rest of the questions had low mean score due to the following:

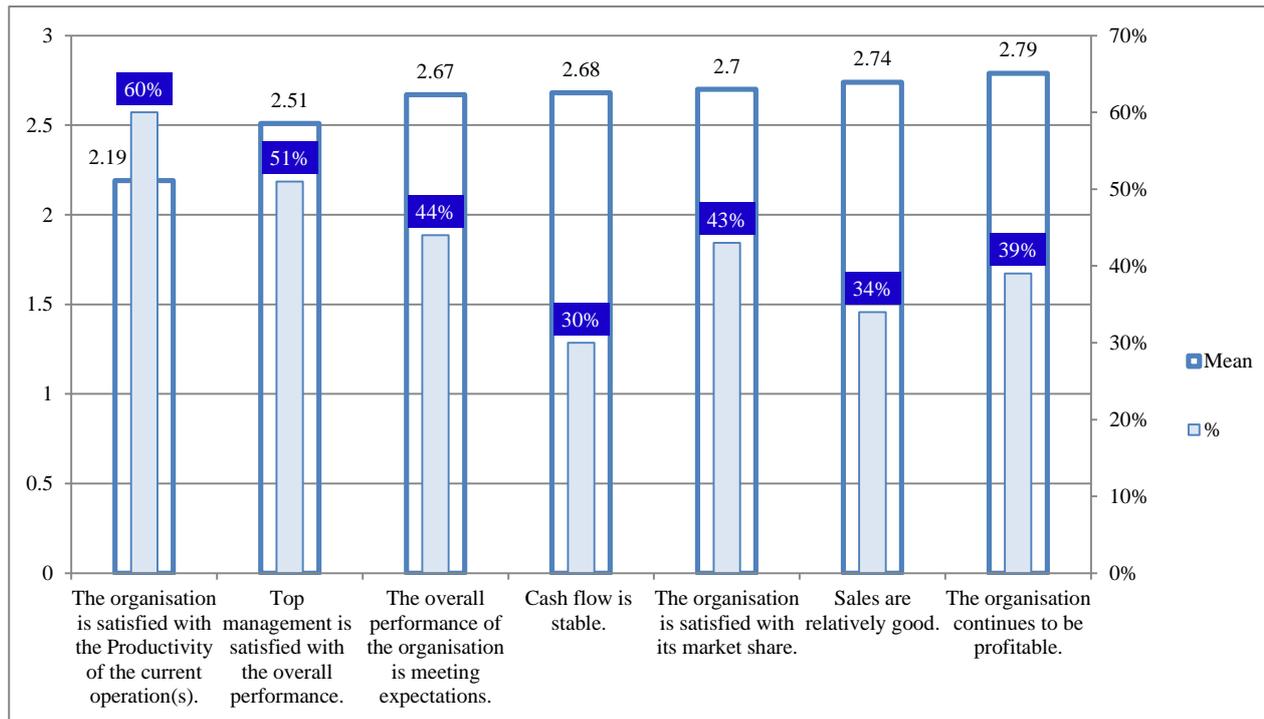
- About 40% of the respondents indicated that their organizations do not have ETL tools for data transfer.
- About 37% of the participant responded negatively to question M5 indicating that data warehouses are not used as repository for all data relevant to their organization.
- About 30% of the respondents do not use OLAP techniques in the organizations.
- About 46% of the respondents do not have proper data mining tools to identify patterns and relationships within a data warehouse.
- More than half (53%) of the respondents indicated that their organizations do not have real-time intelligence.

The data for the perceived business performance of the organizations is presented and discussed below.

### 6.1.5 Perceived Business Performance

The results for the overall business performance are shown in Figure 1.

**Figure 1: Mean scores in ranking order for perceived business performance**



(Source: Compiled by authors from survey results)

About 60% of the organizations were not satisfied with the productivity of their current operations. Top management was not satisfied with overall performance in 51% of the organizations. The overall performance of 44% of the mines were not meeting expectations, this is in agreement with the 39% whose organizations were not profitable. 43% of the mines were not satisfied with their current market share. A significant number (30%) of the mines indicated that their cash flows were not stable at all.

The other objective was to confirm the factor reliability of the dimensions which were used. The results are shown in the following section.

## 6.2 Factor Analysis

An instrument is said to have high reliability if it can be trusted to give an accurate and consistent measurement of an unchanging value. Reliability was calculated and evaluated by means of Cronbach Alpha. Sekaran and Bougie (2010) suggest that the Cronbach alpha co-efficient should be greater than 0.70, for the data to be regarded as reliable and internally consistent. Factor reliability of the identified dimensions is presented in Table 5.

All the factors display satisfactory levels of reliability with alpha coefficients ranging from 0.90 to 0.96.

**Table 5: Results of factor reliability**

Factor	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	Mean	Minimum	Maximum	Range	Variance
Business Intelligence	0.900	0.908	6	3.039	2.964	3.124	0.161	0.004
Competitive Intelligence	0.943	0.946	11	2.886	2.490	3.438	0.948	0.099
Marketing Intelligence	0.959	0.959	8	2.957	2.549	3.192	0.642	0.064
Business Performance	0.946	0.946	7	2.613	2.192	2.788	0.596	0.042
Information Systems	0.916	0.917	8	2.573	2.283	3.021	0.738	0.0564

(Source: Compiled by authors from survey results)

The number of items that loaded on each factor is shown in the table. The mean values are also shown. The highest mean score was obtained for business intelligence indicating that the largest proportion of participants responded positively to the items of this factor. The lowest mean was obtained for the information systems factor as it had the highest number of negative responses.

The other main objective is to determine if there are any positive relationships among the different constructs of intelligence and the performance of those organizations. The results of those correlations are shown and discussed in the next section.

### 6.3 Correlations

The results of the product-moment correlation coefficients between the constructs are reported in Table 6.

**Table 6: Correlation coefficients between Intelligence and Business Performance Dimensions**

	Business Performance	Business Intelligence	Competitive Intelligence	Market Intelligence
Business Performance	1.000	.796**	.723**	.826**
Business Intelligence	.796**	1.000	.877**	.878**
Competitive Intelligence	.723**	.877**	1	.826**
Marketing Intelligence	.826**	.878**	.826**	1.000

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

(Source: Compiled by authors from survey results)

The table shows that Business Intelligence dimension is positively correlated to *Business Performance* (practically significant, large effect). *Marketing Intelligence* is positively correlated to *Business Performance* (practically significant, large effect). *Competitive Intelligence* is positively correlated to *Business Performance* (practically significant, large effect). All the dimensions of intelligence are positively correlated to the overall business performance of the organization (practically significant, large effect).

The other objective of this study was to compare the findings based on the demographic differences. This was achieved by using the ANOVA tools to establish if there were any significant differences in the responses based on the biographical information of the participants.

The results are discussed below.

## **6.4 Differences according to geographic location**

The data indicated that mines in other continents have relatively higher means implying that they use these different types of intelligentsia more than those in SA and the rest of Africa. Lowest means were observed for mining organization in Africa.

## **7. CONCLUSIONS**

Conclusions regarding the specific theoretical objectives and the results of the empirical study are made.

### **7.1 Conclusions regarding the specific theoretical objectives**

To answer the first objective of the study with regard to the conceptualisation of different types of intelligentsia, from the literature study, the following emerged.

Business intelligence technologies give historical, current and predictive insight of business operations and use technologies, processes and applications to examine mostly internal, structured data and business processes, whereas competitive intelligence collects, assesses and disseminates information with a topical focus on the rivals. Competitive and Market Intelligence are both involved with the development of a logical program for gathering, examining and handling external information and knowledge to enhance organizational decision-making capabilities. Market intelligence is focused on the organization's markets whilst competitive intelligence is mainly focused on the competition.

The mining industry, like other organizations, uses information to expand and maintain competitive advantage in the current information age in which knowledge is power. Collecting information and transforming this raw data into intelligence is an essential aspect of business. By utilising information systems when generating intelligence, the wealth of available information can enable mining organizations to achieve competitive advantage to survive and succeed in the long term.

## **7.2 Conclusions regarding the specific empirical objectives**

The other main objective was to determine to what extent the different types of intelligentsia are used within the mining industry.

Results of the factor analysis showed that all the factors displayed satisfactory levels of reliability. More than half of the respondents indicated that their organizations do not have real-time intelligence. About 46% of the respondents do not have proper data mining tools to identify patterns and relationships within a data warehouse.

The other objective was to determine the relationship between the dimensions of intelligence and the performance. The results indicated that 60% of the organizations were not satisfied with the productivity of their current operations. The overall performance of 44% of the mines was not meeting expectations. About 30% of the mines indicated that their cash flows were not stable at all.

The results also confirmed that a statistically and practically significant positive relationship with a large effect exists between Business Intelligence, Competitive Intelligence and Marketing Intelligence dimensions and Business Performance.

The data also indicated that mines in other continents use the different types of intelligentsia more than those in SA and the rest of Africa.

## **8. RECOMMENDATIONS**

Based on the review of literature and the empirical data generated in this study, the researcher makes the following recommendations to the managers of the mining organizations. The recommendations are generally applicable to any industry.

- Organizations need to systematically and continuously collect information from their own internal business operations, the competitive environment, the competitors and the markets to assist in operational, tactical and strategic decision-making.
- All forms of intelligence need to be distributed to management in a timely fashion.
- The organizations need to make an organized effort to channel all the information gathered from all types of intelligentsia to a central repository.

- The organization's information system should be tailored in such a way that it provides easy access to the required data.
- Intelligence tools used by the organizations should have forecasting abilities.

The intelligence activities are a key input variable in all strategic decision-making. As organizations seek sustainable growth in global business, it is essential for them to have accurate and timely intelligence concerning threats and opportunities in the international business environment. This is the reason why organizations have been found to use various types of intelligence systems to gather and process this intelligence. The integration of business intelligence, competitive intelligence and marketing intelligence is recommended and should be enabled as a strategic function of the organization to inform and improve the decision-making process of the managers. Some of the benefits of such convergence would be innovation, marketing differentiation, anticipating new markets, avoiding cost, customer satisfaction, winning market share, and revenue prospect. In general mining organizations need to structure their data so they can find answers easily, share timely information, make better business decisions, improve productivity and allow flexibility for future growth.

Participants in different geographic areas responded differently to the questions about intelligence dimensions and business performance. Possible reasons for this can be established by further research.

The researcher has made a proposal for the integration of different types of intelligentsia; generation of more empirical data to support this can also be done by further research.

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## CHAPTER 6: RESEARCH ARTICLE 3

### Title: INVESTIGATING THE USE OF KNOWLEDGE MANAGEMENT AS A MANAGEMENT TOOL IN THE MINING INDUSTRY

The reader is requested to take note of the following:

The article **was *accepted*** for publication in the following IBSS indexed, internationally peer-reviewed academic journal as follows:

- ❖ Boikanyo, D.H., Lotriet, R. & Buys, P.W. Investigating the use of knowledge management as a management tool in the mining industry. *Problems and Perspectives in Management Journal* (submitted). (ISSN: 1727-7051)

**Acceptance letter** is shown in APPENDIX C on page 225. The article was written in line with the journal's submission guidelines, which are included in **Appendix G: Problems and Perspectives in Management Journal author guidelines** on page 229.

The article was researched and written by the first author (D. H. Boikanyo) as the PhD candidate and primary author, while the co-authors (R. Lotriet and P.W. Buys) fulfilled a reviewer function thereto as the PhD project's promoters.

# INVESTIGATING THE USE OF KNOWLEDGE MANAGEMENT AS A MANAGEMENT TOOL IN THE MINING INDUSTRY

## ABSTRACT

The main objective of this research study was to investigate the extent to which knowledge management is used within the mining industry. Knowledge management includes the identification and examination of available and required knowledge and the subsequent planning and control of actions to develop knowledge assets to accomplish organizational objectives.

A structured questionnaire was used for the study. A total of 300 mines were randomly selected from a research population of mining organizations in South Africa, Africa and globally. The respondents were all part of senior management. A response rate of 64% was achieved.

A significant number of respondents indicated that there is no transfer of knowledge about the best practices within their organizations. Some of the participants indicated that their organizations do not have the required technical infrastructure to enable knowledge sharing whilst some agreed that the culture in their organizations is not conducive to the sharing of knowledge.

A statistically and practically significant positive relationship with a large effect was found between the construct of knowledge management and perceived business performance. The mining organizations in Africa ranked the lowest in terms of applications of knowledge management principles.

**Keywords:** Knowledge, Knowledge Management, Mining Industry

**JEL Classification:** M10, M15

## **1. INTRODUCTION**

This study focuses on investigating the level of knowledge management in the mining industry. A background to the research study will be provided to enable the framing of the research gap and research focus. Subsequently, the research objectives and an overview of the research methodology will be presented. The results of the empirical study will thereafter be reported. Finally the conclusion resulting from the study will be discussed as well as any recommendations that can be made to management and for future studies.

## **2. BACKGROUND**

According to Davenport and Prusak (2000:5), knowledge is a fluid combination of framed experience, principles, insight from experts and intuition that is grounded for the provision of a framework and environment that enable proper evaluation and incorporation of new experiences and information. Knowledge originates and is applied in the minds of those who know. In organizations, it often becomes embedded in organizational routines, processes, practices and norms, documents or repositories. In general, there are two types of knowledge: tacit knowledge and explicit knowledge as outlined below.

Tacit knowledge refers to knowledge that exists in a person's mind and can consist of aspects of culture or the way things are done (Nonaka & Krogh, 2009). Tacit knowledge can also be tied to individual perception, rules of thumb and some intuition, skills in body movement, the senses and physical experiences (Von Krogh *et al.*, 2000:6). According to Uriarte (2008:5) tacit knowledge is specific to a certain context and not easy to make formal, record or articulate. It consists of intuitions, conjectures and subjective insights. The degree and facility by which tacit knowledge can be shared depends to a large extent on the willingness and ability of the person having it to transfer it to others, because it is highly individualized. The distribution of tacit knowledge is a serious challenge to many organizations. Uriarte (2008:5) recommends that various activities and mechanisms including conversations, workshops and on-the-job training should be used to share and communicate tacit knowledge. Such mechanisms may include the use of information technology tools such as email, groupware, instant messaging and related technologies. In managing tacit knowledge, most organizations struggle to identify the tacit knowledge that is beneficial to the organization. Tacit knowledge becomes extremely beneficial to the organization having it when it is identified because it is a unique asset that is not easy for other organizations to

replicate. Its uniqueness and difficulty to duplicate is what makes tacit knowledge a basis of the organization's competitive advantage. Accordingly, it is critical for an organization to find, disseminate and utilize the tacit knowledge of its employees in order to enhance the use of its own intellectual capital. Tacit knowledge is an essential requirement for good decision-making in any organization. It is therefore critical for creating value for the organization (Awad & Ghaziri, 2004).

According to Koenig (2012), explicit knowledge can be referred to as knowledge that is set out in a tangible form. Thus it is knowledge that has been recorded as information in some medium such as a document, image, computer data or photograph. It can be written on a paper, expressed in a form of sentences or shown in drawings and specifications. According to Alwis and Hartmann (2008); tacit knowledge is not entirely isolated from explicit knowledge. The two are mutually complementary. Without tacit knowledge it will be difficult, if not impossible, to understand explicit knowledge. For example, a person without some form of scientific or mathematical knowledge (tacit knowledge) will struggle to comprehend a very complex mathematical formulation or chemical process flow diagram, although it may be easily accessible from the organization's databases or library (explicit knowledge). Tacit knowledge must be converted to explicit knowledge; otherwise it cannot be reflected upon, studied, discussed and shared within the organization as it will stay inside the knower's head and remain hidden and inaccessible (Uriarte, 2008).

Knowledge is one of the most essential assets for organizational success among other assets such as materials, machineries, capital and properties (Ganesh et al. 2014:3).

Knowledge management (KM) is the name of a concept in which an organization knowingly and systematically collects, organizes, shares and evaluate its knowledge in terms of people skills, resources and documents (Rouse, 2013). Prior (2010) defines knowledge management as a logical and integrated process for finding, gathering, storing, retrieving and converting knowledge and information assets into knowledge that is readily available in order to enhance the performance of the organization. Ahmad (2010) summarized the definition of knowledge management as a set of logical techniques and procedures which are founded on practices and technologies that encourage effective formation, collection, organization, dissemination, utilisation and sharing of both valuable explicit and tacit knowledge to enable employees to be more productive in their work and generate value for their organizations.

Thus KM is the process through which organizations generate value from their intellectual and knowledge based assets (Ahmad et al., 2007). Knowledge management involves data mining and some operational method to disseminate information to users. A knowledge management plan consists of a review of strategic goals and a thorough evaluation of the technical tools that are required for addressing the needs of the organization. Knowledge management is made up of the initiatives, processes, strategies and systems which sustain and improve the storage, evaluation, distribution, refinement and creation of knowledge.

According to Liebowitz (2012), knowledge management has three main components: people, process and technology which are explained as follows:

- People: The people side is about creation and nurturing of an environment and culture of knowledge sharing in the organization.
- Process: The process side is about management of the KM processes and making knowledge sharing part of the daily work of the employees.
- Technology is about the formation of an integrated platform for the employees to network and share knowledge.

Skyrme (2011) emphasized that there is a growing interest about the knowledge management due to the following reasons:

- Competition and globalization – many organizations depend on knowledge for the creation of their strategic advantage.
- Knowledge can lead to a premium price in the market – Applied expertise can improve the value and hence the price of services and products.
- Downsizing and restructuring – Without effective means and procedures to collect knowledge of experienced employees, organizations make mistakes and end up having to pay again for the knowledge that was once readily available.
- Sharing of best practices – Organizations can save costs by capturing the knowledge from their best performers and utilizing it in the same conditions elsewhere.
- Successful Innovation – Organizations using knowledge management procedures have realized that they can create new products and services quicker and better through knowledge networking.

According to Deloitte (2015), sharing knowledge leads to competitive advantage and adds real customer value. Knowledge management prevents employees from continually reinventing the wheel, provides a baseline for measuring progress, decreases the burden on attrition of experts, makes visual thinking tangible and manages efficiently huge volumes of information to assist employees in serving their clients quicker and better.

The problem statement is discussed below.

### **3. PROBLEM STATEMENT**

The mining sector is under a lot of pressure and there have been several reports of certain mines being forced to downsize their labour force as part of cost cutting strategies. The aging workforce together with the high staff turnover caused by either downsizing efforts to cut costs or others leaving to join other companies lead to a loss of knowledge and experience on an ongoing basis in the sector. Reductions in staffing have created a need to replace informal knowledge with formal methods. There is a need for a re-evaluation of the methods used to retain and develop knowledge within the sector.

There is also a scarcity in empirical literature about the use of knowledge management in the sector. This prompted the researcher to investigate the extent of the use of knowledge management and how it contributes to business performance in the sector. This study will not only aim to improve understanding of the concept of knowledge management, but also produce findings of practical relevance and value for the mining and other sectors. Therefore, this research seeks to contribute to both management practitioners and academics alike.

The research objectives of the study are outlined below.

### **5. RESEARCH OBJECTIVES**

The primary aim of this research study is to investigate the extent to which knowledge management is utilised within the mining industry. The secondary objectives are:

- To determine the relationship between the dimensions of knowledge management and perceived business performance
- To compare the findings based on the geographic location of the organizations.

The research methodology used for this study is discussed in the next section.

## **5. RESEARCH METHODOLOGY**

### **5.1 Research Design and Sample**

A survey design was used. The survey was based on a selection of an unbiased and representative sample of subjects drawn from senior management in the mining organizations in South Africa, Africa and globally. A simple random sampling technique was used to select participants. According to Saunders et al. (2009), simple random sampling involves the selection of a sample at random from the sampling frame using either a computer or random number tables. A total of 300 mining organizations were randomly selected from a population of 850. A response rate of 64% was achieved.

The survey questions were taken from a questionnaire from a study by Kruger (2010) and also based on the existing literature. The structured questionnaire was sub-divided into sections consisting of the biographic information, items of knowledge management and perceived business performance. A 4-point Likert-type scale was used.

### **5.2 Statistical Analysis**

The data gathered from the received questionnaires was captured and analysed using the statistical software programs, SPSS and STATISTICA, with the help of the Statistical Consulting Services of the North-West University.

Effect sizes and descriptive statistics were utilised to decide on the significance of the findings. The mean and standard deviations are used to describe and compare the results. The mean is used to measure the central tendency of the results. The standard deviation presents the average distance of the individual scores from the mean.

Confirmatory Factor Analysis (CFA) was used to confirm the factor structure of the set of variables. Cronbach Alpha was calculated to check the reliability of the measuring instrument.

Pearson product-moment correlation coefficients were computed to find the relationships between the variables. The statistical significance level was set at a 95% confidence interval ( $p \leq 0.05$ ). The cut-off point of 0.30 is used to determine practical significance of a medium effect.

## **6. PRESENTATION AND DISCUSSION OF RESULTS**

The results of the empirical study are reported and discussed below.

Biographical information was reported for the number of employees, level of employment, type of metal processed or mined, age of the organization and its geographic location.

A total of 193 questionnaires were received representing a response rate of 64%. Most of the respondents (66%) were employed in the mines with more than 1000 employees. About 18% of the respondents were from smaller operations with less than 499 employees. The respondents from medium-sized mines with 500 to 999 employees were about 16%.

Most of respondents were managers (57%). Directors formed 34% of the total number of respondents whilst CEOs were 9%

The majority of the respondents (51%) were from the mines producing precious metals such as platinum group metals and gold. About 17% were from coal mining organizations and 11% were from the steel industry. About 12% were from the mines producing non-ferrous metals like copper and only 8% were in the industrial metal mines.

About 87% of the respondents were from the mines having been more than 20 years in operation. This serves as a confirmation that most of the mines in the world have been in operation for decades. Majority of the respondents were from the South African mining operations (55%), about 23% were from the rest of Africa while the respondents from other continents such as Australia and USA were about 21% of all the respondents.

The results of descriptive statistics are presented in the next section.

### **6.1 Descriptive Statistics**

#### **6.1.1 Knowledge Management**

The main objective of this study was to measure the extent of the use of Knowledge Management by the mining organizations. The questionnaire was designed to help critique the knowledge

management process used by the mining organizations. The results of the survey are presented in Table 1.

**Table 1: Results of the questionnaire on Knowledge Management**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree	Mean	Std Deviation
I1	Knowledge Management assists in creating value out of the intangible assets.	0	9.8	58.0	32.1	3.233	0.609
I2	The company values knowledge as a strategic asset, critical for success.	.5	5.2	52.8	41.5	3.354	0.607
I3	The culture in the organization is conducive to the sharing of knowledge.	8.3	17.6	56.5	17.6	2.841	0.816
I4	The organization benefits from the processes created to contribute knowledge.	4.2	25.5	54.7	15.6	2.825	0.741
I5	There is a general culture in the company where people respect knowledge.	3.6	9.4	67.2	19.8	3.042	0.651
I6	Employees are responsible for the transfer of knowledge in their areas of responsibility.	3.1	13.0	53.4	30.6	3.106	0.743
I7	Knowledge is accessed by employees by means of a central intelligence repository.	22.5	20.9	37.2	19.4	2.534	1.039
I8	The organization has the technical infrastructure to enable knowledge sharing.	13.0	19.2	48.7	19.2	2.725	0.91
I9	There is transfer of knowledge about best practices among employees in order to improve operational efficiency	16.6	18.1	36.8	28.5	2.778	1.048
I10	There is a document management system in place	14.1	15.1	54.2	16.7	2.751	0.897
I11	The organization stores Intellectual Capital.	4.7	13.5	67.4	14.5	2.937	0.649

(Source: Compiled by authors from survey results)

The mean score for question I1 is 3.23 with low standard deviation of 0.609. About 90% of the participants responded positively and agreed that knowledge management assists in creating value out of the intangible assets in their own organizations. The mean score for question I2 was also high (3.35) with a low standard deviation because about 94% of the respondents agreed that their organizations value knowledge as a strategic asset which is critical for success.

About 26% of the participants responded negatively to question I3 indicating that the culture in their organizations is not conducive to the sharing of knowledge. Almost 30% of the respondents do not believe that their organizations are currently benefitting from the processes created to contribute knowledge. About 32% of the participants indicated that their organizations do not have the technical infrastructure to enable knowledge sharing and 35% believe that there is no transfer of knowledge within their organizations about the best practices among the employees in order to improve operational efficiencies. About 29% also indicated that their organizations do not have document management systems in place. Question I7 had the lowest mean score because 47% of the

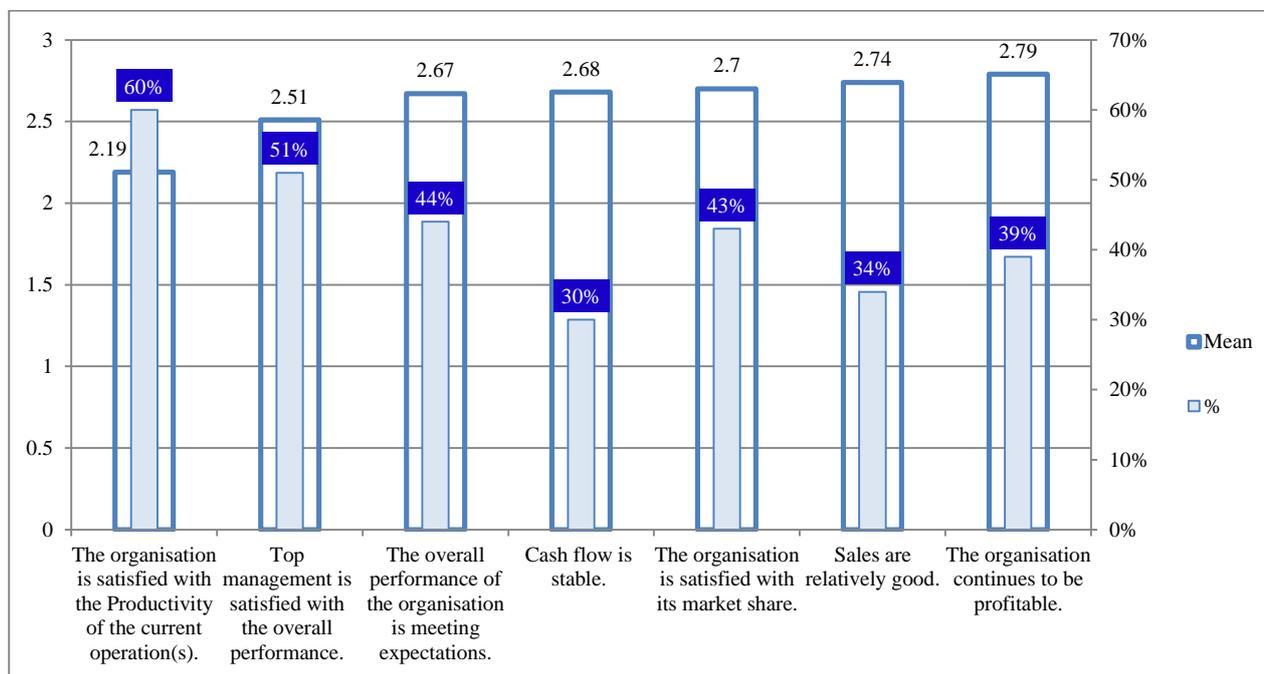
participants responded negatively to this question. This means that almost half of the respondents do not agree that knowledge is accessed by means of a central intelligence repository in their organizations.

The perceived business performance of the organizations is discussed below.

### 6.1.2 Perceived Business Performance

The results for the overall business performance are shown in Figure 1.

**Figure 1: Mean scores in ranking order for perceived business performance**



(Source: Compiled by authors from survey results)

The majority of the organizations (60%) were not satisfied with the productivity of their current operations. There was also a large number (51%) of respondents who indicated that their top management was not satisfied with the overall performance of the organizations. The overall performance of a significant number (44%) of the mines was not meeting expectations. About 39% indicated that they were not profitable while about 43% were not satisfied with their current market share. A significant number (30%) of the mines indicated that their cash flows were not stable.

The other objective was to confirm the factor reliability of the dimensions which were used. The results are shown in the following section.

## 6.2 Factor Analysis

An instrument has a high reliability if it can be trusted to give a consistent and accurate measurement of an unchanging value. Reliability was computed and calculated by means of Cronbach Alpha. According to Sekaran and Bougie (2010), Cronbach alpha co-efficient should be greater than 0.70 for the data to be considered as internally consistent and reliable. Factor reliability of the identified dimensions is presented in Table 2.

All the factors display satisfactory levels of reliability with alpha coefficients ranging from 0.870 to 0.95.

**Table 2: Results of factor reliability**

Factor	Cronbach Alpha	Cronbach Alpha Based on Standardized Items	N of Items	Mean	Minimum	Maximum	Range	Variance
Knowledge Management	0.876	0.873	11	2.921	2.534	3.354	0.820	0.059
Business Performance	0.946	0.946	7	2.613	2.192	2.788	0.596	0.042

(Source: Compiled by authors from survey results)

The other main objective was to determine if there are any positive relationships between the use of knowledge management and the perceived business performance of those organizations. The results of those correlations are shown and discussed below.

## 6.3 Correlations

The results of the product-moment correlation coefficients between the constructs are reported in Table 3.

**Table 3: Correlation coefficients between Knowledge Management and Perceived Business Performance Dimensions**

	Business Performance	Knowledge Management
Business Performance	1.000	.705**
Knowledge Management	.705**	1.000

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

The table shows that Knowledge Management dimension is positively correlated to Business Performance (practically significant, large effect).

The other objective of this study was to compare the findings based on geographic location of the organisations. This was achieved by using the ANOVA tools to establish if there were any significant differences. The results are discussed below.

#### 6.4 Differences according to geographic location

Table 4 shows the results of the mean values calculated for the dimensions as a function of the geographic location of the organization. The results of the ANOVA calculation are also shown. For all the dimensions, the p-value is less than 0.05 indicating that the participants in different geographic locations answered the questions in a significantly different manner statistically. The results for the effect sizes indicate that for all the dimensions, the d-value was 0.8 for Africa when compared to other continents. This indicates a large practically visible difference. The mean values for Africa were the lowest indicating that the mining organizations in Africa rank the lowest in terms of applications of knowledge management principles.

**Table 4: Descriptive statistics and ANOVA results for the geographic location**

		N	Mean	Std Deviation	Effect Size		ANOVA	
					SA	Africa	F	Sig.
<b>Knowledge Management</b>	SA	107	2.899	0.586			9.27	0.00
	Africa	45	2.747	0.485	0.26			
	Other	37	3.128	0.309	0.39	0.79		
	Total	189	2.907	0.532				

(Source: Compiled by authors from survey results)

## 7. CONCLUSION

Conclusion regarding the specific theoretical objectives and the results of the empirical study are made.

## **7.1 Conclusions regarding the specific theoretical objectives**

The mining organizations can also benefit from implementing knowledge management systems like other industries. The effective management of knowledge in these organizations has the capability to positively impact the manner in which they do business from the little details of daily operations to the major strategic decision-making processes. An important goal of knowledge management is the sharing of the best practices. By utilising knowledge management, the organizations can provide their employees with the ability to find and use procedures and methods which were formed or used by others in the past to solve similar problems and to learn from previous experiences, while maintaining the newly formed experiences to be utilised in the future. Thus by re-using and sharing previous knowledge and experiences, employees can solve their problems without spending more time, resources and efforts on reinventing solutions that have previously been invented elsewhere in the organization.

Knowledge management is essential for the successful management of mining operations and a complement to the other business activities of these organizations. Knowledge is indeed one of the most vital assets for organizational success. With the successful collection, distribution and creation of valuable knowledge, the mining organizations can enhance the process of organizational learning to improve performance and create more possibilities to gain competitive advantages.

## **7.2 Conclusions regarding the specific empirical objectives**

Results of the factor analysis showed that all the factors displayed satisfactory levels of reliability with alpha coefficients ranging from 0.87 to 0.95. Most of the respondents agreed that their organizations value knowledge as a strategic asset which is critical for success.

A significant number of the respondents do not agree that their organizations are currently benefitting from the processes created to contribute to knowledge. Some of the participants indicated that their organizations do not have the technical infrastructure to enable knowledge sharing. About 35% believe that there is no transfer of knowledge within their organizations about the best practices among the employees in order to improve operational efficiencies.

The results also indicated that majority (60%) of the organizations were not satisfied with the productivity of their current operations. A significant number (30%) of the mines indicated that their cash flows were not stable at all.

The results also confirmed that a statistically and practically significant positive relationship with a large effect exists between the construct of knowledge management and business performance. The data indicate that mines in other continents use knowledge management systems more than those in SA and the rest of Africa. Lowest means were observed for mines in other African countries.

## **8. RECOMMENDATIONS**

Based on the review of literature and the empirical data generated in this study, the researcher makes the following recommendations to the managers of the mining organizations. The recommendations are generally applicable to any industry.

- Organizations should create and promote a knowledge sharing culture.
  - To effectively develop organisation knowledge sharing culture, there need to be change in the culture of the organisation strategy, structure, support mechanism, management development, communication, trust, motivation and learning. These approaches are based on the fundamental premise that it is management's role to motivate and foster employees toward knowledge sharing culture.
  - Developing a culture which values and practices knowledge-sharing is an effort involving attention to the social, organizational, managerial and technical components of this behavior.
  - Continuous communication by management about the importance of knowledge-sharing is essential to the development of this behavior.
  - Organizational processes and practices should be redesigned in such a way that encourages knowledge sharing among employees through teamwork and have factors including recognition and rewards for knowledge sharing; the role of information in the organization and how the organization's processes integrate knowledge. Group based incentives for knowledge sharing can be introduced to work as positive catalyst to create more interaction between the employees and result in strong and positive relationships.

- Organizations must be prepared to provide adequate resources to support the knowledge-sharing they require. They should also put emphasis on their IT infrastructure and tools such as mail, telephone, facsimile, Internet, Intranet, e-mail, video and telephone conferencing.
- Integration of knowledge management processes such as acquisition, creation, sharing, utilization and transfer into the essential activities of the organization should be carried out by the managers.
- Two generic knowledge management strategies are proposed. The first one is personalization strategy which is about connecting people who possess knowledge to those who need it. The second one is codification with its main emphasis being on documenting knowledge, storing it in databases and then distributing it to those who need it. Depending on the available resources, any one of these strategies can be used for knowledge management.
- Organizations should perform a knowledge audit which normally involves identification of critical knowledge assets and knowledge competencies as well as identification of experts in various knowledge domains within the organization.
- A design of knowledge architecture is recommended for managing explicit knowledge mainly in the form of documents and reports in file cabinets.
- Organizations could also invest in a proper knowledge infrastructure which comprises facilities such as talk rooms and libraries.

Participants in different geographic areas responded differently to the questions about the use of knowledge management and business performance. Possible reasons for this can be determined by further research. A significant number of participants indicated that the culture in their organizations is not conducive to the sharing of knowledge. A possible framework to create such a culture can also be established by further research.

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## CHAPTER 7: RESEARCH ARTICLE 4

### Title: INVESTIGATING THE USE OF STRATEGIC INTELLIGENCE AS A MANAGEMENT TOOL IN THE MINING INDUSTRY

The reader is requested to take note of the following:

The article was submitted for peer review and possible publication in the following IBSS indexed, internationally peer-reviewed academic journal as follows:

- ❖ Boikanyo, D.H., Lotriet, R. & Buys, P.W. Investigating the use of strategic intelligence as a management tool in the mining industry. *Management and Business Administration. Central Europe* (submitted). (ISSN: 2084-3356)

Notice of submission is shown in Appendix E on page 227. The article was written in line with the journal's submission guidelines, which are included in **Appendix I: Management and Business Administration. Central Europe author guidelines** on page 235.

The article was researched and written by the first author (D. H. Boikanyo) as the PhD candidate and primary author, while the co-authors (R. Lotriet and P.W. Buys) fulfilled a reviewer function thereto as the PhD project's promoters.

# INVESTIGATING THE USE OF STRATEGIC INTELLIGENCE AS A MANAGEMENT TOOL IN THE MINING INDUSTRY

## ABSTRACT

The main objective of this research study was to investigate the extent to which strategic intelligence is used within the mining industry. Strategic intelligence is about having the correct and accurate information in the hands of the right people at the right time in order to enable them to make informed decisions about the future of the organization. Strategic intelligence is also about the capability to adapt to changing environments instead of continuing blindly on a path when the need to change course is suggested by the signals in the competitive environments. A structured questionnaire was used for the study. A total of 300 mines were randomly selected from a research population of mining organizations in South Africa, Africa and globally. The respondents were all part of senior management. A response rate of 64% was achieved.

About 32% of the respondents indicated that their organizations do not have a strategic intelligence process in place and 47% disagreed that strategic intelligence is distributed to management in a timely fashion. A statistically and practically significant positive relationship was found between strategic intelligence of an organization and perceived business performance. There is also a statistically and practically significant positive relationship between strategic intelligence and strategic planning and implementation. Strategic intelligence was found to be related to business intelligence, competitive intelligence, marketing intelligence and knowledge management. A regression analysis indicated that strategic intelligence is a function of business intelligence, competitive intelligence, marketing intelligence and knowledge management.

**Keywords:** Strategic intelligence, business intelligence, competitive intelligence, marketing intelligence, knowledge management, strategic intelligence quotient, mining industry.

**JEL Classification:** M10, M15

## **1. INTRODUCTION**

This study focuses on investigating the utilisation of strategic intelligence as a management tool in the mining industry. A background to the research study will be provided to enable the framing of the research gap and research focus. Subsequently, the research objectives and an overview of the research methodology will be presented. The results of the empirical study will thereafter be reported. Finally the conclusion resulting from the study will be discussed as well as any recommendations that can be made to management and for future studies.

## **2. BACKGROUND**

Wells (2012:3) defines strategic intelligence (SI) as the ability and capacity to adapt to changing situations and environments, instead of continuing blindly on a path when all the signs in the competitive environment suggest the need for change. According to Djekic (2014), strategic intelligence is a methodical and ongoing process of gathering, examining and disseminating intelligence of strategic value in an actionable way to assist in long-term decision-making.

Liebowitz (2006) considers strategic intelligence as the convergence and synergy of knowledge management, business intelligence and competitive intelligence. These different types of intelligence are briefly explained below. Seitovirta (2011) also situated strategic intelligence as a main concept that covers signals emanating from all of the levels of intelligence – business intelligence, competitive intelligence and competitor intelligence. Business intelligence is viewed by Coker (2014) as the means used by an organization to gather its own information concerning operations, sales, customers, returning clients or website hits and convert the numbers into quantifiable metrics to make sure that the organization is performing efficiently.

Competitive intelligence is defined as the process of collecting information on rivals and the competitive environment, ideally using this in the planning process as well as tactical and strategic decision-making with the main objective being to adjust activities in order to enhance performance (Wright *et al.*, 2009:942). Marketing intelligence is viewed as the information pertaining to the organization's markets, examined and analysed specifically for decision-making in determining market opportunity, market penetration strategies and market development metrics. Knowledge management includes the identification and examination of available and required knowledge and the subsequent planning and control of actions to develop knowledge assets to meet the objectives of the organization (Uriarte, 2008).

According to Wells (2012), Strategic Intelligence Quotient (SIQ) is the measure of strategic intelligence. Measuring SIQ includes a focus on both the strategic path and its results versus the best practices in order to assist the organization to accomplish ongoing business excellence and superior results. It also focuses on the Strategic Management System and Cycle to produce these results. Measuring SIQ also gives an integrated approach to planning, people, leadership and change in order to deliver value for the customer continuously. The SIQ measurement is an essential process for determining the organization's level of strategic excellence. Wells (2012:4) alluded to different levels of strategic intelligence. The least intelligent do not realize they need to change or cannot change even if they do. Smart organizations respond and maintain pace with external changes, but the smartest change even faster, shaping the environment to their advantage. When the environment is not changing a lot, smart organizations will gain ground on their less intelligent competitors. When times are volatile, they are more likely to be able to adapt and survive.

A problem statement is discussed below.

### **3. PROBLEM STATEMENT**

The mining industry has undergone considerable upheaval in recent times (Deloitte, 2013.3). Various macro-environmental influences have formed a turbulent and challenging competitive environment for the sector characterized by technologies that are changing and markets that represent both difficulties and opportunities (Thornton, 2013). The global mining industry is affected by various factors which are moving to a new level of extremity, compelling the organizations to consider more extensive scenarios than ever before (Deloitte, 2013.3). The challenges faced by the mining organizations include requirements such as mandated beneficiation, royalty taxes, export levies and restrictions on foreign ownership. According to Brummer *et al.* (2007:20), some of the critical issues that mining organizations have to deal with include commodity price volatility, regulatory influences, global opportunities and threats, global competition, mergers and acquisitions, restructuring and even a complete departure from the business scene.

Amid this complex and challenging environment, a common denominator for many mining organizations is their struggle to create a sustainable competitive advantage (Mining Weekly, 2013). Increased strategic flexibility is required together with the speed and innovation to manage

environmental discontinuities and unpredictable changes for the creation or maintenance of any competitive advantage (Thornton, 2013).

Without the means to organise and present the vast amount of data generated daily at a mine site in a timely and accurate manner, it becomes difficult to make informed decisions regarding the daily operations and long-term viability of a mine site (Mining Weekly, 2013). The main risk is the presence of some organizational blind spots. According to Büchel (2010:2), these blind spots are areas in which managers fail to see or understand critical information and thus lead their organizations into some form of a trap. These traps may include misjudging the boundaries of the industry; being unable to identify emerging competition; being out of touch with the needs of the clients or customers, over-emphasizing the rivals' visible competence and allowing the non-existence of foresight to limit the managers' frame of reference. Continuously engaging in strategic intelligence can assist managers to overcome these blind spots and avoid falling into the rigidity trap (Büchel, 2010:2).

According to Botha (2013), many of the challenges that organizations in the mining industry face can be pre-empted by introducing strategic intelligence early in the strategy crafting or formulation process. Strategic intelligence can be used to provide insight into understanding the forces and factors that are influencing the industry. SI has the ability to handle huge amounts of data and information and can be used to assist in identifying and developing new opportunities and implementing effective strategies that can provide competitive advantage as well as stability. SI can therefore act as a sonar and help in searching for underlying threats and opportunities that cannot be found easily, thus monitor critical strategic themes. SI can also act as a radar to help the organization on its path to the future and provide intelligence for promoting a change in direction when necessary, forecasting what is ahead and developing scenarios for the organization. Thus SI can enable organizations to respond to future trends or opportunities which will lead to the survival and sustainability of those organizations.

In this research, strategic intelligence is proposed to be the convergence and synergy of knowledge management, business intelligence, marketing intelligence and competitive intelligence. SI is thus proposed to be situated as an overarching concept that covers signals coming from all of the levels of intelligence.

Although the practice of involving intelligence is not particularly difficult, strategic intelligence is a relatively new phenomenon for the execution level. The latter is not fully understood, nor with regard to the commitment and hard work it entails, nor how to make best use of it (Strain,

2013:113) So far the emphasis of strategic intelligence literature has been on the process of gathering, analysing and disseminating data and there has been little research done on the extent of strategic intelligence activities and how it affects strategic planning plus decision-making and improve competitive advantage and business performance. There is still a void in academia and in practice about the effect and the use of strategic intelligence as a strategic management tool essential for decision-making and business performance.

The research objectives of the study are outlined below.

## **6. RESEARCH OBJECTIVES**

The primary aim of this research study is to investigate the extent to which strategic intelligence is utilised within the mining industry. The secondary objectives are to measure the level of Strategic IQ of different mining organizations; to determine how strategic intelligence is used and contributes to the perceived business performance; to establish to what degree strategic intelligence can address the input needs of the strategic planning process and to compare the findings based on the geographic location of the organizations.

The research methodology used for this study is discussed below.

## **5. RESEARCH METHODOLOGY**

### **5.1 Research Design and Sample**

A survey design was used and based on a selection of an unbiased and representative sample of senior management in the mining organizations in South Africa, Africa and globally. A simple random sampling technique was used to select participants. According to Saunders *et al.* (2009), simple random sampling involves the selection of a sample at random from the sampling frame using either a computer or random number tables. A total of 300 mining organizations were randomly selected from a population of 850. A response rate of 64% was achieved.

Some questions were adopted from a questionnaire by Strategic Futures Consulting (2009). The structured questionnaire was sub-divided into sections consisting of the biographic information, items of Strategic IQ of the mine, Strategic Planning and Management Process, Business

Performance, Business Intelligence, Competitive Intelligence, Marketing Intelligence and Knowledge Management. A 4-point Likert-type scale was used.

## **5.2 Statistical Analysis**

The data gathered from the received questionnaires was captured and analysed using the statistical software programs, SPSS and STATISTICA, with the help of the Statistical Consulting Services of the North-West University.

Effect sizes and descriptive statistics were used to decide on the significance of the findings. The mean and standard deviations are used to describe and compare the results. The mean is used to measure the central tendency of the results. The standard deviation presents the average distance of the individual scores from the mean.

Confirmatory Factor Analysis (CFA) was used to confirm the factor structure of the set of variables. Cronbach Alpha was calculated to check the reliability of the measuring instrument. Pearson product-moment correlation coefficients were computed to find the relationships between the variables. The statistical significance level was set at a 95% confidence interval ( $p \leq 0.05$ ). The cut-off point of 0.30 is used to determine practical significance of a medium effect. A multiple regression analysis was conducted with the aim of determining the percentage of variance in dependent variables that could possibly be predicted by independent variables.

## **6. PRESENTATION AND DISCUSSION OF RESULTS**

The results of the empirical study are reported and discussed below.

Biographical information was reported for number of employees, level of employment, type of metal processed or mined, age of the organization and its geographic location. A total of 193 questionnaires were received representing a response rate of 64%. Most of the respondents (66%) were employed in the mines with more than 1000 employees. About 18% of the respondents were from smaller operations with less than 499 employees. The respondents from medium sized mines with 500 to 999 employees were only about 16%.

Most of the respondents were managers (57%). Directors formed 34% of the total number of respondents whilst CEOs were only 9%. The majority of the respondents (51%) were from the mines producing precious metals such as platinum group metals and gold. About 17% were from coal mining organizations and 11% were from the steel industry. About 12% were from the mines producing non-ferrous metals like copper and only 8% were in the industrial metal mines.

About 87% of the respondents were from the mines with more than 20 years in operation. This serves as a confirmation that most of the mines in the world have been in operation for decades. The majority of the respondents were from the South African mining operations (55%), about 23% were from the rest of Africa while the respondents from other continents such as Australia and USA were about 21% of all the respondents. The results of the factors analysis are presented in the next section.

## 6.1 Factor Analysis

An instrument has a high reliability if it can be trusted to give a consistent and accurate measurement of an unchanging value. Reliability was determined by means of Cronbach Alpha. According to Sekaran and Bougie (2010), Cronbach alpha co-efficient should be greater than 0.70 for the data to be considered as internally consistent and reliable. Factor reliability of the identified dimensions is presented in Table 1. All the factors display satisfactory levels of reliability with alpha coefficients ranging from 0.870 to 0.97.

**Table 1: Results of factor reliability**

Factor	Cronbach Alpha	Cronbach Alpha Based on Standardized Items	N of Items	Mean	Minimum	Maximum	Range	Variance
Strategic IQ	0.958	0.957	10	3.253	3.026	3.479	0.453	0.015
Developing Strategic Plans	0.907	0.911	8	3.320	3.175	3.536	0.361	0.016
Managing Strategic Plan Implementation	0.959	0.961	8	3.206	3.091	3.441	0.349	0.019
Business Intelligence	0.900	0.908	6	3.039	2.964	3.124	0.161	0.004
Competitive Intelligence	0.943	0.946	11	2.886	2.490	3.438	0.948	0.099
Marketing Intelligence	0.959	0.959	8	2.957	2.549	3.192	0.642	0.064
Knowledge Management	0.876	0.873	11	2.921	2.534	3.354	0.820	0.059
Strategic Intelligence	0.968	0.968	12	2.606	2.244	3.088	0.845	0.060
Business Performance	0.946	0.946	7	2.613	2.192	2.788	0.596	0.042
Strategic IQ	0.958	0.957	10	3.253	3.026	3.479	0.453	0.015

(Source: Compiled by authors from survey results)

A number of items that load onto each factor as well as the mean scores are shown in the table. There is a variation in terms of the mean scores; the mean scores above 3 imply that a large proportion of the participants responded positively to the questions. A relatively low mean score implies that a number of participants who responded negatively is relatively high and generally increases as the mean score drops.

The results of descriptive statistics are presented in the next section.

## 6.2 Descriptive Statistics

One of the main objectives of this study was to measure the extent of the use of strategic intelligence in the mining sector. The results are presented and discussed below.

### 6.2.1 Strategic Intelligence

The results for the use of Strategic Intelligence are presented in Table 2.

**Table 2: Results for Strategic Intelligence**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree	Mean	Std Deviation
<b>J1</b>	The organization has a Strategic Intelligence process in place	21.2	10.9	52.8	15.0	2.617	0.983
<b>J2</b>	The organization consolidates all the Intelligence into a single Intelligence repository	22.8	36.3	22.8	18.1	2.363	1.027
<b>J3</b>	Management uses all types of Intelligentsia to create Strategic Intelligence	22.8	18.1	46.6	12.4	2.487	0.98
<b>J4</b>	Management believes that Strategic Intelligence, as a collective, provides better information input to decision-makers	14.0	4.7	39.9	41.5	3.088	1.009
<b>J5</b>	The organization has a long-term Strategic Intelligence plan.	21.8	17.6	42.0	18.7	2.575	1.029
<b>J6</b>	Strategic Intelligence is used at all levels in strategic planning	18.7	4.1	44.6	32.6	2.912	1.055
<b>J7</b>	Strategic Intelligence is used at all levels in strategic decision-making.	16.1	6.2	70.5	7.3	2.689	0.827
<b>J8</b>	Strategic Intelligence is used to sharpen Internal performance monitoring.	18.1	11.9	64.8	5.2	2.570	0.846
<b>J9</b>	Gathering Strategic Intelligence is a continuous activity in the organization.	24.4	12.4	45.1	18.1	2.570	1.049
<b>J10</b>	The organization has dedicated human resources to maintain the SI function.	35.8	17.6	33.2	13.5	2.244	1.084
<b>J11</b>	Strategic Intelligence requirements are linked to the company's strategic objectives and long-term goals.	23.8	8.3	29.5	38.3	2.824	1.181
<b>J12</b>	Strategic Intelligence is distributed to management in a timely fashion.	28.5	18.7	44.0	8.8	2.332	0.986

(Source: Compiled by authors from survey results)

The mean scores for most of the questions are below 3 with relatively high standard deviations indicating a large spread in terms of the responses. About 32% of the participants indicated that their organizations do not have a strategic intelligence process in place while more than half of the respondents (59%) indicated that their organizations do not consolidate all their intelligence into a single repository. A total of 41% responded negatively to question J3 implying that their management does not use all types of intelligence to create strategic intelligence. There are no long-term strategic intelligence plans in 39% of the organizations. About 22% of the participants indicated that strategic intelligence is not used at all levels for strategic planning and decision-making. There are no dedicated human resources to maintain the strategic intelligence function in more than half of the organizations (53%). It is important that SI requirements are linked to the strategic objectives and goals of the organizations, however 32% of the participants responded negatively to this question. About 47% of the participants disagreed that strategic intelligence is distributed to management in a timely fashion.

Respondents were asked to indicate the purpose for which strategic intelligence is used. The results are summarised in Table 3.

**Table 3: Summary of what SI is used for**

		No	Yes
<b>K1</b>	Competitive advantage, (e.g. What you need to know about the external environment to give you a competitive advantage in the market)	17.6	82.4
<b>K2</b>	Early Warning Systems, (e.g. For the threads and opportunities)	27.5	72.5
<b>K3</b>	Market Entry, (e.g. How you can enter a new market.)	29.5	70.5
<b>K4</b>	New Product Development, (e.g. how the customers are likely to react.)	30.6	69.4
<b>K5</b>	Commodity price forecast	11.4	88.6
<b>K6</b>	Key account management.	20.7	79.3

(Source: Compiled by authors from survey results)

A large proportion of the respondents use SI to gain competitive advantage, as an early warning system and for market entry, new product development, commodity price forecast and key account management.

Table 4 shows to what extent the organizations use SI as an input to decision-making at the different levels.

**Table 4: Extent of the SI use at various levels**

		Never	Rarely	Often	Always
<b>L1</b>	Strategic (Top Management – Corporate Level)	3.1	12.0	50.5	34.4
<b>L2</b>	Tactical (Middle Management – Business, Functional or Department Level)	5.7	28.1	52.6	13.5
<b>L3</b>	Operational (Lower Management – Day to Day)	22.9	40.1	34.9	2.1

(Source: Compiled by authors from survey results)

A total of 23% of the respondents do not use SI at operational level whilst about 40% rarely use it at that level. About 34% always use it at top management level whilst about 51% often use it at that strategic level. About 6% never use it at the Tactical level, whilst 28% rarely use it at that level. A total of 53% often use it at middle management level with only about 13.5% using it all the time at that level.

Another objective of this study was to measure the strategic intelligence quotient of the mining organizations. The results are presented and discussed below.

### 6.2.2 Strategic IQ

A summary of the results for the Strategic IQ of the mining organizations is presented in Table 5.

**Table 5: Results for Strategic IQ**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree	Mean	Std Deviation
<b>B1</b>	The company has a well-articulated statement of strategy.	9.4	11.5	25.5	53.6	3.234	0.988
<b>B2</b>	Each member of the management team understands that strategy.	9.3	9.8	26.4	54.4	3.266	0.975
<b>B3</b>	Each member of the management team can write the statement of that strategy without consulting the other.	12.4	13.5	33.2	40.9	3.026	1.026
<b>B4</b>	The strategy is in a written form.	15.0	10.4	16.1	58.5	3.193	1.116
<b>B5</b>	The strategy statement serves as a guide in determining which markets the company pursues.	7.8	17.1	20.2	54.9	3.234	0.983
<b>B6</b>	The strategy statement serves as a tool in deciding how resources are allocated within the company.	9.8	13.0	23.8	53.4	3.208	1.012
<b>B7</b>	The strategy statement serves as a tool in choosing which opportunities the company pursues and which ones it does not.	8.3	13.0	25.4	53.4	3.24	0.973
<b>B8</b>	The management team has sat down to try to obtain consensus about the future direction of the organization.	3.6	5.7	30.1	60.6	3.479	0.765
<b>B9</b>	The organization does not have different visions of what it is trying to become.	2.6	10.4	31.1	56.0	3.411	0.774
<b>B10</b>	The organization has a formal process of strategic thinking to determine what the organization wants to become.	5.2	19.2	23.3	52.3	3.24	0.924

(Source: Compiled by authors from survey results)

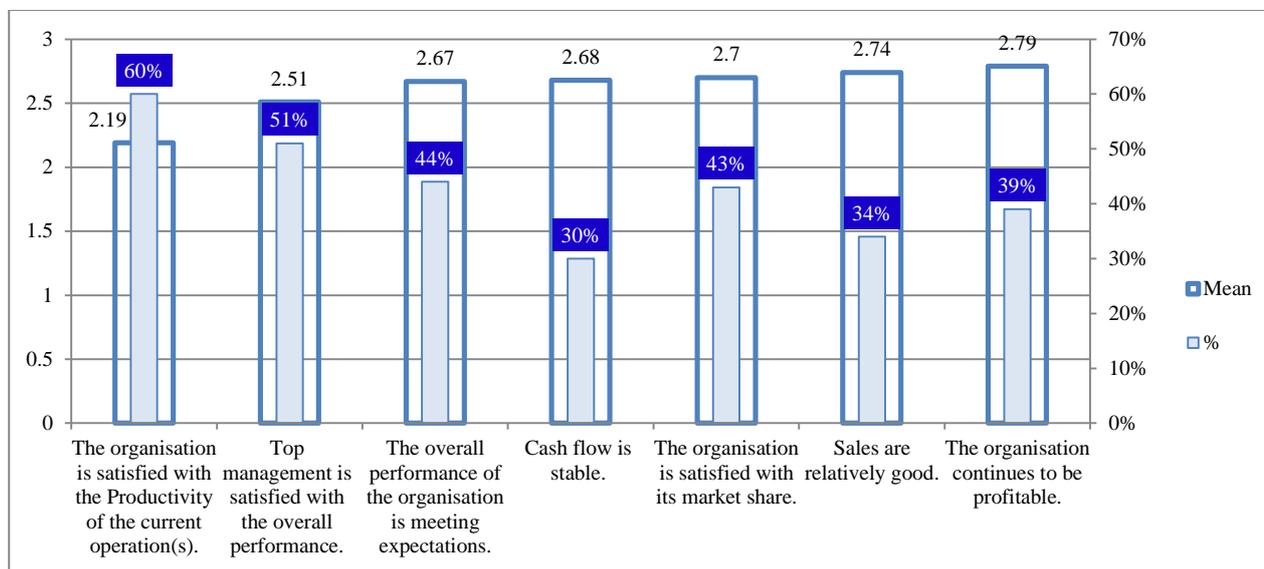
An average of 53% of the organization strongly agreed to the questions; it can therefore be inferred that they appear to have the highest strategic intelligence quotient. About 26% slightly agreed and are therefore deemed to have a moderate intelligence quotient whilst 21% responded negatively indicating that they have the lowest SIQ and are therefore deemed to be strategically blind.

The perceived business performance of the organizations is discussed in the next section.

### 6.2.3 Perceived Business Performance

The results for the overall business performance are shown in Figure 1.

**Figure 1: Mean scores in ranking order for perceived business performance**



(Source: Compiled by authors from survey results)

A total of 60% of the organizations were not satisfied with the productivity of their current operations. Top management was not satisfied with overall performance in 51% of the organizations. The overall performance of 44% of the mines were not meeting expectations, this is in agreement with the 39% whose organizations were not profitable. A total of 43% of the mines were not satisfied with their current market share. A significant number (30%) of the mines indicated that their cash flows were not stable at all.

The other main objective was to determine if there are any positive relationships among the different constructs of strategic intelligence, other types of intelligence, strategic planning and implementation and the performance of those organizations. The results of those correlations are shown and discussed below.

### 6.3 Correlations

The results of the product-moment correlation coefficients between the constructs are reported in Table 6.

**Table 6: Correlation coefficients between the dimensions**

	Strategic IQ	Strategic Plans	Strategic Plan Implementation	Business Performance	Business Intelligence	Competitive Intelligence	Marketing Intelligence	Knowledge Management	Strategic Intelligence
Strategic IQ	1.000	.858**	.848**	.841**	.843**	.730**	.842**	.704**	.723**
Strategic Plans	.858**	1.000	.869**	.790**	.745**	.653**	.788**	.689**	.696**
Strategic Plan Implementation	.848**	.869**	1.000	.793**	.812**	.682**	.741**	.727**	.698**
Business Performance	.841**	.790**	.793**	1.000	.796**	.723**	.826**	.705**	.756**
Business Intelligence	.843**	.745**	.812**	.796**	1.000	.877**	.878**	.798**	.863**
Competitive Intelligence	.730**	.653**	.682**	.723**	.877**	1.000	.826**	.788**	.914**
Marketing Intelligence	.842**	.788**	.741**	.826**	.878**	.826**	1.000	.763**	.862**
Knowledge Management	.704**	.689**	.727**	.705**	.798**	.788**	.763**	1.000	.841**
Strategic Intelligence	.723**	.696**	.698**	.756**	.863**	.914**	.862**	.841**	1.000

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

(Source: Compiled by authors from survey results)

The table shows that all types of Intelligence dimensions are positively correlated to *Business Performance* (practically significant, large effect). *Strategic Intelligence* is positively correlated to *Strategic Plan development and implementation* (practically significant, large effect). *Strategic Intelligence* is positively correlated to *Business Intelligence, Competitive Intelligence, Marketing Intelligence and Knowledge Management* (practically significant, large effect).

The other objective of the study was to determine if strategic intelligence is a function of the other types of intelligence and knowledge management.

### 6.4 Regression Analysis

Regression analysis was carried out to test whether Strategic Intelligence which is the dependent variable could be successfully predicted by the following predictors: Knowledge Management, Business Intelligence, Competitive Intelligence and Marketing Intelligence. Table 7 shows the model summary.

**Table 7: Model Summary**

Model	R	R square	Adjusted R square	Std. error of the estimate	Change Statistics					Durbin-Watson
					R Square change	F change	Df1	Df2	Sig. F change	
1	.954a	.910	.908	.26331	.910	472.634	4	188	.000	1.934

- a. Predictors: (Constant), knowledge management, business intelligence, marketing intelligence, competitive intelligence  
b. Dependent variable: Strategic intelligence

(Source: Compiled by authors from survey results)

The results indicate that based on the coefficient of multiple determination, 91% of the variance in strategic intelligence is explained by the variation in knowledge management, business intelligence, market intelligence and competitive intelligence. The model is a good fit for the data based on the F-test and the p-value. The coefficients and co-linearity statistics are shown in Table 8.

**Table 8: Coefficients and Co-linearity Statistics**

Model		Unstandardized Coefficients		Standardized coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-1.148	.108		-10.607	.000	-1.361	-.934		
	Business Intelligence	.416	.048	.342	8.612	.000	.321	.512	.305	3.284
	Competitive Intelligence	.276	.063	.207	4.385	.000	.152	.400	.217	4.613
	Marketing Intelligence	.397	.050	.373	7.959	.000	.299	.496	.219	4.567
	Knowledge Management	.178	.060	.110	2.942	.004	.059	.297	.343	2.914

(Source: Compiled by authors from survey results)

The beta coefficients are shown in the table. Based on the data in the table, the equation for the regression line is as follows:

- $Strategic\ Intelligence = -1.148 + 0.416 (Business\ Intelligence) + 0.276 (Competitive\ Intelligence) + 0.397 (Marketing\ Intelligence) + 0.178 (Knowledge\ Management)$

The other objective of this study was to compare the findings based on the demographic differences. This was achieved by using the ANOVA tools to establish if there were any significant differences in the responses based on the geographic location of the organisations. The results are discussed below.

## 6.5 ANOVA results for geographic location

Table 9 shows the results of the mean values calculated for the dimensions as a function of the type on geographic location of the organization. The results of the ANOVA calculation are also shown.

**Table 9: ANOVA results for the geographic location**

		N	Mean	Std Deviation	Effect Size		ANOVA	
					SA	Africa	F	Sig.
<b>Strategic Intelligence</b>	SA	107	2.521	0.886			17.87	0.000
	Africa	45	2.241	0.841	0.32			
	Other	37	3.261	0.316	0.84	1.21		
	Total	189	2.599	0.865				

(Source: Compiled by authors from survey results)

The p-value is less than 0.05 indicating that the participants in different geographic locations answered the questions in a significantly different manner statistically. The results for the effect sizes indicate that the d-value was 0.84 for SA when compared to other continents and 1.21 when Africa is compared to other continents. This indicates a large practically visible difference. The mean values for Africa were the lowest indicating that the mining organizations in Africa rank the lowest in terms of the utilization of Strategic Intelligence. The mean value for SA was significantly lower when compared to other continents indicating that South African mines use SI to a lesser extent when compared to mining organizations in other continents.

## 7. CONCLUSION

Conclusion regarding the specific theoretical objectives and the results of the empirical study are made.

### 7.1 Conclusions regarding the specific theoretical objectives

Strategic intelligence is about having the correct information at the disposal of the right people to enable those people to make informed strategic decisions about the current status and future of their organization. Strategic intelligence is therefore expected to provide an organization with the data

and information it needs about its external and internal environment and help the organizations to have the capacity to anticipate change, design suitable strategies that will not only create business value for customers, but also create future growth and profits for the organization in new markets within or across industries. Organizations must be able to adapt to changing circumstances, especially when signals in the competitive environment suggest a need to change course.

The mining industry needs to remain competitive and be able to sustain their performance. The rising pressure on these mining companies to grow profits despite a sub-optimal macro-economic environment and rising costs requires in-depth analysis and strategic flexibility.

## **7.2 Conclusions regarding the specific empirical objectives**

One of the objectives was to determine to what extent Strategic Intelligence is used within the mining industry. The results of the factor analysis showed that all the factors displayed satisfactory levels of reliability. About one third of the respondents indicated that their organizations do not have a strategic intelligence process in place. About 39% indicated that their organizations do not have any long-term strategic intelligence plans. There are no dedicated human resources to maintain the strategic intelligence function in more than half of the organizations. A significant number of respondents disagreed with the statement that strategic intelligence is distributed to management in a timely fashion.

The other objective was to determine the relationship between the dimensions of strategic intelligence and the performance. The results indicated that a majority of the organizations were not satisfied with the productivity of their current operations. The overall performance of 44% of the mines was not meeting expectations. About a third of the mines indicated that their cash flows were not stable at all.

A statistically and practically significant positive relationship was found between Strategic IQ of an organization and perceived business performance. There is a statistically and practically significant positive relationship between strategic intelligence and perceived business performance. There is a statistically and practically significant positive relationship between strategic intelligence and strategic planning and implementation. Strategic Intelligence was found to be related to business intelligence, competitive intelligence, marketing intelligence and knowledge management. The

results of a regression analysis confirmed that strategic Intelligence is a function of business intelligence, competitive intelligence, marketing intelligence and knowledge management.

The data also indicated that mines in other continents have relatively higher means implying that they use strategic intelligence systems more than those in SA and the rest of Africa. Lowest means are observed for the mining organizations in other African countries.

## **8. RECOMMENDATIONS**

Based on the review of literature and the empirical data generated in this study, the researcher makes the following recommendations to the managers of the mining organizations. The recommendations are generally applicable to any industry.

Managing successfully with strategic intelligence must begin with the organization's ability to effectively use information and knowledge about customers, products, services, operations, finances, markets and trends in order to impact future business performance. Managers must treat the management of information and knowledge as a distinct core competency in their organizations. Mining managers must develop organizational guidelines to help employees through the process of collecting, maintaining, sharing, and using information. They should also ensure that employees understand the business well and know the type of information that is critical to business performance. Managers also need to assist employees in understanding how to use technology effectively. They must build a culture where all employees play a role in the organization's strategic intelligence process. The organizations need to develop effective ways of learning about their internal and external environments and implement strategic decision systems which allow them to capitalize on opportunities and defend themselves against threats. Thorough scanning and analysis of the competitive environment and customers should be carried out continuously to detect any new entrants, competitors, emerging technologies, competitive advantages and disadvantages and new ideas about products or services.

The convergence and synergy of the business intelligence, marketing intelligence, competitive intelligence and knowledge management has been proposed to form strategic intelligence in this research. Future research can be used to generate more theoretical and empirical data in this regard. The optimal framework used for such a synergy can also be tested through future research.

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## **CHAPTER 8: SUMMARY AND PROPOSED MODEL**

### **8.1 Introduction**

The purpose of this chapter is to draw conclusions from the four research articles that formed the basis of this study. Conclusions are drawn in accordance with the research objectives. The primary objectives of the study were as follows:

- to investigate the extent to which strategic management process is used within the mining industry and whether it is used to achieve competitive advantage and business performance
- to investigate the extent to which business intelligence, competitive intelligence and marketing intelligence are used within the mining industry and whether they are used to achieve competitive advantage and business performance.
- to investigate the extent to which knowledge management is utilized within the mining industry and whether it is used to achieve business performance.
- to investigate the extent to which strategic intelligence is utilized within the mining industry and whether it is used in strategic planning and decision-making to identify opportunities or threats within the global environment to remain competitive.

In order to answer the research questions, a quantitative research methodology was used. A structured questionnaire with Likert type response scales was used and the research population consisted of senior management in the mining organisations in South Africa and globally. A simple random sampling technique was used. A summary of the findings is presented below.

### **8.2 Summary of the findings**

The primary objective of this study as set out above has been addressed separately and integrally in the four research articles, as discussed below.

### **8.2.1 Article 1: Investigating the use of strategic management process in the mining industry**

The main objective of this part of the study was to determine to what extent the strategic management process is used within the mining industry. The results of the empirical study are summarised as follows:

- A large proportion of the organisations have institutionalized their strategic planning functions, established a good strategic foundation, developed sound strategic plans and are managing the implementation of those strategic plans well, however there was about 20% who did not.
- About 60% of the organisations were not satisfied with their productivity. The overall performance of 44% of the mines was not meeting expectations and 30% indicated that their cash flows were not stable at all.
- A statistically and practically significant positive relationship with a large effect was found between Strategic Management dimensions and Business Performance.

The other objective was to determine if the mining organisations use analytical tools for the analysis of their external environments and internal situations as part of their strategic management processes.

In general, a large proportion of the organisations were using various analytical tools; however it was also worth noting the following findings:

- About 20% do not analyze their core-competencies and determine their strengths and weakness;
- A total of 26% do not determine the critical success factors while about 37% do not carry out value chain analysis;
- About 38% of the respondents do not use Porter's 5 Forces technique, and
- Half of the organisations do not assess their industry structure using the strategic group maps' technique.

The other objective of the study was to compare the findings based on the demographic differences.

The main findings were as follows:

- The majority of the large mines have well-established strategic management processes compared to the smaller and medium-sized organisations.

- Mining organisations in Africa were the worst performers in comparison to those in SA and other continents.

Based on the findings, it was recommended that mining organisations should use formalised strategic management process and suitable analytical tools for the continuous analysis of the external environment and internal resources, competencies and capabilities in order to continually review their strategic positions and remain competitive.

### **8.2.2 Article 2: Investigating the use of business intelligence, competitive intelligence and marketing intelligence in the mining industry**

The main objective of this part of the study was to determine to what extent the different types of intelligence are used within the mining industry. The results of the empirical study are summarised as follows:

- About 53% of the respondents indicated that their organisations do not have real-time intelligence.
- A significant number of the respondents indicated that their organisations do not have systematic ways of gathering different types of intelligence and use them for strategic decision making.
- A statistically and practically significant positive relationship with a large effect exists between Business Intelligence, Competitive Intelligence and Marketing Intelligence dimensions and Business Performance.

The following main recommendations were made.

- Organisations need to systematically and continuously collect information from their own internal business operations, the competitive environment, the competitors and the markets to assist in operational, tactical and strategic decision-making.
- All forms of intelligence need to be distributed to management in a timely fashion.
- Integration of business intelligence, competitive intelligence and marketing intelligence is recommended and should be enabled as a strategic function of the organisation to inform and improve the decision-making process of the managers.

### **8.2.2 Article 3: Investigating the use of knowledge management in the mining industry**

The main objective of this part of the study was to determine to what extent knowledge management is used within the mining industry. The results of the empirical study are summarised as follows:

- About 30% do not agree that their organisations are currently benefitting from the processes created to contribute knowledge.
- A total of 32% indicated that their organisations do not have the technical infrastructure to enable knowledge sharing.
- About 35% indicated that there is no transfer of knowledge within their organisations about the best practices among the employees in order to improve operational efficiencies
- A statistically and practically significant positive relationship with a large effect exists between the construct of Knowledge Management and Business Performance.

The following recommendation was made.

- Managers should integrate knowledge management into the core activities of the organisation.

### **8.2.4 Article 4: Investigating the use strategic intelligence in the mining industry**

The main objective of this part of the study was to determine to what extent the strategic intelligence is used within the mining industry. The results of the empirical study are summarised as follows:

- About 47% of the participants disagreed that strategic intelligence is distributed to management in a timely fashion
- A total 32% of the participants indicated that their organisations do not have a strategic intelligence process in place.
- A statistically and practically significant positive relationship exists between Strategic Intelligence and Business Performance

- A statistically and practically significant positive relationship exists between Strategic Intelligence and Strategic Planning and Implementation.
- Strategic Intelligence is related to Business Intelligence, Competitive Intelligence, Marketing Intelligence and Knowledge Management
- Strategic Intelligence is a function of Business Intelligence, Competitive Intelligence, Marketing Intelligence and Knowledge Management.

The researcher proposes the following model for Strategic Intelligence based on the findings from the research.

### **8.3 Proposed model for Strategic Intelligence**

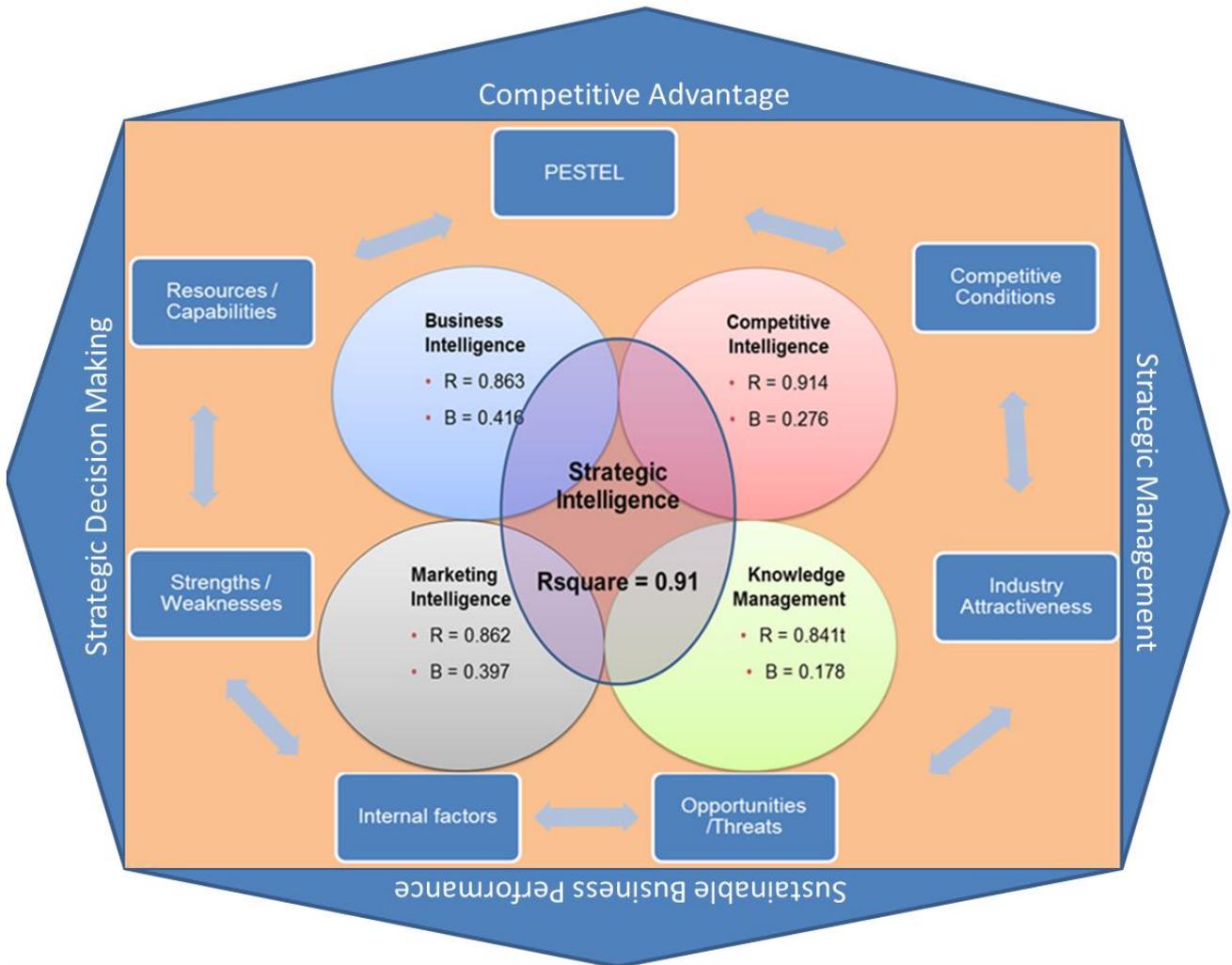
Competitiveness and performance is influenced by environmental forces. The organisation's ability to perform within these environment forces depends on how well it is able to identify, manage and gain leverage from opportunities and threats (Vecchiato & Roveda, 2010). Environmental forces exert pressure on organisations. External macro environmental forces come from the political, economic, social, technological, environmental and legal forces that place limits on what an organisation may do. Forces from the external environment come from external groups that are closer to the organisation and come from the industry and market specific forces created by suppliers, customers, competitors and business partners. The internal organisation environment also creates forces from its structure, processes, people, systems and resource constraints. These forces, their impact, significance and direction need to be understood through the SI. It is imperative that organisations view strategic intelligence as a business process for effectively managing the present and shaping the future, and providing a consistent route towards continuous improvement (Marchand & Hykes, 2007).

Strategic intelligence is proposed to be the convergence and synergies of knowledge management, business intelligence, marketing intelligence and competitive intelligence as shown below in Figure 8-1.

SI is thus situated as an overarching concept that covers signals coming from all of the levels of intelligence – KM, BI, MI and CI to provide an organisation with the information it needs to know

of its business environment to enable it to gain insight into its present processes, anticipate and manage change for the future, design appropriate strategies that will create business value for customers, and improve profitability in current and new markets.

**Figure 8-1: Convergence and Synergies of KM, MI, CI and BI to form Strategic Intelligence and its input in Strategic Management Process**



(Source: Compiled by the author)

Synergy is defined as the interaction of two or more agents or forces so that their combined effect is greater than the sum of their individual effects. In this case, it is expected that the effects produced by combining the KM, BI, MI and CI functions will be greater than the sum of their individual effects.

KM, BI, MI and CI are distinct by being complementary and synergistic. At their core, all the fields are concerned with achieving competitive advantage from better applications of information, intelligence and knowledge. Their integration can lead to an improvement in organisational effectiveness, productivity, strategic -making and a sustainable competitive advantage. The integration can therefore help in identifying organisational blind spots; improve control, clarity, communications and decisions; lead to tactical improvements to operations, processes and products; deliver superior sustainable performance and position the organisation well within the competitive environment.

The main objectives of an integrated SI system will be to:

- Act as a predictive enabler and an important instrument of strategy;
- Serve as a support and not a deterrent to the development of sound plans;
- Assess the outlines of the uncertainty and assist managers to develop plans to deal with it;
- Assist in defining the strategic environment;
- Identify opportunities and estimate the probable reactions and results of different approaches;
- Help define the most likely scenarios, those strategic trends for which the strategist must develop approaches;
- Assist in anticipating low-probability/high-impact challenges, those events that alter the strategic landscape;
- Give insight into the plans of competitors;
- Give insight into the objectives, concerns, vulnerabilities, and mindset of key actors;
- Assist managers to take into account a wide range of possibilities, addressing the most likely future while providing the flexibility to adapt to unexpected changes or trends;
- Give earlier warning that the future is deviating from the anticipated path;
- Give timely and insightful information, resulting in better-informed and more successful strategic decisions;
- Empower personnel using timely, meaningful information and trend reports;
- Easily create in-depth financial, operations, customer, and vendor reports;
- Efficiently view, manipulate, analyze and distribute reports using many familiar tools;
- Extract up-to-the-minute high-level summaries;
- Consolidate data from multiple organisations, divisions and databases, and
- Minimize manual and repetitive work.

The model can assist in building an SI strategy that aligns with the goals of the organisation, improves knowledge management, advances business by making the best use of information, enables SI penetration into the business processes, and assist the organisation with strategic, tactical, and operational decision making. Building an effective SI strategy requires a conscious approach, a blending of organisational resources to bring a predictable, comprehensive, consistent, reliable, and timely source of information to deliver on the promise of SI.

#### **8.4 Significance of the study**

The significance of the study was shown by some of the responses from the CEOs of huge mining houses. Some of the direct comments copied from their email responses were as follows:

*“Fascinating questionnaire, which has initiated a lot of review and questions among my colleagues. Thanks for including me, I look forward to the feedback on some of your findings”.*

*“This looks like an interesting study. Like everything in life nothing for nothing – If I complete the questionnaire, will I get a copy of the results?”*

*“Attached is the questionnaire duly completed. I look forward to the findings of your study. I wish you well in successfully completing your PhD.”*

This research has extended knowledge in strategic management and intelligence research in some respects. The author of this thesis was able to provide empirical evidence and show that there exists a relationship between strategic management, different constructs of intelligence, knowledge management and perceived business performance. This finding is consistent with recent research.

The main contribution of this research derives from filling the gap between the theoretical constructs and practical evidence within the mining sector.

The findings are believed to be useful to both academics and practitioners. For the academics, by empirically testing the research hypotheses, this study fills an important gap in the empirical literature. For the practitioners, the study’s findings will inform the managers and assist them in using formalised strategic management and intelligence processes and achieving competitive advantage for their organisations.

## **8.5 Recommendations for Future Research**

Based on the findings from this research, the following recommendations are made for future research:

Strategic management process is not the only factor that leads to business performance of the mining organisations; other contributory factors may be identified with further research. A measure of the critical success factors for this industry is recommended. It is also recommended that a further investigation be carried out to determine the effect of the geographic locations of these organisations and the regulatory framework in those areas on their performance. It was also noted that participants in different geographic areas responded differently to the questions about strategic management, knowledge management, different intelligence dimensions and business performance. Possible reasons for this can be established by further research.

A significant number of participants indicated that the culture in their organisations is not conducive to the sharing of knowledge. A possible framework to create such a culture can also be established by further research.

The convergence and synergy of the business intelligence, marketing intelligence, competitive intelligence and knowledge management has been proposed to form strategic intelligence in this research. Future research can be used to generate more theoretical and empirical data in this regard. The optimal framework used for such a synergy can also be tested through future research.

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## **APPENDIX A: QUESTIONNAIRE**

### **CONFIDENTIAL**

Direct telephone: +27 11 418 9021

Email: hermanb@gold.co.za

2015

Dear Colleague

**Re: Request to participate in an academic research study for PhD in Business Administration by completing the attached questionnaires.**

As part of a PhD research study, I am investigating Strategic Intelligence as a Strategic Management tool in the mining industry. As a manager, you have been selected to participate in the study by completing the attached questionnaires. Completing the questionnaires should take approximately 20 minutes.

The results of these questionnaires will be used for academic purposes only. A concerted and conscious effort will be made at all times to keep the results confidential.

Written feedback will be given to respondents who indicate their interest in it.

Thank you for giving up your valuable time to assist me in this research.

**Herman D Boikanyo**

PhD Student – North West University

Student Number – 20947224

Tel – 011 418 9021

Email – hermanboikanyo@gmail.com



Completion of the questionnaires to be used in partial fulfillment of the requirements for the degree **Doctorate of Philosophy (PhD)** at the Potchefstroom Business School of the North West University

**Code number:**

## **QUESTIONNAIRE:**

### **CONTACT DETAILS:**

Herman Boikanyo

Tel: +27 11 418 9021

Cell: +27 79 117 2863

E-mail: [hermanb@gold.co.za](mailto:hermanb@gold.co.za) or [hermanboikanyo@gmail.com](mailto:hermanboikanyo@gmail.com)

All information will be treated as **STRICTLY CONFIDENTIAL** and will only be used for **ACADEMIC PURPOSES**.

## 2 GENERAL INSTRUCTIONS

1. You are requested to complete these questionnaires.
2. Please answer the questions as objectively and honestly as possible.
3. **Please answer all the questions**, as this will provide sufficient information to the researcher so that an accurate analysis and interpretation of data can be made.

### **PART A: DEMOGRAPHIC INFORMATION**

The following information is needed to help us with the statistical analysis of the data for comparisons among different businesses. **All your responses will be treated confidentially**. We appreciate your help in providing this important information.

Mark the applicable block with a cross (X). Complete the applicable information.

A1	3 Number of employees in your organisation	<100	101 - 499	500 - 999	1000 – 4999	>5000		
A2	4 Your Level of Employment	CEO or Board Member	Executive Director	Non-Executive Director	Senior Manager	Junior Manager		
A3	5 Type of metal mined or processed	Iron and Ferro Alloys	Non-Ferrous Metals	Precious Metals	Industrial Minerals	Mineral Fuels		
A4	6 List the Metals mined or processed by your organisation, e.g. Gold	Metal 1	Metal 2	Metal 3	Metal 4	Metal 5		
A5	7 Number of years your firm has been operating	<1 year	1 – 5 years	6 – 10 years	11 – 20 years	>20 years		
A6	8 Geographic location (s) of your operations	South Africa	Africa (not SA)	USA	South America	Asia	Europe	Australia

### **SECTION 1: STRATEGIC QUOTIENT OF YOUR ORGANISATION**

The following 10 statements are about a numerical assessment of the Strategic I.Q of the organisation you are currently working for. Strategic I.Q. is a measure of strategic intelligence and how an organisation adapts to change. Please read each statement carefully and answer from your company's point of view by making a cross in the relevant block.

Use the following key:

**1** = Strongly Disagree; **2** = Slightly Disagree; **3** = Slightly Agree, **4** = Strongly Agree

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree
<b>Strategic IQ</b>					
<b>B1</b>	The company has a well-articulated statement of strategy.	1	2	3	4
<b>B2</b>	Each member of the management team understands that strategy.	1	2	3	4
<b>B3</b>	Each member of the management team can write the statement of that strategy without consulting the other.	1	2	3	4
<b>B4</b>	The strategy is in a written form.	1	2	3	4
<b>B5</b>	The strategy statement serves as a guide in determining which markets the company pursues.	1	2	3	4
<b>B6</b>	The strategy statement serves as a tool in deciding how resources are allocated within the company.	1	2	3	4
<b>B7</b>	The strategy statement serves as a tool in choosing which opportunities the company pursues and which ones it does not.	1	2	3	4
<b>B8</b>	The management team has sat down to try to obtain consensus about the future direction of the organisation.	1	2	3	4
<b>B9</b>	The organisation does not have different visions of what it is trying to become.	1	2	3	4
<b>B10</b>	The organisation has a formal process of strategic thinking to determine what the organisation wants to become.	1	2	3	4

## **SECTION 2: STRATEGIC PLANNING AND MANAGEMENT**

The following statements are about STRATEGIC PLANNING and MANAGEMENT processes of your organisation. Strategic Planning is the process of developing the direction and scope of an organisation over the long term which achieves advantages for the organisation through its configuration of resources within a changing environment to meet the needs of the markets and fulfill shareholders expectations.

**Indicate to what extent you agree or disagree with the statements. Mark the applicable block with a cross (X).**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree
<b><u>Institutionalizing the Planning Function</u></b>					
<b>C1</b>	Management team takes formal responsibility for the organisation's strategic business planning.	1	2	3	4
<b>C2</b>	The organisation has a formal strategic planning process that is performed regularly.	1	2	3	4
<b>C3</b>	The organisation provides resources ear-marked specifically for strategic planning.	1	2	3	4
<b>C4</b>	The organisation follows a defined set of procedures in its strategic planning process.	1	2	3	4
<b><u>Establishing the Strategic Foundation</u></b>					
<b>C5</b>	The organisation has a written mission statement.	1	2	3	4
<b>C6</b>	All management and senior staff understand the mission.	1	2	3	4
<b>C7</b>	The organisation has written strategic goals.	1	2	3	4
<b>C8</b>	The goals list measurable targets (e.g., volume, profitability).	1	2	3	4
<b>C9</b>	The organisation systematically measures actual performance versus goals.	1	2	3	4
<b>C10</b>	The current vision for the future represents the "best thinking" from all of the members of the leadership team.	1	2	3	4
<b><u>Developing Strategic Plans</u></b>					
<b>C11</b>	The organisation uses the strategic (situational) diagnosis to formulate strategic plan options.	1	2	3	4
<b>C12</b>	It considers business performance options, (e.g., cost reduction, alternative suppliers or production improvements).	1	2	3	4
<b>C13</b>	It considers market penetration options, (e.g., pricing/ promotion, market expansion and segmentation)	1	2	3	4
<b>C14</b>	It considers management options, (e.g., restructuring, purchasing competitive businesses).	1	2	3	4
<b>C15</b>	The organisation considers product enhancement options.	1	2	3	4
<b>C16</b>	The planning process is based on criteria by which options can be compared.	1	2	3	4
<b>C17</b>	The organisation decides its strategic plan(s) based on risk/return criteria.	1	2	3	4
<b>C18</b>	It takes into account unavoidable uncertainties about the future.				
<b><u>Managing Strategic Plan Implementation</u></b>					
<b>C19</b>	The organisation makes strategic decisions based upon the strategic plan.	1	2	3	4
<b>C20</b>	The organisation assigns lead responsibility for the implementation of the action plan to a person or, alternately, to a team.	1	2	3	4
<b>C21</b>	Sufficient resources are allocated for implementation.	1	2	3	4
<b>C22</b>	The organisation sets performance standards for each plan element.	1	2	3	4
<b>C23</b>	The organisation develops an organized system for monitoring how well those performance standards were met.	1	2	3	4
<b>C24</b>	The organisation reviews monitoring data regularly.	1	2	3	4
<b>C25</b>	Managers are updated regularly about how the organisation is progressing towards its future vision.	1	2	3	4
<b>C26</b>	The organisation's vision for the future has been clearly communicated through all levels of the organisation.	1	2	3	4
<b>C27</b>	<b>Strategic Planning is used for the following Organisational Purposes:</b>				
<b>a</b>	Achieving sustainable competitive advantage.	1	2	3	4
<b>b</b>	Motivating innovation.	1	2	3	4
<b>c</b>	Implementing productive action plans.	1	2	3	4
<b>d</b>	Ensuring ongoing success.	1	2	3	4
<b>e</b>	Identifying various types of risks facing the organisation.	1	2	3	4
<b>f</b>	Scanning business environment.	1	2	3	4
<b>g</b>	Ensuring the existence of proactive business continuity planning.	1	2	3	4
<b>h</b>	Ensuring effective recovery after a disaster or crisis.	1	2	3	4

**SECTION 3: ANALYTICAL TOOLS AND TECHNIQUES**

Please indicate if your organisation uses the following analytical tools and techniques in strategy management processes. Select **YES** if your organisation uses the technique or **NO** if it does not.

		<b>NO</b>	<b>YES</b>
<b><u>Analysis of Internal Resources</u></b>			
<b>D1</b>	Product life-cycle analysis	1	2
<b>D2</b>	Analysis of cost structures	1	2
<b>D3</b>	Risk analysis	1	2
<b>D4</b>	Analysis of corporate culture	1	2
<b>D5</b>	Analysis of core competencies	1	2
<b>D6</b>	Critical success factors	1	2
<b>D7</b>	Value chain analysis	1	2
<b>D8</b>	Strength-weakness analysis	1	2
<b>D9</b>	Internal – External Factors Analysis	1	2
<b><u>Analysis of External Market Forces</u></b>			
<b>D10</b>	PESTEL	1	2
<b>D11</b>	Competitor analysis	1	2
<b>D12</b>	Benchmarking	1	2
<b>D13</b>	Porter’s 5 Forces	1	2
<b>D14</b>	Analysis of industry structures – Formation of strategic groups	1	2
<b>D15</b>	Opportunity-Thread analysis	1	2
<b><u>Portfolio analysis / aggregation of results</u></b>			
<b>D16</b>	BCG-matrix (market growth and market share matrix)	1	2
<b>D17</b>	Relative Strength and Industry Attractiveness	1	2
<b><u>Tools for Strategic Positioning</u></b>			
<b>D18</b>	Mission statement	1	2
<b>D19</b>	Ansoff matrix	1	2
<b>D20</b>	Generic strategies	1	2
<b>D21</b>	Definition of strategic business segments	1	2
<b><u>Tools for Strategic Planning / Strategy Development and Evaluation</u></b>			
<b>D22</b>	Brainstorming	1	2
<b>D23</b>	Mind-mapping	1	2
<b>D24</b>	Innovation management	1	2
<b>D25</b>	SWOT	1	2
<b>D26</b>	TOWS matrix	1	2
<b>D27</b>	Scenario planning	1	2
<b>D28</b>	Risk scenario planning	1	2
<b>D29</b>	Economic value added	1	2
<b>D30</b>	Cash flow projections	1	2
<b>D31</b>	Gap analysis	1	2
<b>D32</b>	Balanced Scorecard	1	2
<b>D33</b>	Break-even analysis	1	2
<b>D34</b>	Blind-spot analysis	1	2

**SECTION 4: BUSINESS PERFORMANCE**

The following statements are about the Business Performance of your organisation. Please rate **your degree of satisfaction with your organisation's performance**

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree
<b><u>Business Performance</u></b>					
<b>E1</b>	The overall performance of the organisation is meeting expectations.	1	2	3	4
<b>E2</b>	Top management is satisfied with the overall performance.	1	2	3	4
<b>E3</b>	Sales are relatively good.	1	2	3	4
<b>E4</b>	The organisation continues to be profitable.	1	2	3	4
<b>E5</b>	Cash flow is stable.	1	2	3	4
<b>E6</b>	The organisation is satisfied with its market share.	1	2	3	4
<b>E7</b>	The organisation is satisfied with the Productivity of the current operation(s).	1	2	3	4

**SECTION 5: BUSINESS INTELLIGENCE**

The following statements are about the use of Business Intelligence (BI) in your organisation. Business Intelligence is a managerial tool used to manage and enrich business information and to produce up-to-date knowledge and intelligence for operative and strategic decision making.

		Strongly disagree	Slightly Disagree	Slightly Agree	Strongly Agree
<b><u>Business Intelligence</u></b>					
<b>F1</b>	Information is systematically collected to assist in strategic decision making.	1	2	3	4
<b>F2</b>	The availability of Business Intelligence has increased the effectiveness of managerial decision making.	1	2	3	4
<b>F3</b>	Business Intelligence tools are used to manipulate data, e.g. operational or/and historical data.	1	2	3	4
<b>F4</b>	The Business Intelligence tools have forecasting capabilities.	1	2	3	4
<b>F5</b>	Data gathered from Business Intelligence deployment is reliable.	1	2	3	4
<b>F6</b>	Knowledge generated from successful Business Intelligence deployment can be used to sustain competitive advantage.	1	2	3	4

## **SECTION 6: COMPETITIVE INTELLIGENCE**

The following statements are about the use of Competitive Intelligence (CI) in your organisation. CI is defined as the process of gathering actionable information about competitors and the competitive environment, applying it to the planning processes and decision-making to improve performance.

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree
<b><u>Competitive Intelligence</u></b>					
<b>G1</b>	The company collects useful information about the competitors.	1	2	3	4
<b>G2</b>	The company collects useful information about the competitive environment.	1	2	3	4
<b>G3</b>	Competitive analysis is conducted in a coordinated manner by various units.	1	2	3	4
<b>G4</b>	Competitive Intelligence is used in decision-making processes to improve performance.	1	2	3	4
<b>G5</b>	The company has the ability to determine the future intent of a competitive force on which the strategies are based.	1	2	3	4
<b>G6</b>	Competitive analysis is used to create a competitive advantage.	1	2	3	4
<b>G7</b>	Competitive analysis is focused upon the strategic requirements of the company.	1	2	3	4
<b>G8</b>	The Competitive Intelligence is distributed to management in a timely fashion	1	2	3	4
<b>G9</b>	Management is up to date with emerging technologies in their field of business.	1	2	3	4
<b>G10</b>	The organisation is cognisant of government legislation and legislative trends that impact it.	1	2	3	4
<b>G11</b>	There is an organised effort to channel all information about competitive forces to a central repository.	1	2	3	4

## **SECTION 7: MARKET INTELLIGENCE**

The following statements are about the use of Market Intelligence (MI) in your organisation. MI is Information relevant about company's markets, gathered and analysed specifically for accurate and confident decision-making in determining market opportunity, market penetration strategy and market development metrics

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree
<b><u>Market Intelligence</u></b>					
<b>H1</b>	The organisation has a systematic way of gathering of market intelligence.	1	2	3	4
<b>H2</b>	Market analysis is used to identify key threads or opportunities.	1	2	3	4
<b>H3</b>	Market intelligence is used to help the company grow (to increase revenue, profit, or market share).	1	2	3	4
<b>H4</b>	Market intelligence is used in understanding the nature of the market requirements.	1	2	3	4
<b>H5</b>	Market intelligence helps the organisation to keep abreast of the ongoing emerging circumstances.	1	2	3	4
<b>H6</b>	The resulting information of the market intelligence contributes to the decision-making process.	1	2	3	4
<b>H7</b>	The Market Intelligence is distributed to management in a timely fashion.	1	2	3	4
<b>H8</b>	There is an organised effort to channel all information about the markets to a central repository.	1	2	3	4

### **SECTION 8: KNOWLEDGE MANAGEMENT**

The following statements are about the use of Knowledge Management (KM) in your organisation. KM includes the identification and analysis of available and required knowledge and the subsequent planning and control of actions to develop knowledge assets to fulfil organisational objectives.

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree
<b><u>Knowledge Management</u></b>					
<b>I1</b>	Knowledge Management assists in creating value out of the intangible assets.	1	2	3	4
<b>I2</b>	The company values knowledge as a strategic asset, critical for success.	1	2	3	4
<b>I3</b>	The culture in the organisation is conducive to the sharing of knowledge.	1	2	3	4
<b>I4</b>	The organisation benefits from the processes created to contribute knowledge.	1	2	3	4
<b>I5</b>	There is a general culture in the company where people respect knowledge.	1	2	3	4
<b>I6</b>	Employees are responsible for the transfer of knowledge in their areas of responsibility.	1	2	3	4
<b>I7</b>	Knowledge is accessed by employees by means of a central intelligence repository.	1	2	3	4
<b>I8</b>	The organisation has the technical infrastructure to enable knowledge sharing.	1	2	3	4
<b>I9</b>	There is transfer of knowledge about best practices among employees in order to improve operational efficiency	1	2	3	4
<b>I10</b>	There is a document management system in place	1	2	3	4
<b>I11</b>	The organisation stores Intellectual Capital.	1	2	3	4

### **SECTION 9: STRATEGIC INTELLIGENCE**

The following statements are about the use of Strategic Intelligence (SI) in your organisation. SI is the gathering, analysis and dissemination of data relevant to strategic decision making. It is what the company needs to know of its business environment to enable it to gain insight into its present processes, anticipate and manage change for the future, design appropriate strategies that will create business value for customers and improve profitability in current and new markets

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree
<b><u>Strategic Intelligence</u></b>					
<b>J1</b>	The organisation has a Strategic Intelligence process in place.	1	2	3	4
<b>J2</b>	The organisation consolidates all the Intelligence into a single Intelligence repository	1	2	3	4
<b>J3</b>	Management uses all types of Intelligentsia to create Strategic Intelligence	1	2	3	4
<b>J4</b>	Management believes that Strategic Intelligence, as a collective, provides better information input to decision-makers.	1	2	3	4
<b>J5</b>	The organisation has a long-term Strategic Intelligence plan.	1	2	3	4
<b>J6</b>	Strategic Intelligence is used at all levels in strategic planning	1	2	3	4
<b>J7</b>	Strategic Intelligence is used at all levels in strategic decision-making.	1	2	3	4
<b>J8</b>	Strategic Intelligence is used to sharpen Internal performance monitoring.	1	2	3	4
<b>J9</b>	Gathering Strategic Intelligence is a continuous activity in the organisation.	1	2	3	4
<b>J10</b>	The organisation has dedicated human resources to maintain the SI function.	1	2	3	4
<b>J11</b>	Strategic Intelligence requirements are linked to the company's strategic objectives and long-term goals.	1	2	3	4
<b>J12</b>	Strategic Intelligence is distributed to management in a timely fashion.	1	2	3	4

Please indicate below whether Strategic Intelligence is used by your organisation when considering the following:

		No	Yes
K1	Competitive advantage, (e.g. What you need to know about the external environment to give you a competitive advantage in the market)	1	2
K2	Early Warning Systems, (e.g. For the threads and opportunities)	1	2
K3	Market Entry, (e.g. How you can enter a new market.)	1	2
K4	New Product Development, (e.g. how the customers are likely to react.)	1	2
K5	Commodity price forecast	1	2
K6	Key account management.	1	2

Please indicate below to what extent your organisation uses Strategic Intelligence as an input to decision-making at the following levels.

		Never	Rarely	Often	Always
L1	Strategic (Top Management – Corporate Level)	1	2	3	4
L2	Tactical (Middle Management – Business, Functional or Department Level)	1	2	3	4
L3	Operational (Lower Management – Day to Day)	1	2	3	4

#### **SECTION 10: INTELLIGENCE TOOLS**

The following statements are about the use of Intelligence Tools in your organisation for SI.

		Strongly disagree	Slightly Disagree	Slightly agree	Strongly Agree
<b><u>Information Systems</u></b>					
M1	The company's management information system provides easy access to data.	1	2	3	4
M2	Intelligence Data is integrated across various corporate applications.	1	2	3	4
M3	Technical abilities of the IT staff related to Intelligence are good.	1	2	3	4
M4	There are Extraction-Transformation-Load (ETL) tools for data transfer.	1	2	3	4
M5	Data Warehouses are used as repository for all data relevant to an organisation.	1	2	3	4
M6	On-Line Analytical Processing (OLAP) techniques are used to analyse and report data from huge data sources.	1	2	3	4
M7	The organisation has data mining tools to identify patterns and relationships within a data warehouse and create detailed reports.	1	2	3	4
M8	The organisation has Real-Time Intelligence capabilities.	1	2	3	4

**ALL THE INFORMATION YOU PROVIDE WILL BE TREATED IN THE STRICTEST CONFIDENCE**

Thank you for taking the time to complete this questionnaire. If you have any queries, please do not hesitate to contact me by telephone on 011 418 9021 or 079 117 2863 or by e-mail at [hermanb@gold.co.za](mailto:hermanb@gold.co.za) or [hermanboikanyo@gmail.com](mailto:hermanboikanyo@gmail.com)

**APPENDIX B: Confirmation of ACCEPTANCE of ARTICLE 2 for publication**



**BUSINESS  
PERSPECTIVES**

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<http://businessperspectives.org/>

E-mail: [head@businessperspectives.org](mailto:head@businessperspectives.org)

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February 22, 2016

Dinko Herman Boikanyo,  
PhD candidate  
North-West University  
Potchefstroom campus  
(South Africa)

**ACCEPTANCE LETTER**

Dear Dinko Herman Boikanyo,

We are very pleased to inform you that your paper "Investigating the use of business, competitive and marketing intelligence as management tools in the mining industry" co-authored with Ronnie Lotriet and Pieter W Buys has been accepted for publication in the international journal "Problems and Perspectives in Management".

It is scheduled to be published in the Volume 14, Issue 2 (cont.), 2016.

The article has been peer-reviewed by the Editorial Board of PPM Journal. The journal has been using "double-blind" review since 2003 (the year of journal establishing) because it is the best practice in paper reviewing.

Thank you for your submission.

With cordial regards,

A handwritten signature in black ink, appearing to read 'Serhiy Kozmenko'.



Prof. Dr. Serhiy Kozmenko  
Editor-in- Chief  
International Research Journal  
"Problems and Perspectives in Management"  
Phone: 38-0542-674067  
E-mail: [serhiy\\_kozmenko@businessperspectives.org](mailto:serhiy_kozmenko@businessperspectives.org)

## APPENDIX C: Confirmation of ACCEPTANCE of ARTICLE 3 for PUBLICATION



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<http://businessperspectives.org/>

E-mail: [head@businessperspectives.org](mailto:head@businessperspectives.org)

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January 18, 2016

**Dinko Herman Boikanyo,**  
Mining organization in South Africa  
(South Africa)

### ACCEPTANCE LETTER

Dear **Dinko Herman Boikanyo,**

We are very pleased to inform you that your paper "Investigating the use of knowledge management as a management tool in the mining industry" co-authored with Prof. Ronnie Lotriet has been accepted for publication in the international journal "Problems and Perspectives in Management".

It is scheduled to be published in the Volume 14, Issue 1 (cont.), 2016.

The article has been peer-reviewed by the Editorial Board of PPM Journal. The journal has been using "double-blind" review since 2003 (the year of journal establishing) because it is the best practice in paper reviewing.

Thank you for your submission.

With cordial regards,

A handwritten signature in black ink, appearing to read 'S. Kozmenko', written over a circular official stamp.



Prof. Dr. Serhiy Kozmenko  
Editor-in- Chief  
International Research Journal  
"Problems and Perspectives in Management"  
Phone: 38-0542-674067  
E-mail: [serhiy\\_kozmenko@businessperspectives.org](mailto:serhiy_kozmenko@businessperspectives.org)

**APPENDIX D: Notice of submission of Article 1**

-----Original Message-----

From: onbehalfof+smjeditorial+wiley.com@manuscriptcentral.com [mailto:  
onbehalfof+smjeditorial+wiley.com@manuscriptcentral.com] On Behalf Of  
smjeditorial@wiley.com

Sent: 18 February 2016 09:43 PM

To: Herman Boikanyo

Subject: Strategic Management Journal - Manuscript number SMJ-16-16454

18-Feb-2016

Dear Mr Boikanyo

Thank you for submitting your manuscript titled "INVESTIGATING THE USE OF STRATEGIC  
MANAGEMENT PROCESS IN THE MINING INDUSTRY" to Strategic Management Journal.

Your manuscript has been assigned the following number: SMJ-16-16454. Please mention this  
number in all future correspondence regarding this submission.

We will advise you of the editorial decision as soon as possible.

Best wishes

Sara DiBari

SMJ Managing Editor

350 Main Street

Malden MA 02148

Phone 781-388-8418

smjeditorial@wiley.com

**APPENDIX E: Notice of submission of Article 4**

From: Index Copernicus [mailto:office@indexcopernicus.com]

Sent: Wednesday, February 10, 2016 3:15 PM

To: Anna Gorynska

Subject: Article submission confirmation

Dear Herman Boikanyo,

Thank for submission of your article:

Title: Investigating Strategic Intelligence as a management tool in the mining industry

Authors: Boikanyo Herman Dinko

Please refer to your manuscript registration number (#25688) in all your official correspondence.

Should you like to check the status of your manuscript please visit the Management and Business Administration. Central Europe website at [mbace.eu](http://mbace.eu)

From the left-side menu select Authors Pathway, login, and then select option My articles. Click on selected title from the list of your submission to check the status of the manuscript, submitted files, messages and other information.

Again, thank you for selecting Management and Business Administration. Central Europe for publishing your work.

Sincerely,

Editorial Office

Management and Business Administration. Central Europe

[mbace.eu](http://mbace.eu)

## **APPENDIX F: Emails from industry experts**

From: [REDACTED]  
Sent: 29 April 2015 04:25 PM  
To: Herman Boikanyo  
Subject:

Dear Herman

Fascinating questionnaire, which has initiated a lot of review and questions amongst myself and my colleagues.

Thanks for including me, and look forward to feedback on some of your findings.

Best wishes

From: [REDACTED]  
Sent: 10 April 2015 03:45 PM  
To: Herman Boikanyo  
Subject: RE: Request to Complete a Questionnaire

Hi Herman

Here is the completed questionnaire. This looks like an interesting study. I look forward to the results.

Cheers

## **APPENDIX G: Author guidelines for Problems and Perspectives in Management Journal**

### Requirements to the manuscripts

#### 1. Abstract preparation guidelines

1.1. The abstract (200-250 words) should reflect the conceptual content of the article. In the abstract the author should give a brief overview of research importance, describe the subject matter and the aim of research, its methodology as well as highlight the most significant results of research.

1.2. Journal of Economic Literature (JEL) classifications that can be found at [http://www.aeaweb.org/jel/jel\\_class\\_system.php](http://www.aeaweb.org/jel/jel_class_system.php), and a few key words about the manuscript are necessary.

1.3. Font - Times New Roman; text size - 12 pts, line-spacing - one-and-a-half.

1.4. All tables and figures should be editable.

#### 2. The paper main body preparation guidelines

2.1. The paper should present the result of independent original research undertaken by the author; it should contain the data never published before.

2.2. The paper should contain a clear description of research objective and its subject.

2.3. The methodology of research should be described in detail.

2.4. The author personal scientific contribution must be grounded in the paper.

2.5. The paper should contain basic suggestions on how to solve the problem under study.

2.6. American English has been preferred to British English.

#### 3. The structure of the paper

3.1. The title of the paper.

3.2. Below, in the centre of the page the name of the author should be printed. Reference to the author's name should be made at the bottom of the page with the footnote marked by asterisk ("\*"). The reference should contain information about the author's degree, position and the place of work as well as contact details (phone number, job or/and personal e-mail).

3.3. Below, the text of the abstract should be printed.

3.4. After the abstract's keywords and JEL classifications should be printed.

3.5. Below the main body of the paper should be placed.

3.6. The main body of the paper should be followed by references.

3.7. References contain the list of literature referred to given in alphabetical order.

3.8. All figures and tables should be printed inside the papers' main body.

#### 4. References in the text

4.1. References in the text are made as follows: (Myers, 2000) / (Myers, 2000; Edwards, 2010) /

Barber, Odean and Zhu (2008) investigate...; the former being the name of the author, the latter -  
edition year.

#### 4.2. Examples of references:

Alchian, A. and Woodward, S. (1987). Reflections on the Theory of the Firm, *Journal of Institutional and Theoretical Economics*, 143, pp. 110-136.

Berle, A.A. and Means, G.C. (1932). *The Modern Corporation and Private Property*, New York: Macmillan, 418 p.

Cremers, K. and Nair, V. (2005). Governance Mechanisms and Equity Prices, *Journal of Finance*, 60

## **APPENDIX H: Author guidelines for Strategic Management Journal**

### **9 Strategic Management Journal**



- a Edited By: Sendil Ethiraj, Alfonso Gambardella, Constance Helfat
- b Online ISSN: 1097-0266
- c Associated Title(s): [Global Strategy Journal](#), [Strategic Entrepreneurship Journal](#)

#### **Author Guidelines**

##### ***SMJ* Guidelines**

To be sure that manuscripts move through the copyediting process please observe the following guidelines:

**Title Page:** Please list the full names, titles, and affiliations (with complete addresses) of all authors, including e-mail, telephone, and fax information on the title page. A **running head** of your choice (a short title of up to 60 characters to be used at publication) should appear on the title page as well. For indexing purposes, kindly include five (5) **keywords** that describe your paper.

**Abstract:** Please supply a one-paragraph **abstract** of up to 125 words for all articles, research notes, and commentaries. This, as you know, is a precise summary of your entire paper, not just your conclusions, and must be able to stand alone, separate from the rest of the paper. *SMJ* policy is that no citations to other works are used in the abstract.

**Acknowledgements:** The names of any sponsors of your research, including grant numbers, and/or people you would like to thank, may be included in an **acknowledgements** section that should appear immediately before your list of references when your paper is accepted for publication.

When submitting a paper, **acknowledgements** should be included **ONLY** on the title page and not in the text of the paper.

### **General Style:**

The suggested limit for paper size is 35 pages, which includes figures and tables and no more than **40 pages in total length**. References should be single-spaced to conserve manuscript space. The language of the journal is American English. Please be sure that your paper is double-spaced and uses a 12-point readable font and 1-inch margins on all sides. Your text, including titles of sections, must be left-justified. **Research notes should not be over 20 pages in length** including title page and abstract, text, figures, tables and references.

- Headings and subheadings are flush with the left-hand margin and the first line of the initial paragraph appearing under each is also left-justified. Other paragraphs in a section are indented.
- In subheadings, only the first word is capitalized.
- Do not number sections.
- Do not use ampersands (&) unless it is a commonly used expression (e.g., R&D), part of a universally known product (e.g., M&Ms), or included in a company name (e.g., Standard & Poor's).
- Commas appear before the final 'and' (also 'or') in a series.
- Double, rather than single, quotation marks are used.
- Percent is spelled out in regular text, but a % sign is used in parenthesized text and figures.
- En dashes (–) rather than hyphens (-) are used to denote a range, for example, 1996–2000; pages 124–155.
- Em dashes (—) rather than hyphens (--) are used to separate a thought or phrase from the surrounding sentence. The sentence should be able to stand alone if the material separated by em dashes were removed.
- Commas and periods always appear inside quotation marks, even if those quotation marks are used to signify the special definition of a word or phrase.
- Commas are used in numbers of 1,000 or higher.
- Indicate in the text where tables and figures are to appear, for example, 'Insert Table 1 here.'
- Numbers one to nine are spelled out and numbers 10 and above appear as numerals. The exceptions are when numbers refer to ratings, code numbers, or begin a sentence.
- If a sentence begins with a number, the number must be spelled out. It is usually easier to rephrase the sentence.
- Footnotes, rather than endnotes, are incorporated into the text.

- The journal uses italicized rather than underlined text.
- Blocks of long quotations are indented and single-spaced.
- *et al.* is always italicized.
- Spell out all abbreviations at first use in the body of the article and use abbreviated forms thereafter, for example, return on investment (ROI). If an abbreviated form is used only once, it should be spelled out. This is for the benefit of readers, including students, some of whom may not be familiar with the meanings of all abbreviations.
- A zero (0) always appears in numbers less than 1 (e.g., 0.15, not .15). This holds true for tables and figures as well as within the text and footnotes.
- Example of *SMJ* style: In the United States; U.S.-based; in the U.S. economy.
- Appendices are placed after references. If there is only one Appendix, no number is needed after it (i.e., Appendix 1).

**Figures and tables:** Please do not incorporate your figures and/or tables into the text of your article other than a separate line, such as ‘Insert Table 1 here,’ where appropriate. Figures and tables should appear at the end of the manuscript after the references section. Do not embed other programs, such as PowerPoint, into the article.

- Figure numbers and titles appear centered below the figure, while Table numbers and titles appear left-justified above the table. Only the first word of a title is capitalized.
- In tables and figures, only the first word in column and row titles is capitalized.
- Within tables and figures, a zero (0) always appears in numbers less than 1 (e.g., 0.15, not .15).
- Table values are to be aligned on the decimal except where values differ widely, such values should be centered (this can, for example, apply to the N,  $R^2$ , and F values in the final rows of a table).
- You may have your figures published in color; however, Wiley may charge you to do so.

**Reference and citation style:** *SMJ* uses the author-date style of citation. Citations in the text appear as name, date within parentheses, and listed alphabetically at the end of the paper. When a cited work has four or more authors, the form (main author et al., year) is to be used. Three or fewer authors should be written out at the first text citation and et al. used thereafter (italicize et al., whenever used). When reference is made to more than one work by the same author(s) published in the same year, identify each citation in the text in the following manner: (Collins, 2005a, 2005b). Online citations should end with the date of access. Please be sure that cited works that are chapters

in a book or articles in a magazine include page numbers. References should contain titles and subtitles. If necessary, cite unpublished or personal work in the text, but please do not include it in the reference list.

## **APPENDIX I: Author guidelines for Management and Business Administration. Central Europe**

### **Preparation of the Text**

#### Basic Information

The text should contain information about the Author: name, surname, academic title, place of work, mailing address and e-mail.

#### **Text Format**

The length of the paper should not exceed 22 pages; the minimum length is 11 pages of standard typescript (A4 size; font Times New Roman; size 12; line spacing 1.5, margins 2.5 cm). In case of a review the submitted material length should not exceed 6 pages. The texts should be submitted in Word format, charts - in Excel. Tables, figures and illustrations must be clearly described and included in separate files; their location should be indicated in the text. In case the text contains images, it is recommended to send in the originals.

The Authors are responsible for obtaining the necessary authorizations for the publication of materials for which the copyright is held by a third party.

The materials that are submitted to the editorial office cannot be previously published elsewhere either in whole or in part and cannot be submitted for review to other journals or publishers.

#### **Text Layout**

The paper should contain information about the Author: name, surname, academic title, place of work, e-mail address, as well as the mailing address for sending 5 complimentary copies for the Author and the agreement regarding transfer of authors' rights.

The text should contain the following elements (in the given order):

1. Title – in Polish and English.
2. Structured abstracts – in Polish and English (up to 250 words each). [Click here to see the sample.](#)
3. JEL Classification.
4. Keywords (up to 5) – in Polish and English.
5. Introduction, subsequent subheadings, conclusion(s).
6. Footnotes.
7. Bibliography.

#### Bibliography, Quotations, Footnotes

The bibliography should only include items that are cited in the text. Each item in the bibliography should include the assigned DOI number (if it has one) (<http://www.crossref.org/guestquery/>).

The Authors are requested to draw up the bibliography alphabetically and in the following format:

**APPENDIX J: Language Editor's Report**

**DLTS**



1 December 2015

Tel: (018) 293-3046

**TO WHOM IT MAY CONCERN**

**Re: Letter of confirmation of language editing**

The dissertation **Investigating strategic intelligence as a management tool in the mining industry** by **Dinko Herman Boikanyo (20947224)** was language, technically and typographically edited. The citations, sources and referencing technique applied was also checked to comply with university guidelines as well as the specific journal requirements. Final corrections as suggested remain the responsibility of the student.

**Antoinette Bisschoff**

Officially approved language editor of the NWU since 1998  
Member of SA Translators Institute (no. 100181)