Determining customer needs for a niche supplier in the mining industry

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ABSTRACT

The richest ever mineral treasure trove discovered in a concentrated area has been found beneath the surface of South Africa. South Africa is known to have one of the lengthiest mining histories in the world referencing back to the late Stone Age. It is, therefore, no understatement that the South African economy has been built on the back of mining. For nearly 150 years, mining has been the driving force behind the South African economy, accounting for 30% of the Johannesburg Stock Exchange and contributing 7.7% to the country's gross domestic product.

With a large amount of ore extracted from underground operations, there is major scope for the development of underground mining equipment locally. The current market is dominated by three major international organisations namely; Sandvik, Atlas Copco and Caterpillar. Additionally, due to continued strained labour relations and political influences in the mining labour force, mining companies are increasing the level of mechanisation at their plants, thereby reducing labour costs and inefficiencies.

The primary objective of this study is to determine the customers' needs within the mining industry across South Africa. Any organisation's success is dependable on its ability to create products that address the customer' needs. It is imperative for an organisation to realise the importance of a consumer's needs and the effect it has towards the organisation's products and services.

The study identified nine factors, all relating to customer needs for the mining industry in South Africa. They are value for money, promotion and distribution, service delivery, products from local Original Equipment Manufacturers, local manufacturing, international purchasing, co-operation, skilled staff and quality and increased business activity. These factors explain a satisfactory cumulative variance of 67%. The Kaiser-Meyer-Olkin measure produced a good value of 0.811, which indicates that the sample is highly adequate. Furthermore, Bartlett's test of sphericity also indicated favourable values. The Cronbach alpha coefficient tested positive (≥0.7) for four of the factors. There are several factors that correlate significantly with one another.

This study aimd to contribute to the local manufacturing market by assisting local firms to identify gaps in the market. Moreover, the findings and recommendations in this document contradict the traditional section of local versus international and state that the management teams of local Original Equipment Manufacturers can capitalise on opportunities in the market.

Keyword: Customer needs, mining industry, local manufacturing, original equipment manufacturers

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LIST OF ABBREVIATIONS

B-BBEE	Broad-Based Black Economic Empowerment
BCE	Before Common Era
EFA	Exploratory Factor Analysis
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
JSE	Johannesburg Stock Exchange
JTBD	Jobs to be Done
KMO	Kaiser-Meyer-Olkin
MEMSA	Mining Equipment Manufacturers South Africa
NPS	Net Promoter Score
OEM	Original Equipment Manufacturer
PGM	Platinum Group Metals

CHAPTER 1: NATURE AND SCOPE OF THE STUDY

1.1 INTRODUCTION

The success of every organisation is dependent on its ability to design products and services that address unmet customer needs (Ulwick, 2017b). An organisation could have superior products and services in the market, but if they don't meet the needs of the customer at the right time and place, they might lose out on an opportunity.

Organisations must, however, appreciate the needs of their customers and ensure that they can accommodate various needs. There is no substitute for knowledge, and understanding your customers' needs will be beneficial to any organisation, providing them with competitive advantages (Entrepreneurs, 2017).

The study aims to determine the customer needs of a selected Original Equipment Manufacturer (OEM) in the mining industry within South Africa. Furthermore, this study will assist the OEM to understand their customers better and developed a meaningful relationship with both parties.

1.1.1 The history of mining in South Africa

The richest ever mineral treasure trove discovered in a concentrated area has been found beneath the surface of South Africa (Tourism, 2017). The country is known to have one of the lengthiest mining histories in the world referencing back to the late stone age (Davenport, 2013:5). Lion Cavern is known as the oldest mining operation (41250 BCE) on the high ridge of Ngwenya Mountain in north-west Swaziland. The populations of the late stone age extracted haematite deposits as a source of red ochre utilised for cosmetic and ritual purposes (Chirikure, 2010:11).

Almost every precious stone, metal and mineral known to humanity has been found within South Africa in deposits varying from mere traces to quantities of substantial value. In fact, the country is a world leader in mining and boasts with the world's largest reserves of manganese and Platinum Group Metals (PGMs) (Davenport, 2013:1). South Africa is also, according to the US Geological Survey, a host to some of the most significant reserves of gold, coal, diamonds, chromite ore and vanadium. There is also a great possibility for the discovery of other world-class residues in areas still to be thoroughly explored (Kearney, 2012).

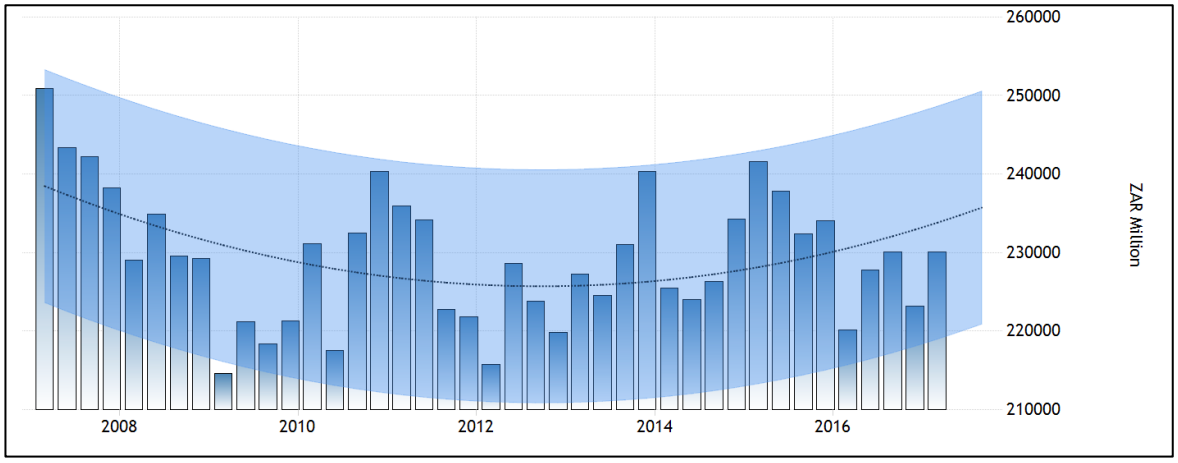
Given the history and mineral wealth of South Africa, it is no surprise that the mining communities have been extremely successful due to the long-lasting nature of its mineral deposits and are important players in the global industry (Sorensen, 2011:625). These mining communities continuously participate in research and development activities and have a very high level of technical and production expertise (Kearney, 2012).

1.1.2 Contribution to the economy

It is no understatement that the South African economy has been built on the back of mining. Mining has been the driving force behind our economy for nearly 150 years (Smith, 2015). The mining sector provides the fuel for a lot of industries that either utilise its products or are suppliers to the mining industry. These industries include but are not limited to energy, financial, engineering, seismic geological and metallurgical services (Africa Mining, 2017). In many ways mining has formed and continues to form the South African political, social and economic landscape and remains a cornerstone of the economy (Goverment, 2016).

The mining sector accounts for approximately 30% of the market capitalisation of the Johannesburg Stock Exchange (JSE) and continues to attract foreign direct investment (FDI) into the country (Kearney, 2012). It furthermore contributes significantly to the employment of the nation. In 2015, 457 698 individuals were directly employed by the mining sector, which represents just over 3% of all employed nationally, earnings approximately R116.7 billion (Chamber of Mines, 2016:6).

Figure 1.1: South African GDP from mining



Source:(Stats SA, 2015)

1.1.3 Mining equipment manufactures

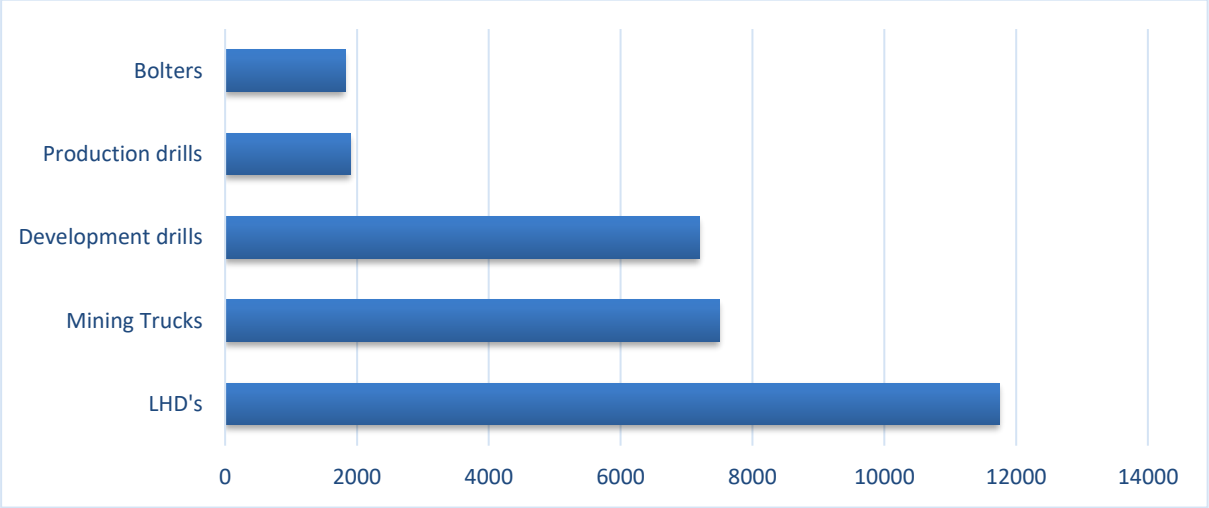
With a large amount of ore extracted from underground operations, there is major scope for the development of underground mining equipment in South Africa. Although non-mechanised methods are still employed on a large scale, mechanisation is a must to ensure a sustainable mining sector for the future. South Africa's mining operations have always been considered as a labour-intensive industry, utilising manual drilling methods with blasting and cleaning on a stop-start basis. With rising labour costs and some of the deepest of mining operations in the world, mechanisation is the only solution to ensure competitiveness in the global mining sector (Chamber of Mines, 2017).

There are predominately five sets of mining equipment utilised in underground operations namely:

- wheel loaders (LHD);
- mining trucks;
- development drills;
- conveyer belts;
- crushers and breakers;
- production drills; and
- roof bolters.

Figure 1.1 below indicates the estimated number of mining machines utilised globally in 2012.

Figure 1.2: Estimate number of machines globally



Source: (Tyblewska, 2012:122)

This equipment is supplied by a vast number of suppliers locally and abroad but is dominated by three major international organisations namely Sandvik, Atlas Copco and Caterpillar. Combined, they have an estimated 88% of the market share of underground mining equipment globally (Tyblewska, 2012:122). According to analysts, the global mining equipment market is expected to reach $150 billion by 2022, a compounded annual growth rate of 7.9% from 2016 to 2022 (Singh, 2016a:2).

There are only a few local original equipment manufacturers (OEM) in South Africa, namely:

- Rham Equipment;
- Aard Mining;
- Fermel; and
- GHH.

Combined, these OEMs have less than 30% of the market share in South Africa. The majority of equipment currently employed in the South African underground mining sector is imported from Europe and the United States of America. This equipment is designed with advanced technologies and requires a high level of technical skills and expertise to operate effectively. Universities, mining houses and OEMs need to combine forces and focus on the modernisation of existing technologies and mining methods in South Africa. This will provide the baseline of mechanised equipment to be developed specifically for mining operations in South Africa.

The movement towards more mechanised operations will ultimately boost the South African economy. People could be removed from high-risk areas, productivity could increase, and costs reduced within a mining operation. With low volatile mineral prices and a weak currency, this could ultimately assist the South African mining industry to be more competitive with the global mining industry.

1.2 BACKGROUND OF NICHE SUPPLIER

The mining equipment industry consists of some entities, ranging from small to some of the world's largest multinational organisations. Mining equipment is used for underground mining and in the processing of mineral operations. The equipment is mainly utilised to

extract different mineable minerals from the earth. The projected forecast for the use of mining equipment is expected to be promising in the earth moving sector (Newswire, 2014). Effective project agreements aligned with infrastructure development in the private and government sectors are the main drivers for local manufacturing of mining equipment. Improving efficiency, productivity and innovation with technological advancements are the key factors for future success.

The organisation under investigation was established in the 1980s and remains in business today due to its success through innovation and attention to detail. Over the past decade, there has been significant progress regarding technology, versatility and designing of mining equipment. This has resulted in a wider variety from which to choose from, thereby addressing the needs of the customer through substantially increased and available options (Nishino, 2014). The current economic conditions are rather challenging and require focused sales and marketing strategies directed at providing the customer with useful, timeous and accurate information to answer the cost versus benefit question which the customer faces. In doing this, organisations create an environment for the customer to discover, evaluate and gain an appreciation for the product, ultimately addressing their needs and ensuring the customers' continued support in the profitability of the organisation (Graham, 2007).

Price is not the sole determining factor when selecting a suitable supplier. Service, reputation, product quality and suitability are equally important. Customers may well be influenced by the relationships they have established and developed with suppliers. To some extent they might have created a mutually beneficial platform from which they support and promote the business activities of one another. One of the organisation's main focus areas is the product design, but it is evident from research that profitability is directly proportional to the perception of the customers about the supplier's business.

Over the last decade, the organisation has focused on research and development of advanced, cutting-edge technology equipment for the mining industry. Superior products were developed from an engineering and manufacturing perspective, but it lacked backup support from the end user. These products created sound awareness in the market but were technically too advanced for the end users. Modifications and alterations were implemented to accommodate the end users' ability to operate and maintain the equipment. This resulted in time and effort invested in customising the equipment to adhere to the specific needs of the customer to develop and improve the efficiency and

cost-effectiveness of the equipment. Furthermore, this has resulted in a negative effect on profits, since these costs could not be recovered by the organisation. As a result, competitors were able to secure a greater portion of the market with less advanced equipment, and the establishment costs and requirements prevented other competitors from sharing in the available market segment.

1.3 PROBLEM STATEMENT

An organisation's success is dependable in its ability to create products that address the customer's needs. A study by Ulwick (2013:1) revealed that 95% of organisations, marketing and development managers disagree on the needs of their customers. For decades, managers of organisations were ineffective in defining the needs of customers because they confuse customer needs with solutions (Moolla, 2012:102). Customer needs must be distinctly analysed and defined to enable the organisation to be innovative. There are some research techniques developed to assist organisations in successfully defining the needs of their customers. These techniques follow similar steps to define customer needs but can be broken down into three primary categories namely; identity, invent and implement (Edwards, 2008:19).

Several research and empirical studies have been conducted on how to define customer needs with an immense number of different models available to suit the different organisations' types. These models have to be applied to the organisation to establish if there will be a significant increase in sales resulting in profits.

The following research questions materialise from the problem statement mentioned above:

- What is the customer needs for a niche supplier in the South African mining industry?
- What are the perceptions of the local mining companies towards local suppliers?
- What is the quality of the products supplied by the local manufacturers?
- What is the value of the local supplier's products (a function of price and product)?
- How is the aftermarket service of the local suppliers?
- Who are the main rivals of the organisation?

1.4 RESEARCH OBJECTIVES

1.1.4 Main objectives

The main objective of this study is to determine the needs of coal, platinum, gold and chrome mines for a local niche supplier.

1.1.5 Secondary objectives

The main objective is achieved by the following secondary objectives:

- Perform a literature study to conceptualise customer needs in the mining industry;
- Determine the perceptions of mining companies towards local OEMs regarding quality, technology and availability;
- Determine the level of service required by the mining industry for local OEMs;
- Measure the level of service delivered to the mining industry for local OEMs;
- Determine the shortcomings and problems with the current equipment in the mining industry;
- Identify new technologies currently researched or employed in mining operations; and to
- Perform an in-depth analysis of the local OEMs competitiveness and service levels in the current market.

1.5 RESEARCH METHOD

This study consists of two phases, namely a literature review and an empirical study.

1.1.6 Phase 1: Literature review

The study employed the full access ability of the North-West University's library services to locate relevant literature. This includes, among others, typical databases, hard copies, and electronic media such as:

- Academic journals;
- Internet articles;
- University supported databases such as EBSCO host, ScienceDirect and others;
- Books;
- Publications;

- Social networks; and
- Dissertations and discussion papers.

1.1.7 Phase 2: Empirical research

Phase 2 consisted of an empirical study that collects primary data from the specific business environment. A quantitative research design employed respondents measuring instruments and statistical analyses to achieve the objectives set in this study.

1.5.1.1 Research design

The research was designed to enable meeting the objectives set specifically; this is required for a scientific study. However, the design also allows expansion of the study if so needed to adapt and explore interesting new avenues that may realise as the study progresses.

A quantitative research design was selected because it enables the interpretation of large numbers of data by utilising numbers and statistical calculations to better provide a picture of the OEMs in the mining industry. The study featured descriptive statistics and factor analysis. Descriptive statistics is concerned with analysing the data and numerically giving the frequency (Welman et al., 2005:231). It is utilised to describe the data with numbers to indicate prevalence and/or extent.

1.5.1.2 Population and sample

The population identified in the study includes mine engineers currently employed by South African mining companies that are active customers of the niche supplier. They are geographically dispersed throughout the borders of South Africa. The total population consists of 500 and 100 engineers in these mines were targeted by a stratified random sample. The sample is stratified according to the number of engineers at the specific mines, while random sampling was used to select the specific respondents in each mine.

1.5.1.3 Measuring instrument

A structured questionnaire was designed and used as measuring instrument. The questionnaire comprised Likert scale questions to acquire the necessary data for this study. The questionnaire is divided into two sections namely, Section A: Demographics and, Section B: Customer needs.

1.5.1.4 Data collection

Questionnaires were distributed via google forms, and the respondents' involvement were entirely voluntary. The first step was to gather all the completed questionnaires from the respondents. The raw data was subsequently converted into the numerical format and plotted by the different applicable theories.

The next step is to test the data for validity and reliability with the Cronbach alpha method. This test was developed by Lee Cronbach in 1951 to assess interlinked reliability for each variable expressed as a number between 0 and 1. The Cronbach alpha is a measure of internal consistency, which describes how closely related a set of items are as a group (Tavakol & Dennick, 2011:53). There are numerous reports regarding acceptable values of Cronbach. However, it was found in previous research that lower reliability coefficients of 0.58 may be sufficient for analytical scrutiny (Bisschoff & Moolla, 2012:104).

1.5.1.5 Statistical analysis

The statistical analysis was carried out in co-operation with the statistical consultation service of the North-West University. Various statistical techniques were applied to analyse the data in a quantitative format.

1.6 CONTRIBUTION OF THE STUDY

The results of this study will be beneficial for both the organisation and the clients. The organisation will understand the needs of their customers better, thus helping the organisation to supply products specifically tailored to their clients' needs in the mining industry. The big question is whether this will increase or maximise profits of the reputable supplier. The study could assist management in making better-calculated decisions. It is management's prerogative to utilise this study to develop their strategies. These strategies will have a significant impact on the business and the future thereof, but more importunately the organisation will have tangible data on their customer needs. Furthermore, the feedback can assist the organisation to improve their existing equipment, making it more cost effective which could increase profits for the client and the organisation.

1.7 CHAPTER DIVISION

This study consists of four chapters. These chapters are:

- **Chapter 1: Nature and scope of the study**

  This chapter comprises an introduction to the research topic and provides the background of the study. The problem statement briefly outlines the concepts and objectives that are set out to address the problem statement. Finally, the research method will be discussed.
- **Chapter 2: Literature review**

  This chapter provides a review of the literature on both primary and secondary sources relating to customer needs for the mining sector. Different theories are discussed and evaluated to determine the customers' needs.
- **Chapter 3: Research methodology**

  In this chapter, the research design and methods that will be employed during the study is discussed in detail.
- **Chapter 4: Analysis and discussions**

  The chapter deals with the empirical results and analysis based on the outcomes of the survey questionnaire.
- **Chapter 5: Conclusions and recommendations**

  The summary and conclusions of the study are presented, together with contributions, limitations and suggestions for future research.

1.8 CHAPTER SUMMARY

Chapter 1 outlines the background to the research, the problem statement, objectives and the research method employed in the study.

Chapter 2 to follow, will focus on a literature study to address the set research objectives.

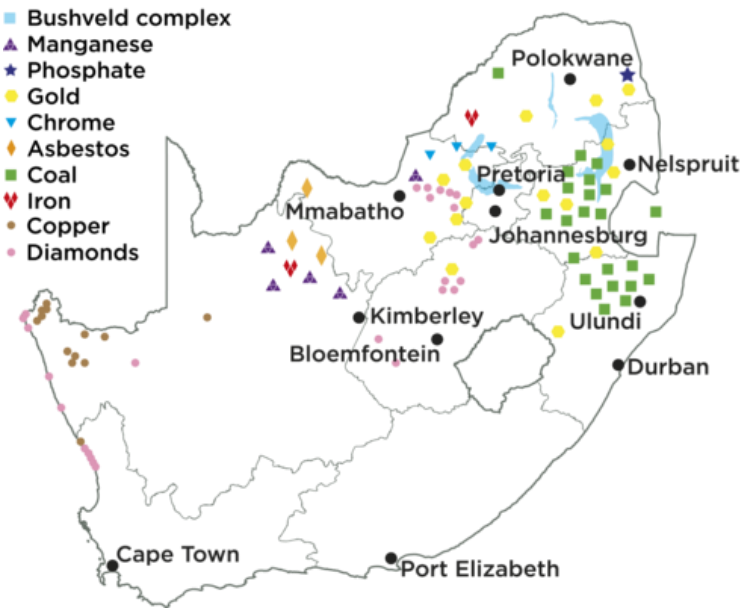
CHAPTER 2: LITERATURE REVIEW

2.1 HISTORY

Mining in South Africa has been a major contributor to the development of the country with its roots from the copper-rich region of Namaqualand in the Northern Cape. In 1852 on the farm Springbokfontein, the first mine was established in the town of Springbok (Davenport, 2013:19). This was followed by the discovery of diamonds in Kimberley in 1871 and the Witwatersrand goldfields in 1884 (Sorensen, 2011:625). However, the intensive exploitation of copper, trailed by diamonds, gold and coal catapulted the South Africa backward economy into the era of modern commercial mining in the second half of the nineteenth century (Tourism, 2017).

South Africa boomed, and for the first time had commodities desperately required by the rest of the world. Immigrants and migrant labourers poured into the country in seek of fortune. Entrepreneurs capitalised on opportunities and businesses were established. Through large-scale exports of its natural wealth, the South Africa economy was not only able to diversify but also industrialise to an unfamiliar degree (Davenport, 2013:460). The figure below illustrates different minerals as well as their locations across South Africa.

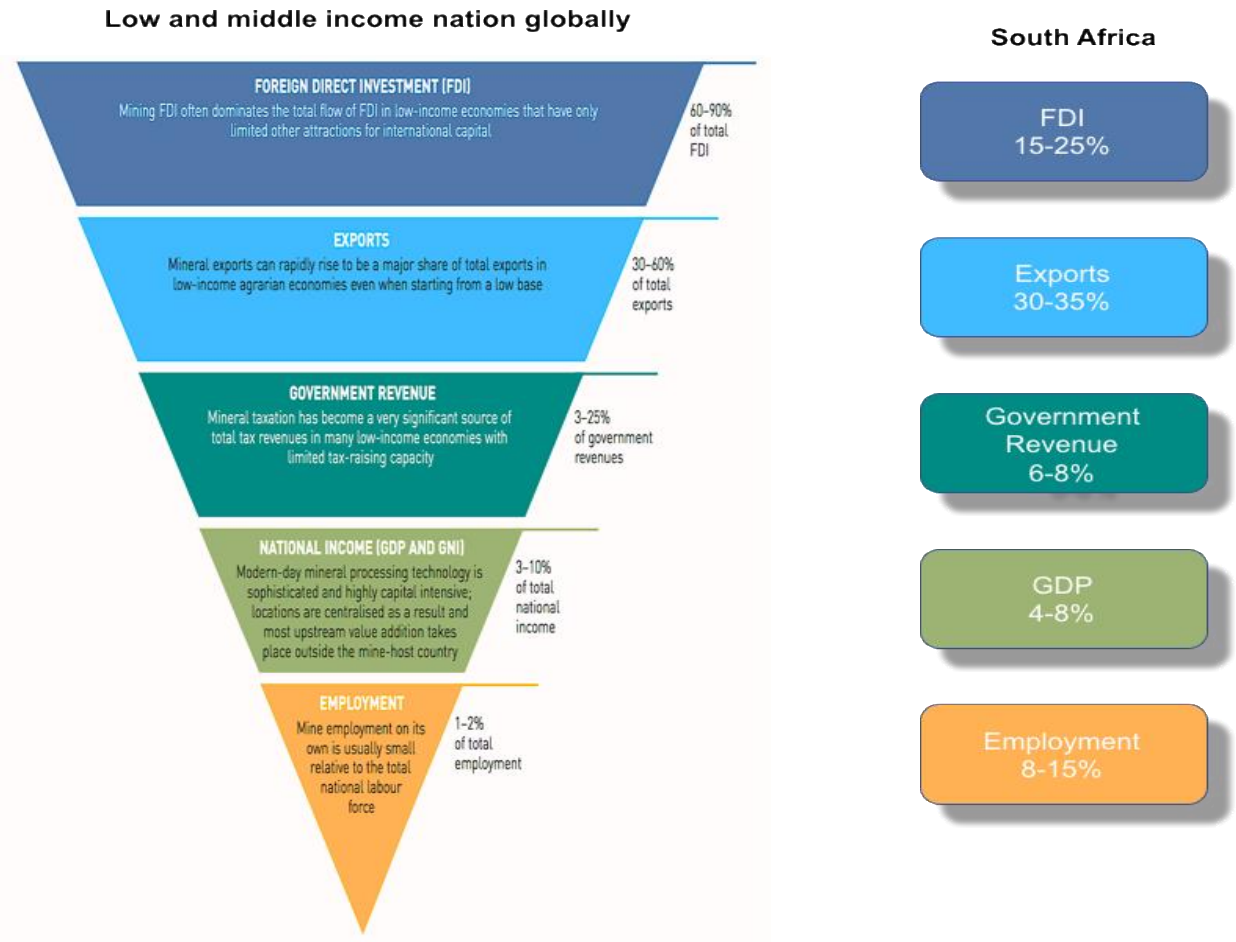
Figure 2.1: South Africa's major mineral deposits



Source: (Davenport, 2013:4)

The figure below is an illustration of the South African mining minerals contribution compared to its global peers.

Figure 2.2: SA mining contribution on upper end compared to global peers – ranked 5th by the International Council on Mining and Metals.



Source: (Baxter, 2016:18)

Although the mining industry has been facing many difficulties over the past few years, it still represents 7.7% of the GDP, a total value of R 419.5 billion in 2015 (SA, 2015).

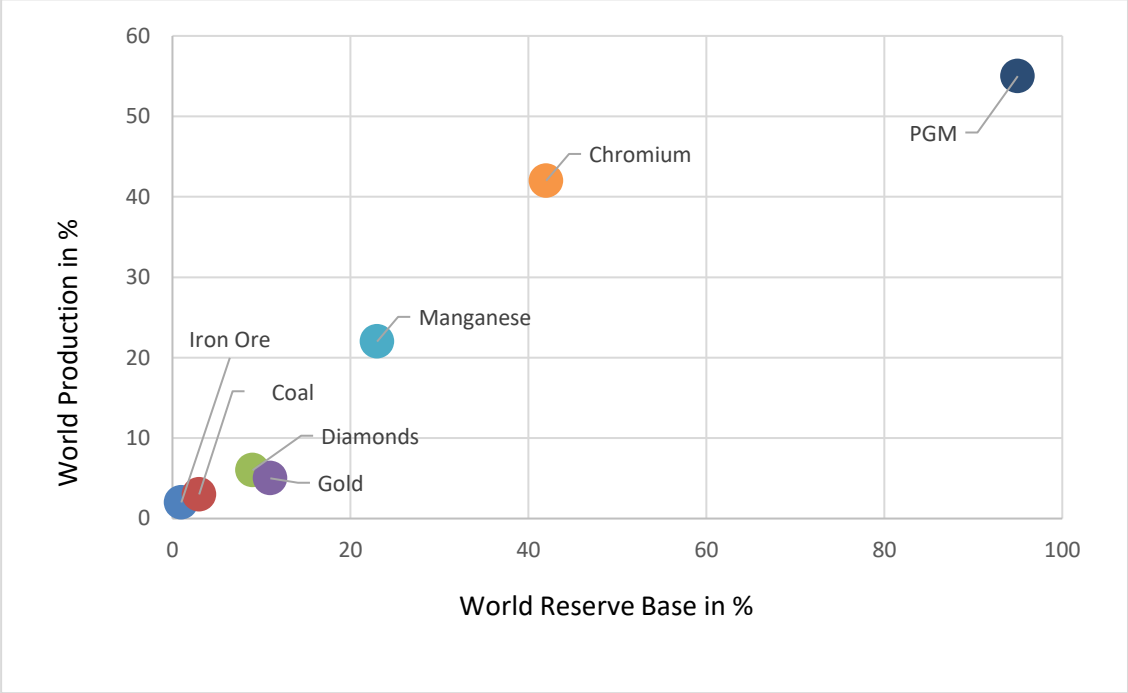
In 2015, the South African mining industry contributed to:

- 1.4 Million jobs;
- Contributes 15% to Foreign Direct Investment;
- Accounts for 29% private investment;
- Critical earner of foreign exchange, more than 50%;
- Accounts for 94% of electricity generation with coal power plants and only utilise 15% of the electricity demanded;

- Accounts for 25% of exports, and is
- The largest contributor to B-BBEE in the economy by value (Baxter, 2016:19).

According to the Chamber of Mines, South Africa's total mineral reserves are estimated at $ 2.5 trillion and the sector contributes to an annual income more than R330 billion (Smith, 2015). Even though the country's market share of global commodity production and reserves have declined in the last few years, the potential is enormous. The figure below illustrates the production and reserves available to South Africa in comparison to the rest of the world.

Figure 2.3: South African production and reserves of major minerals



Source: (Baxter, 2016:20)

South Africa still have large amounts of minerals available, and mining will continue to play a key role in the economy of the country as a foreign exchange earner, and a major employer (direct and indirect) of society. It is therefore important for the organisation to determine their needs and furthermore align the organisation strategy and forecasting for long-term sustainability.

2.2 INTRODUCTION

Announced as the "most significant category innovation since toilet paper first appeared in a roll form in 1890"(Kimberly-Clark, 2001:2), America's first dispensable pre-moistened

wipe on a roll was introduced by Kimberly Clark Corporation in 2001. The product was Cottonelle fresh roll wipes packaged in a dispenser that easily mounts onto the standard toilet-paper holder. Retail sales for the product was forecasted at $150 million for the first 12 months and expected to exceed $500 million in the next six years.

The research Kimberly-Clark conducted appeared to indicate that there was a customer need for a new product to supplement the ordinary dry toilet paper. Surveys revealed that 63% of respondents had experimented with a moist cleaning method after toileting and one out of four used this method on a daily basis (Kimberly-Clark, 2001:3). Based on the research Kimberly-Clarke was convinced that US consumers found the ordinary dry toilet paper to be limited to cater to their real needs. The organisation invested over $100 million in R&D and manufacturing, confident that this was a massive market opportunity. Another organisation that also believed in this market opportunity was Procter & Gamble seeing the buzz generated by Kimberly-Clarke. Procter & Gamble hurriedly followed suit by introducing a similar product.

Unfortunately for these organisations, consumers were not impressed with their products and retail sales were far below the forecasts. Neither Kimberly-Clarke or Procter & Gamble understood their customers' needs despite their market research (AJ Media, 2002). This example is unfortunately not unique and empirical research has revealed that new product failure rates are typically 40% (Castellion & Markham, 2013:976). Some older research quoted new product failure rates of up to 90% (Johnes, 2010; Dillon, 2011:131). A few examples of these products are The Edsel, Ford (1957), Crystal Pepsi, Pepsi (1992), Windows Vista, Microsoft (2007), Nexus Q, Google (2012), Ultrabook, Intel (2012), Watermelon Oreos, Oreo (2014) (CBInsights, 2017).

2.3 DEFINING CUSTOMER NEEDS

Understanding customer needs are critical to the success and sustainability of an organisation (Grönlund *et al.*, 2010:106). In the next sections, different literature theories will be examined to conceptualise needs in a broader context. Needs theories are known to be the key behind the understanding of human behaviour, particularly in the workplace and consumer behaviours. A need can be a psychological define, viewed as an attribute that impels the individual through delivering purpose, meaning and direction towards his/her behaviour (Ward & Lasen, 2009:15).

2.3.1 Individual factors influencing consumer buying decisions

The consumer's decision-making process is complex and does not occur in a vacuum (Lamb *et al.*, 2015:95). There are several individuals and social factors that critically affect the decision-making process of the consumer. These factors influence the recognition of the unfulfilled need, to post-purchase behaviour of the consumer. All these factors are unique and affect the individual consumer's behaviour. Perception, motivation, learning, beliefs and attitudes are the four major psychological factors influencing consumer behaviour.

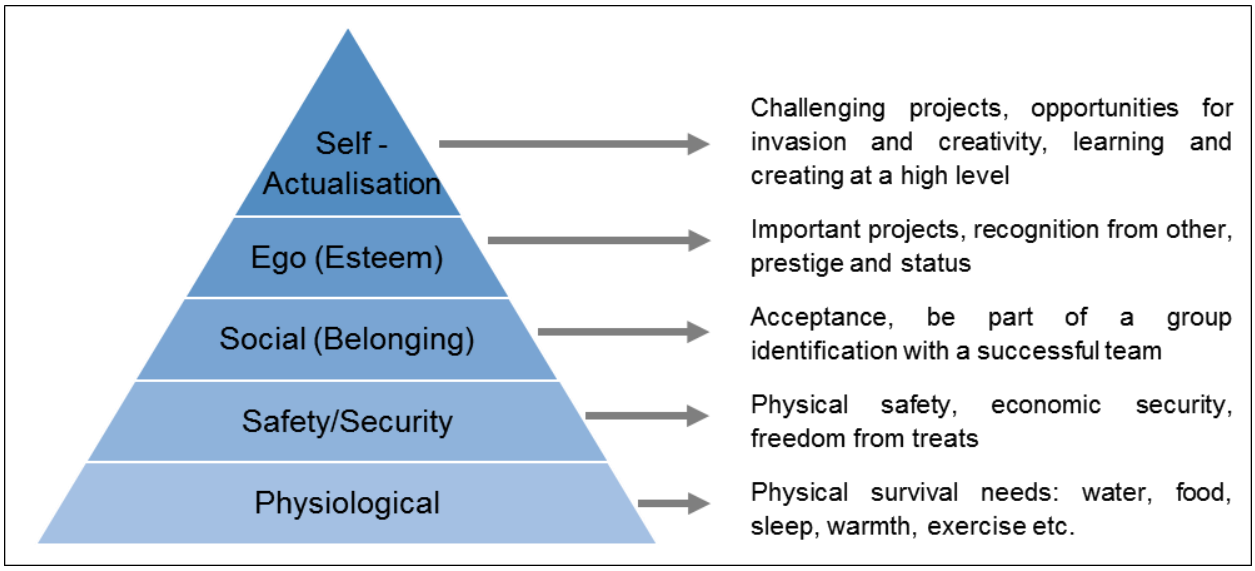
Perception has been defined as the process by which people select, organise and interpret information to form a meaningful picture of the world (Kotler *et al.*, 2005:10). Consumers are constantly drowned with a vast amount of information on a daily basis and cannot perceive and internalise every stimulant in their environment (Lamb *et al.*, 2015:95). The influential factors are relevant to information processing and relate to the consumer's defences namely: selective attention, selective perception and selective retention. The perceptions of the individual will dictate the manner in which he or she reacts to the purchase of a product or service.

It is imperative for an organisation to realise the importance of a consumer's perception and the effect it has towards the organisation's products and services. Mining equipment suppliers offer products and services, which consumers have a particular view of. Thus, consumers develop images of services, products and brands as a result of their perception. Perception has a strategic influence on mining equipment manufacturers because consumers base their decisions on what they perceive instead of being biased (Schiffman *et al.*, 2012:187). It is therefore important for organisations to understand and evaluate their consumers about what type of information they are exposed to, how they interpret such information and their view of the organisation.

Motivation has a major influence on the decision-making process of the consumer and whether he or she will or will not purchase the service or product. All individuals have needs at any given time, and these needs become motives when aroused sufficiently (Lamb *et al.*, 2015:100). Motives are regarded as the initiator for an individual taking action to satisfy their needs. The stronger the drive, the greater the perceived urgency of response. Maslow's hierarchy of needs is a popular theory that addresses the particular time and need of the consumer. These needs are divided and ranked into five categories

namely physiological, safety/security, social, ego and self-actualisation as illustrated in figure 2.4 below (Lamb *et al.*, 2015:99; D'Souza & Gurin, 2016:211).

Figure 2.4: Maslow's hierarchy of needs



Source: (Solomon *et al.*, 2006:99)

In each level, distinctive priorities exist regarding the product benefits, or what a consumer is looking for. Maslow's hierarchy imply that an individual must first satisfy his or her basic needs before progressing to the next higher level of needs (Solomon *et al.*, 2006:99). Marketers exploit these hierarchy needs of consumers to sell their services or products. Organisations must focus on their consumers and the consumers' specific needs.

Learning is the process that creates changes in behaviour through experience (Lamb *et al.*, 2015:101). When individuals act, they learn. The majority of learning theories state that human behaviour results from learning, which occurs through the interaction of drives, stimuli, cues, responses and reinforcement. Learning theories have a significant practical advantage for marketers as they can utilise it to create a demand for a product by linking it with strong drives through using motivating cues and providing positive reinforcement (Kotler *et al.*, 2005:274). If consumers' needs are satisfied, continued reinforcement will normally lead to brand loyalty for the particular brand, product or service, but if the consumer learning experience has been negatively affected, they will respond to the stimuli from competitive brands (Moolla & Bisschof, 2012:101). It is an important factor for marketers to understand the way their consumers learn to design the marketing strategy to developed brand loyalty for the organisation (Schiffman *et al.*, 2012:176). Consumers are doing and learning, through which they develop beliefs and

attitudes. A belief can be defined as a descriptive thought that an individual holds that is true in his or her world, whereas attitude is the individual's consistency to favour or un-favour evaluations, feelings and tendencies towards an object or idea (Kotler *et al.*, 2005:274).

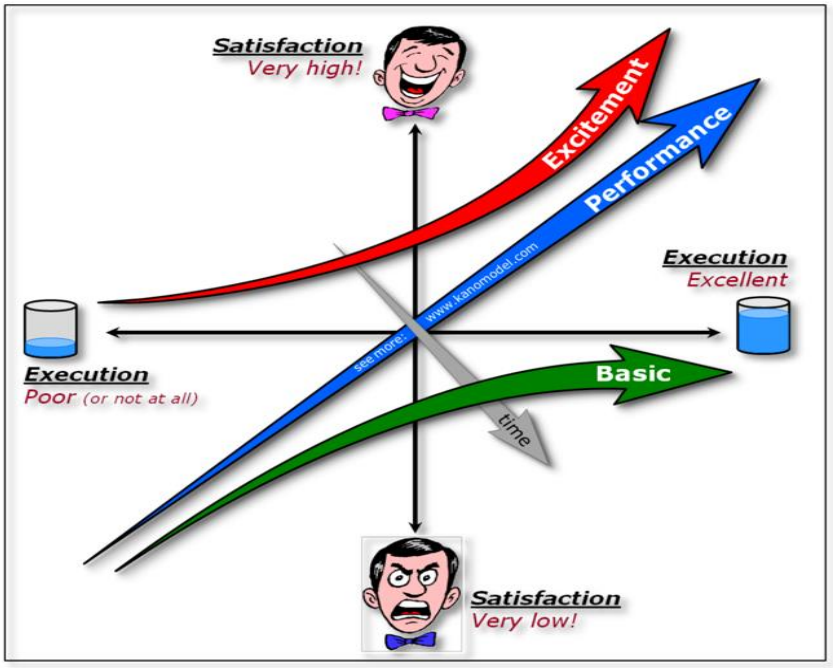
It is difficult to remould an individual attitude, which represents his standards of good and bad, right and wrong and so forth. Consumers buy products based on the beliefs and attitudes they have developed towards a product or service. Thus consumers will not purchase a respectable product if they are of the opinion that the product is inferior (Pickett-Baker & Ozaki, 2008:281). Marketers' objectives are to cultivate a positive belief and attitude towards the products of an organisation. Once these products meet the required goals, positive attitudes merely have to be reinforced, however, if the product is not succeeding, marketers need to adapt their strategy to change the consumers' attitude towards the product (Lamb *et al.*, 2015:102).

2.3.2 The Kano-model

The Kano Model of customer satisfaction is one of the most widely mentioned approaches used to determine customer needs (Witell *et al.*, 2013:1241). Ever since the theory was introduced into the academia in 1984 by Professor Noriaki Kano at Tokyo Rika University, it has gained extensive interest in the industry. Managers have found that newly researched methods have failed to provide similar or consistent results compared to the Kano methodology (Witell & Lofgren, 2007:56). The Kano methodology provides guidance in competitiveness, product development and innovation through applied strategic thinking and business forecasting (Lee *et al.*, 2010:180).

The Kano model was developed by the ideas of Fredrick Herzberg in his theory of attractive quality (Kano *et al.*, 1984:39). Attractive quality theory is valuable to understand the different aspects of how customer's assess products and its offerings. The key concepts of Kano's model are summarised and illustrated in figure 2.5 below. The horizontal (x) axis addresses the degree of execution to which a particular customer need is fulfilled, and the vertical (y) axis addresses the level of satisfaction for the particular need, ranging from very low to very high.

Figure 2.5: Two-dimensional plot of Kano's Model



Source: (Verduyn, 2013:9)

Furthermore, within the two-dimensional plot, customer needs can be differentiated into three different categories namely; basic, performance and excitement needs. The table below describes the different needs in a broader sense.

Table 2.1: The three differentiated categories of customer needs

Needs	Description
Basic (Must-Be)	The minimum requirements the customer expect. They are normally taken for granted. When performed well, customers are neutral, but when performed poorly customer are very dissatisfied. These customer needs must be included and are the price of entry into the market. Completely meeting customer basic needs will not greatly increase customer satisfaction, but if they are absent or below par customers will not react favourably.
Performance (One-dimensional)	The requirements that the customers are able to articulate and are at the top of their minds when making choices or evaluating options. They represent needs for which customer satisfaction is roughly proportional to the performance exhibited by the product or service. These are the most visible in the Kano model. The requirements are easily obtainable because customer talk about them freely.
Excitement (Delighters)	The unexpected and pleasant surprises you provide to your customers. Thus, if this need is completely addressed the customer is delighted but if not, the customer does not really care. These are innovations that set you apart from the rest, also known as unique selling propositions. These needs are the order winners for customers.

Source: (Verduyn, 2013:9)

The Kano model is simple, yet a powerful tool to understand customer needs. An important note to keep in mind is that an exciting need today will sooner or later become a performance need and then eventually become a basic need. What is expected today will most probably not meet the minimum customer requirements in the future (Lee *et al.*, 2010:181).

2.3.3 Net Promoter Score (NPS)

In recent decades, customer experience has gained a prominent place in research by marketing professionals and organisations to help improve service and productivity. The profits from repeated sales of products are fundamental to the long-term sustainability of an organisation (Ruth, 2016:2). It is for this reason that organisations contemplate when it comes to customer experience. Customers who have positive and memorable experiences from dealing with organisations, are more enthusiastic to return to these organisations where they were treated as though they are considered special. The simplest way to determine how customers feel about their experience with an organisation is to allow them the opportunity to inform the organisation.

Organisations need to be able to measure their customer's loyalty. A large number of organisations spend a substantial amount of time and effort in promoting and selling their products to customers. After the customer has purchased the product, organisations tend to sit back and hope for the best (Mostert *et al.*, 2016:25). Measuring customer loyalty will enable organisations to manage their customers better and strategically align business decisions. Customer loyalty can be used as a gauge to establish how well an organisation or its products are positioned to either grow or shrink based on future earnings (Sauro, 2015:20). There are some factors to take into consideration when determining the best metric to measure customer loyalty. Such factors include the industry, organisation and type of product or service, but for the majority of organisations, measuring the customer's intent on repeatable purchases and on their enthusiasm to recommend the organisation or its products to others, provides a solid base (Sauro, 2015:20).

In 2003, by asking a single question, Frederick Reichheld discovered through two years of research, the organisation can determine the level of their customer's loyalty (Reichheld, 2003:2). He created a new advocacy equation called the Net Promoter Score (NPS). The NPS became a popular metric within organisations to measure customer loyalty through the understanding of word-of-mouth marketing (Deshmukh & Karandikar,

2007:40). Based on the single question: “On a 0-10 scale, how likely is it that you would recommend us (or this product or service) to a friend or colleague?”, Reichheld tested a variety of questions on several organisations to determine how well the answers correlate with customer behaviours but found that this one single question has superior results in comparison to the rest (Reichheld, 2003:2).

The NPS classify customers based on their rating (0-10), into three groups namely: detractors, passives and promoters. These groups are further discussed in table 2.4.

Table 2.2: Net Promoter Score groups

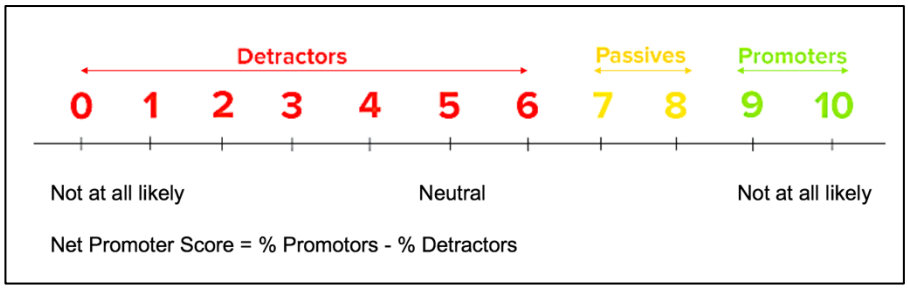
Group	Score	Description
Detractors	0-6	They are not particularly inspired by the product or the service. They, with all likelihood, won’t purchase again from the company, could potentially damage the company’s reputation through negative word of mouth.
Passives	7 or 8	They are somewhat satisfied but could easily switch to a competitor’s offering if given the opportunity. They probably wouldn’t spread any negative word-of-mouth, but are not enthusiastic enough about your products or services to actually promote them.
Promoters	9 or 10	They love the company’s products and services. They are the repeat buyers, are the enthusiastic evangelist who recommends the company products and services to other potential buyers.

Source: (Medallia, 2017)

The NPS can be determined by organisations through the following three-step process:

1. The organisation needs to ask their customer “on a 0 -10 scale how likely is it that they would recommend them (or their product or service) to a friend or colleague”?
2. Determine the numbers of detractors, passives and promoters and compute the propositions.
3. Calculate the NPS by subtracting the percentage detractors from the percentage promoters. Figure 2-6 illustrates a summary of the three-step process.

Figure 2.6: Net Promoter score



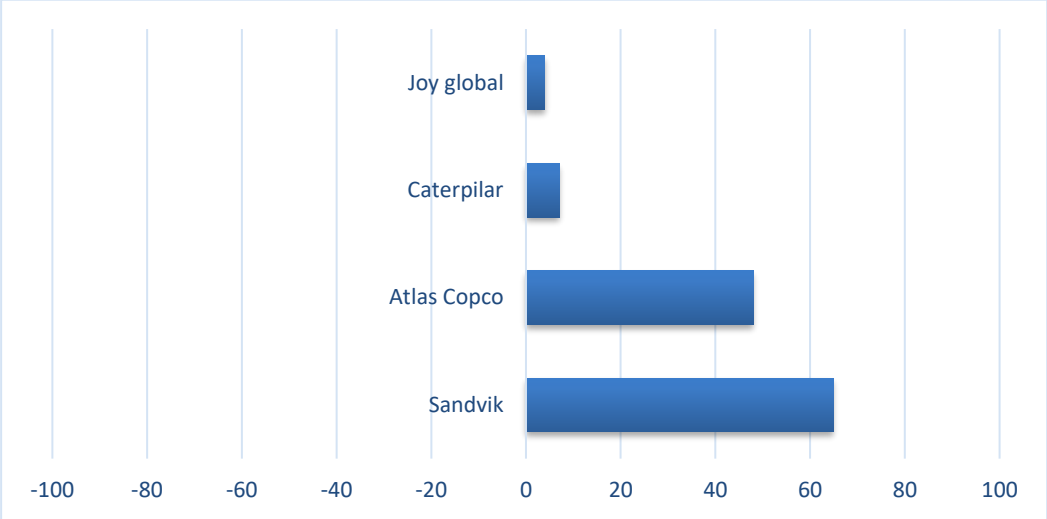
Source: (Markey & Reichheld, 2011)

Several multinational organisations utilise the NPS scorecard in their industries to assist them in enhancing their customer experience. Good NPS scores according to the global NPS standards would be anything above 0, 50 and above are considered to be excellent and 70 and above as world class. The range of NPS scores are from -100 to 100, thus any positive score would mean that the organisation has more promoters than detractors.

A great example was Netflix in February 2011; they had a “world class” NPS score of 73%. The organisation took a strategic decision within to divide its home delivery of DVDs and streaming service into two companies. This internal decision made their customers very unhappy, and their NPS score plundered to 7% (Sauro, 2015:20). Another good example is how Avaya turned around their customer rating, an article from Harvard Business Review. The organisation experienced growing pains evolving from the $475 million mergers with Nortel, and was facing lingering customer disappointment. They had an NPS score in the 20s, which would suggest they would find it difficult to retain their existing customers if they left it alone to grow on word-of-mouth. The CEO of Avaya, Mr Kevin Kennedy realised the greater problem behind the low NPS score and knew a radical change was needed. By introducing new strategies, Avaya was able to align themselves with the customer needs and move their NPS score up to 65% in just five years (Neren, 2016:3). Once again, another example to illustrate the importance of understanding your customer needs.

Figure 2.7 illustrates the net promoter scores of international competitors in a bar chart format. It is evident that these organisations have fairly good NPS values.

Figure 2.7: Net Promoter Scores of international competitors in 2017



Source:(Guru, 2017)

There is, unfortunately, no data available for the local OEMs and therefore benchmarking is done on an international level. The organisation has never before attempted to conduct such a study on their customers. If the organisation can provide superior products and services to the customers they encounter, they will be able to outcompete these international organisations and improve their chances of building loyalty. Business experts proclaim that when customers feel loyal to the organisation based on treatment, their customer satisfaction increases. These customers are then also more likely to return to the organisation rather than purchasing the same products elsewhere. If the organisation can combine quality goods with high-level service, they can improve customer loyalty and ultimately increase customer satisfaction (Reichheld, 2003:2).

2.3.4 Jobs to be done (JTBD) theory

Innovation can be defined as the process to develop solutions that address unmet customer needs. For organisations to be successful in innovation, they need to uncover all their customers' needs, identify the unmet needs and then figure-out possible solutions that will best address these number of unmet customer needs. The method sounds simple and easy, but unfortunately, within the majority of organisations the sales, marketing and R&D departments simply cannot agree on what a customer "need" is. This is set to be the main cause of failure in innovation (Ulwick, 2017b).

Innovation is and has been a top priority for many organisations but unfortunately also one of the top frustrations for business leaders. McKinsey has researched innovation in 2016 and found that 84% of executives noted that innovation was an extremely important factor to their growth strategy, but an unprecedented 94% were disappointed with their organisation's innovation performances (Christensen *et al.*, 2016:54). More often than not innovation falls short of expectations which on paper makes no sense (Pisano, 2015:1). Currently, the big data revolution has turned the world upside down. Organisations can collect large amounts of data about their customer groups in a short time frame and conduct high-level analysis on it. One would feel that these organisations have enough information to master the innovation process. The majority, still work on a hit and miss basis.

Many organisations' innovation growth are driven by looking backwards. They focus on their existing product range that they already sell and try to improve these products through monitoring the customer behaviour. If they were to focus on the jobs, a deeper understanding would be realised for what drives behaviour, and more opportunities will arise (Moebius & Staack, 2015:4). The innovation landscape can be transformed through this perspective, and furthermore, it will ensure that concepts are associated with customers' true motivations. The first step for the organisation is to develop superior tailor-made products that satisfy the customer's functional jobs. If these products are moreover appealing to the customer (individual or corporation) emotional needs, organisation chances are good to transform these products into a breakthrough success (Ulwick, 2016:36).

The big question is, what are the jobs customers are trying to complete? A job can be defined as the fundamental problem a customer wishes to resolve a particular situation. A good example to explain this phenomenon and show how much clearer the method to successful innovation can be for an organisation is the Ford Motor Company. People were using horses to travel the world. Henry Ford did not study how the individuals utilise these horses but more importantly understood what job they were trying to do. He once said, "If I asked customers what they wanted, they would have said faster horses" (Wunker *et al.*, 2016:3). The well-known and great marketing professor Theodore Levitt taught his students that "People don't want to buy a quarter inch drill, they want a quarter-inch hole!".

The jobs to be done theory (JTBD) states that people buy products and services to get jobs done. While products come and go, the underlying jobs to be done does not go away, and people need products to complete these jobs. These products evolve to help people get more jobs done. Furthermore, the more jobs a product can help a customer accomplish, the more valuable the product becomes. Think of a Swiss army knife or a smartphone; they are both single products that can get some jobs done (Walsh, 2017:2).

The process comprises the following six steps:

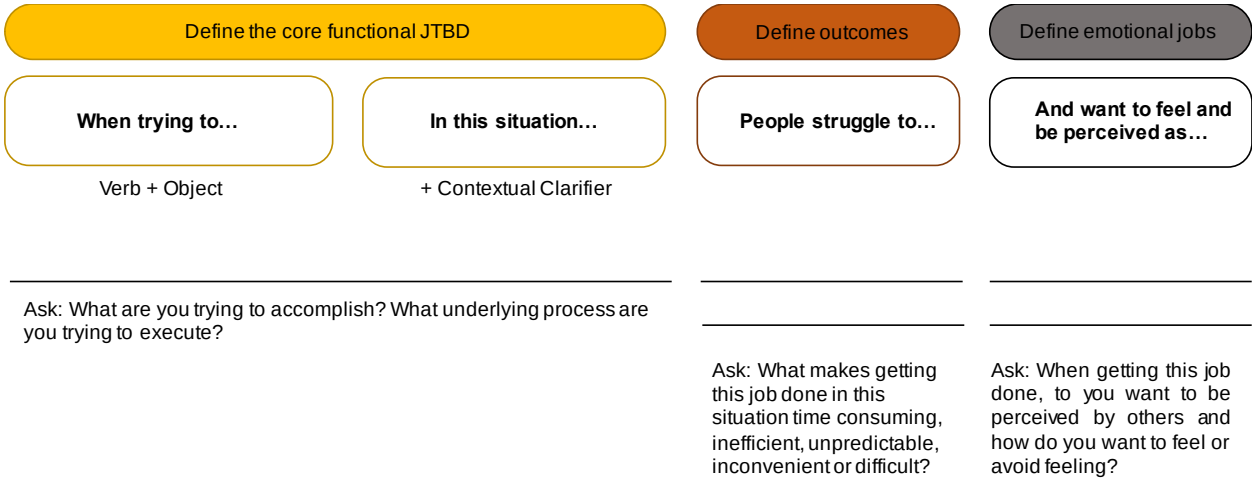
1. Define the customers' jobs to be done;
2. Uncover the customers' needs;
3. Quantify the degree to which each outcome is underserved;
4. Outcome-driven innovation;
5. Align existing products with market opportunities; and
6. Conceptualise new products to address unmet outcomes.

For this study, only the first two steps will be completed to address the objectives set out in chapter 1.

2.3.4.1 Define the customers' jobs to be done.

Organisations frequently make the mistake of defining the markets they serve around technology with their product offerings. Ill-advisedly, this technology will one day become out-dated. It is therefore clear that this is the wrong approach, but unfortunately, it has been repeated by so many organisations over the past decades (Levitt, 1983:1). It is a requirement to predict success that the core functional JTBD is defined precisely. Figure 2-8 define the core functional JTBD at the required level of abstraction.

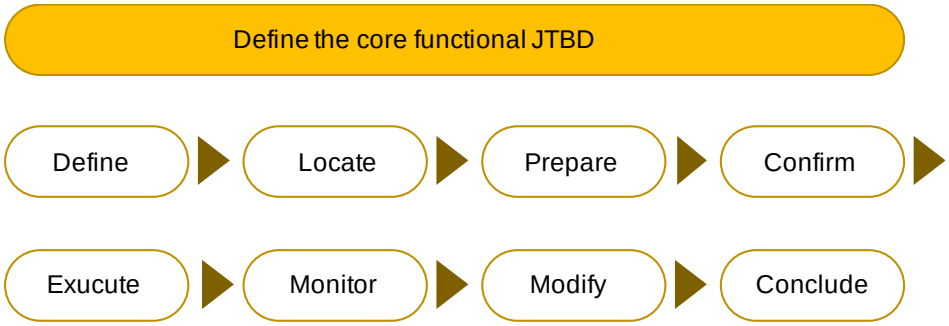
Figure 2.8: The JTBD market discovery



Source: (Ulwick, 2017a:8)

With the core functional job defined, the next step is to create a job map. The job map is a visual representation of the core functional job, divided into processes. This is to assist the organisation in understanding step by step what the job is that the customer is trying to get done. The job map contains eight fundamental steps. Figure 2.9 explains the job map in a diagram format.

Figure 2.9: Job Map



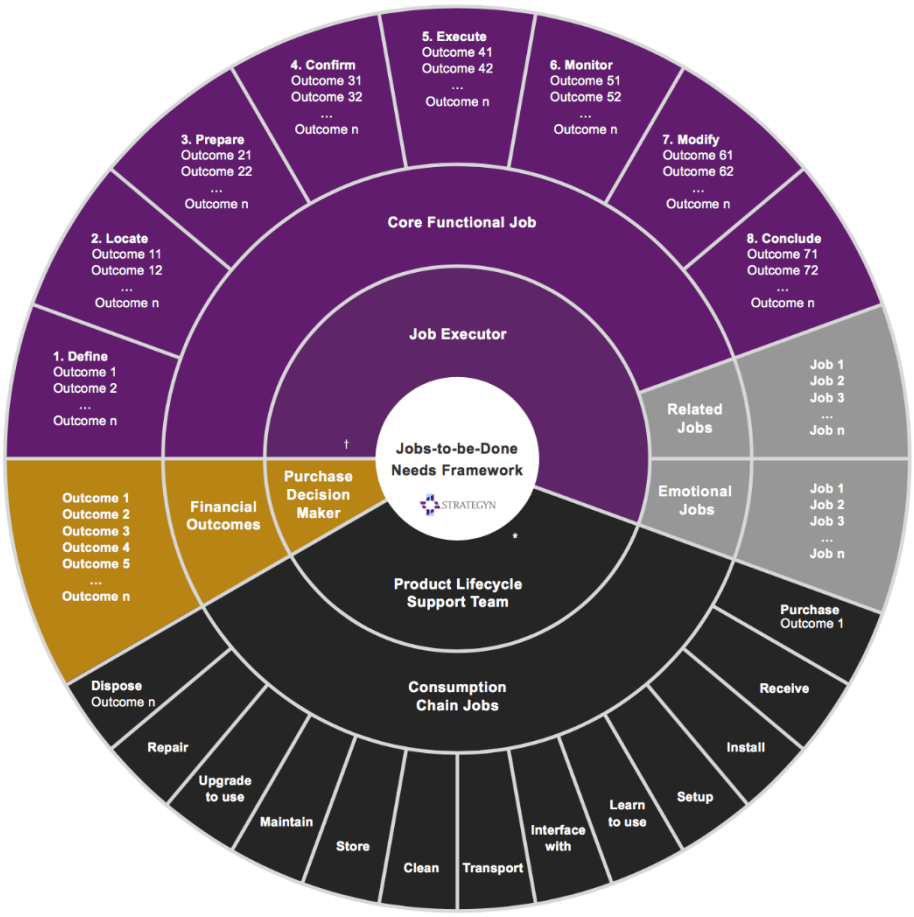
Source: (Ulwick, 2017a:9)

A well-constructed job map enables one to understand what the customer is trying to get done and is not dependant on the current solution the customer is using. Job maps are generated to define vision and direction, discover opportunities and a guide to formulate customer needs.

2.3.4.2 Uncover the customers' needs

Many organisations are under the impression that it is impossible to determine all the customers' needs. Some organisations believe that customers don't know what they want. Thus, suggesting that their customers don't know their real "needs", organisations are unable to articulate the information to win at innovation. Large amounts of customer data are easily obtainable for organisations. The JTBD theory provides an outcome driven innovation process that assists organisations in extracting the customer inputs that are required to make innovation more predictable. Figure 2.10 is the JTBD needs a framework which provides the model for categorising, defining, capturing and organising all your customer needs.

Figure 2.10: JTBD needs framework



Source:(Ulwick, 2017a:11)

The framework assists organisations with a basic model around which to define customer needs. From a set of multilayered and complex inputs, the framework can categorise and organise, show the reason they are captured and show how they should be used. The model challenges the status quo on determining customer needs in a structured method.

2.4 SUMMARY

This chapter has provided literature of the notion of customer needs. Firstly, the chapter provided an overview of the history and background of mining in South Africa. Mining is and has been a major contributor to the GDP of South Africa.

The chapter then continued through elaborating on the significance of customer needs. Different theories models are discussed to form a better understanding of defining customer needs. The theories include; Maslow, Kano, Net Promoter Score and Jobs to be Done. A questionnaire was developed in conjunction with the literature to conduct a quantitative study. The study will assist the organisation to align and developed their strategy to become a niche supplier to the South African mining industry.

The next chapter will present and describe the research methodology.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

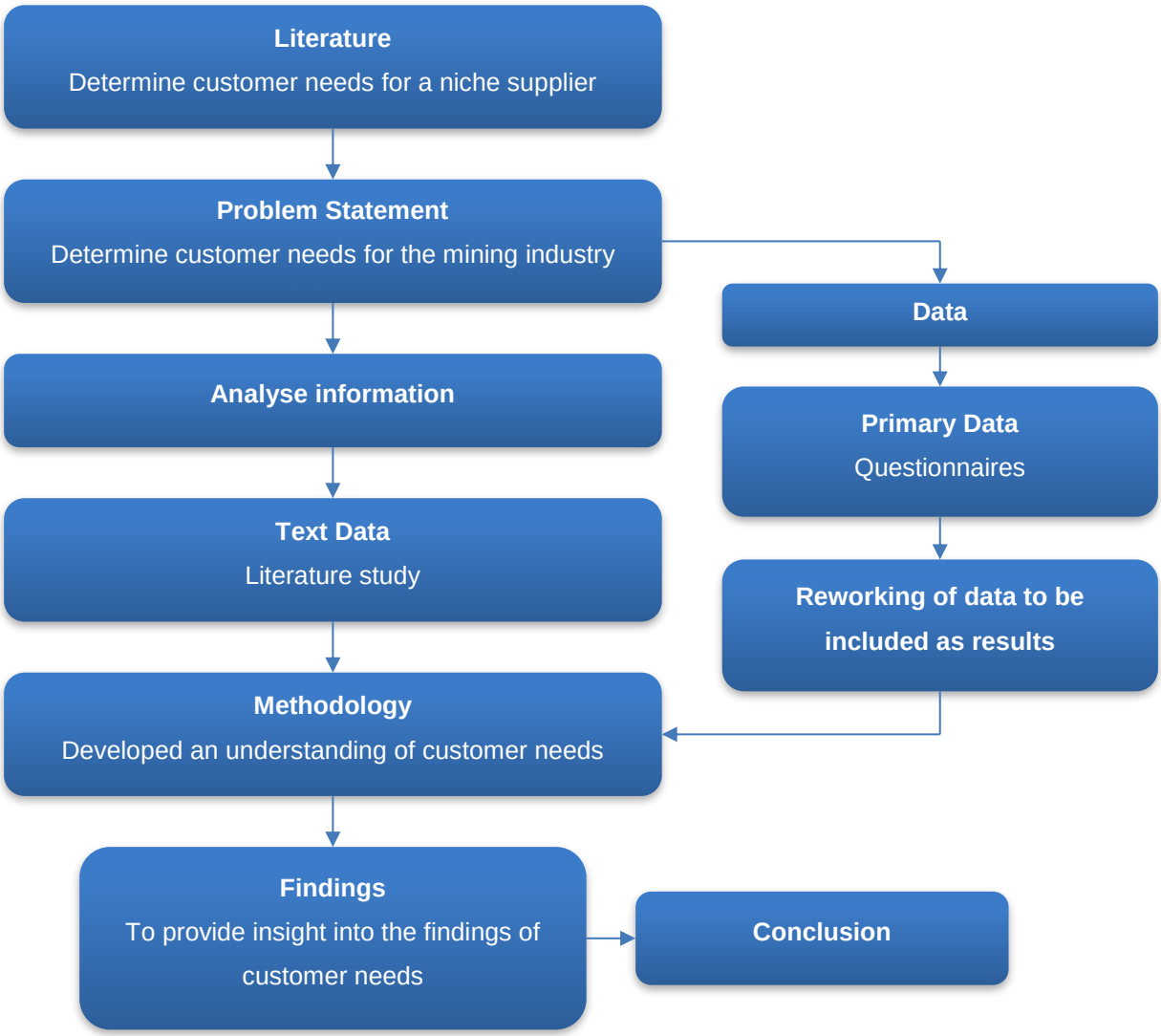
The primary objective of this study is to determine customers' needs within the mining industry across South Africa. It was deemed to be of cardinal importance for the organisation to investigate this matter, to ensure growth and sustainability for the future. To address the primary objective of this study, it is critical to analyse the customer needs through a literature review, including an empirical study. Furthermore, the literature and empirical study will assist in resolving the secondary objectives. A discussion will follow regarding the research process as well as various research design methods. The chapter will be concluded with remarks on the data collection method, population, sampling and data analysis.

Research is a common term that simply involves the process of finding solutions to a specific problem, in a way, thoroughly studying and analysing the methodical situation and features. In short layman terms, advancing the frontiers of knowledge. According to the Advanced Learner's Dictionary of Current English (Anon, 1952:1069), research is defined as "a careful investigation or inquiry specifically through a search for new facts in any branch of knowledge." However, for Kothari (2004:1), research comprises "defining and redefining problems, formulating a hypothesis or suggested solutions; collecting, organising and evaluating data; making deductions and reaching conclusions; and last, but not least carefully testing the conclusions to determine whether they fit the formulating hypothesis". It can, therefore, be concluded that research is defined as applying methods to investigate the formulate research question to contribute and expand the existing stock of knowledge.

3.2 RESEARCH PROCESS

Figure 3.1 below indicates that the research process includes some closely related activities. The process includes ten steps that are symbiotic and interrelated to each other, which constantly overlap rather than following a prescribed structure. The primary step for any scientific research process is to formulate the problem statement to be assessed accurately (Welman *et al*., 2005:12). These ten steps will provide the author with the useful procedural guidance required for effectively conducting the research.

Figure 3.1: Research Model



Source: (Welman, 2005:34)

3.3 RESEARCH DESIGN

After defining the research problem, the next essential step is to formulate the design of the research project, also known as research design. Selltiz (1962:50) describes research design as the arrangement of conditions that will control the collection and analysis of data in a manner that aims to combine relevance to the research purpose. The research design is considered as the theoretical structure within which research is executed; it formalises the outline for the collection, measurement and analysis of data (Kothari, 2004:44). According to Welman *et al*. (2005:52) research design is the overall plan to which we obtain research participants and accumulate information from them. In conclusion, research design provides the researcher with a clear research framework and

supports decisions upon questions like what, where, when, how, and by what means (Baxter & Jack, 2008:556).

There are several types of research design methods that are suitable for each type of research project. The selection of an appropriate design is vital in acquiring accurate data with regards to reliability and validity (Welman *et al.,* 2005:142). The choice of which research and design to apply is dependent on the nature of the problems posed by the research problem. Research complications are the key driver of the study and will determine the methods and procedures to be employed for the proposed research. Respectively, all types of research designs contain a range of research methods that are used to collect and analyse the type of data generated by the study (Walliman, 2011:9).

Table 3.1: Types of research designs

Quantitative Designs		**Qualitative Designs**	
Design Type	**Application**	**Design Type**	**Application**
Experimental	Test an idea, treatment, program to see if it makes a difference. There is a control group and a test group. Individuals are randomly assigned to the two groups. One group gets the treatment (test group) and the other group (control group) does not get the treatment. There is a pre and post-test for both groups in a traditional experimental design.	**Case Study and Historical**	Intent is to study and understand a single situation, which could be a leader, a classroom, a process, program, activity. Collect a variety of material in a specific and bounded time period. This is also used for historical studies, when collecting historical data to understand and learn from the past.
Quasi-experimental	It is the same as experiment in that there is a control and test group. However, current groups are used as is rather than randomly assigning people to the two groups. Both groups receive the pre and post- test in a traditional design.	**Phenomenology**	Studies a human experience at an experiential level such as understanding what it means for a woman to lose a child. It is about understanding the essence or meaning of the experience.
Non-experimental	In this type of research one or more variables, apart from the independent variable in question, could be the actual source observed variation in the dependent variable(s). It provides a numeric description of trends, attitudes, or opinions of a selected population by studying a sample of that population.	**Grounded Theory**	The focus is to develop an understanding of a phenomenon or situation in order to be able to develop a theory/model for items such as factors, a form of interaction, or a process.

Source: (CIRT, 2012:3)

For this study, a quantitative research design has been adopted. Quantitative research is founded on the measurement of quantity (Kothari, 2004:3). The research method is utilised to test the correlation between variables with the main objective being to study and represent the correlation mathematically through numerical analysis. The next section will stipulate the collection method of the required data.

3.4 DATA COLLECTION METHODS

Data collection refers to the method of collecting the data and includes the identification of the applicable measuring instruments that will be utilised for the study. Hahn and Allison (2016), define it as "the process by which scientist, scholars and other researchers gather information to test their hypotheses and arguments". For the researcher, it is important to know the sources of data which he will require for the different purposes. There are some different methods to collect data. These methods include visual observation, textual interpretation, interviews, questionnaires as well as experiments.

The data collection method utilised for this study was a quantitative research method. The tool utilised for the collection of the data from the respondents was a self-developed questionnaire. This questionnaire was distributed through google forms to the selected respondents, and their participation was solely voluntarily. According to Walliman (2011:97), the collecting data method through mailing the questionnaires to the respondents is the most extensively employed in some economic and business surveys.

3.4.1 Quantitative data gathering

A questionnaire consists of a set of questions focused on a specific topic or specialised area. Sanders *et al.* (2009:360) define a questionnaire as a method of collecting data consisting of some questions and other prompts to collect information from respondents. According to Monette *et al. (*2014:161)*,* a questionnaire is a means to collect data through survey research which includes recorded questions that individuals respond to directly on the questionnaire form itself, without the aid of an interviewer.

The questionnaire developed for this study consisted of close-ended questions to generate quantitative data for the study. Annexure A refers to the questionnaire using Likert scales, which was used for this study and is enclosed for ease of reference. The

following criteria were utilised to develop the questionnaire to maximise response rates and ensure validity and reliability.

- Sampling issues, of which includes the sampling size, strategy and the minimum acceptable response rate;
- Questionnaire design, of which includes appearance, question arrangement, wording of the questions and response groups; and
- The data collection method, i.e. email, fax or delivery.

Questionnaires utilised as a research tool have advantages and disadvantages. Table 3.2 is a summary of the advantages and disadvantage of questionnaires. It is important to understand them, especially when self-developed questionnaires are constructed.

Table 3.2: Advantages and disadvantages of questionnaires

Advantages	Disadvantages
Questionnaires are a familiar research tools which allows participants to complete at their own convenience. This furthers allow the participant adequate time to think about the answers.	Normally questionnaires provide low response rates. Follow ups can be time consuming as well as data entry.
Questionnaires facilitate the collection of vast amounts of data with very little effort.	Distribution of question are easy and could result in far more data that can be effectively managed.
The availability of a several participants at a certain place makes possible economy of time and provides a high proportion of useable responses.	Majority of research utilised questioners and they are all competing for time and participants.
Questionnaires can be reused to measure differences between groups of people and are a very reliable data collection tool.	Long questionnaires may result in superficial data due to lack of adequate time.
The researcher administrating the instrument is provided with data, which will assist him with a better understanding, the purpose of the study and further elaborate on the meaning of items that are not clear.	Questionnaires that are mailed has no personal contact and may mean that the response rates will suffer. The researcher will then have to follow up through letters, telephonic calls and other means of chasing the participant at his own expense.
Relationships between data can be identified through well-designed questionnaires. They are particularly suitable to present relationships with data that are easily quantifiable.	

Source: (Vosloo, 2014:339)

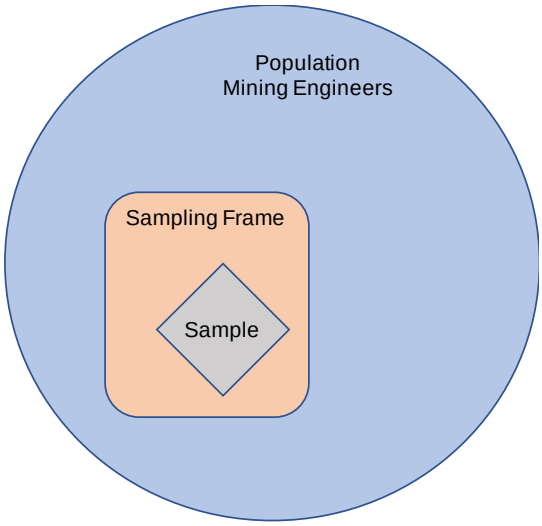
The advantages and disadvantages in table 3.2 have been considered to assist the self-developed questionnaire is suitable and more importantly, guiding the flow of the

questionnaire while ensuring seamless data collection form the target and study population.

3.5 TARGET AND STUDY POPULATION

A population refers to an entire group of people, events, or objects of interest that the researcher wants to investigate (Simuforosa & Wiseman, 2015:61). According to Adams *et al.* (2007:96), a population consists of any distinct set of elements or characteristics. The population in this study are mining engineers employed within the mining groups in South Africa. The population of approximately 500 were identified to receive a questionnaire via e-mail; 104 responded. The population of mining engineers in South Africa are estimated at 500. The sample is a small portion or quantity intended to represent the entire size of representativeness and is considered to be the most basic factors of a sample.

Figure 3.2: Sampling frame about the population and the sample



Source:(Walliman, 2011:94)

A non-probability sampling method will be utilised in this study because the selection of the population elements is not randomly conducted. This sampling procedure does not provide any basis for approximating the probability. All the items in the population would have a uniform chance of being included in the sample. This type of sampling allows the researcher a deliberate choice for the items of the sample eliminating respondents that do not make part of the intended skillset.

3.6 DATA ANALYSIS

Data analysis can be defined as the process of methodically applying statistical or logical techniques to describe, illustrate, summarise, recap, and assess data. According to Shamoo and Resnik (2003:32), various analytic procedures provide a way of drawing inductive inferences from data and distinguishing the signal (the phenomenon of interest) from the noise (statistical fluctuations) present in the data. Various statistical techniques were applied to categorise, analyse and interpret the quantitative data from the questionnaires.

Quantitative analysis utilises mathematical procedures with the data in the form of numbers to investigate their properties. The main purposes of quantitative analysis are to measure, form comparisons, examine relationships, enable forecasting, test hypothesis and control and describe (Walliman, 2011:113). There are numerous statistical tests available to conduct and analyse data. An important factor to take into consideration when the appropriate selection of statistical tests is the number of cases about which you have data. Generally speaking, the greater the number of involved cases in the study, the more reliable results will be found in the statistical tests encountered (Walliman, 2011:114). Validity and reliability will be further discussed in the next section.

3.7 VALIDITY AND RELIABILITY

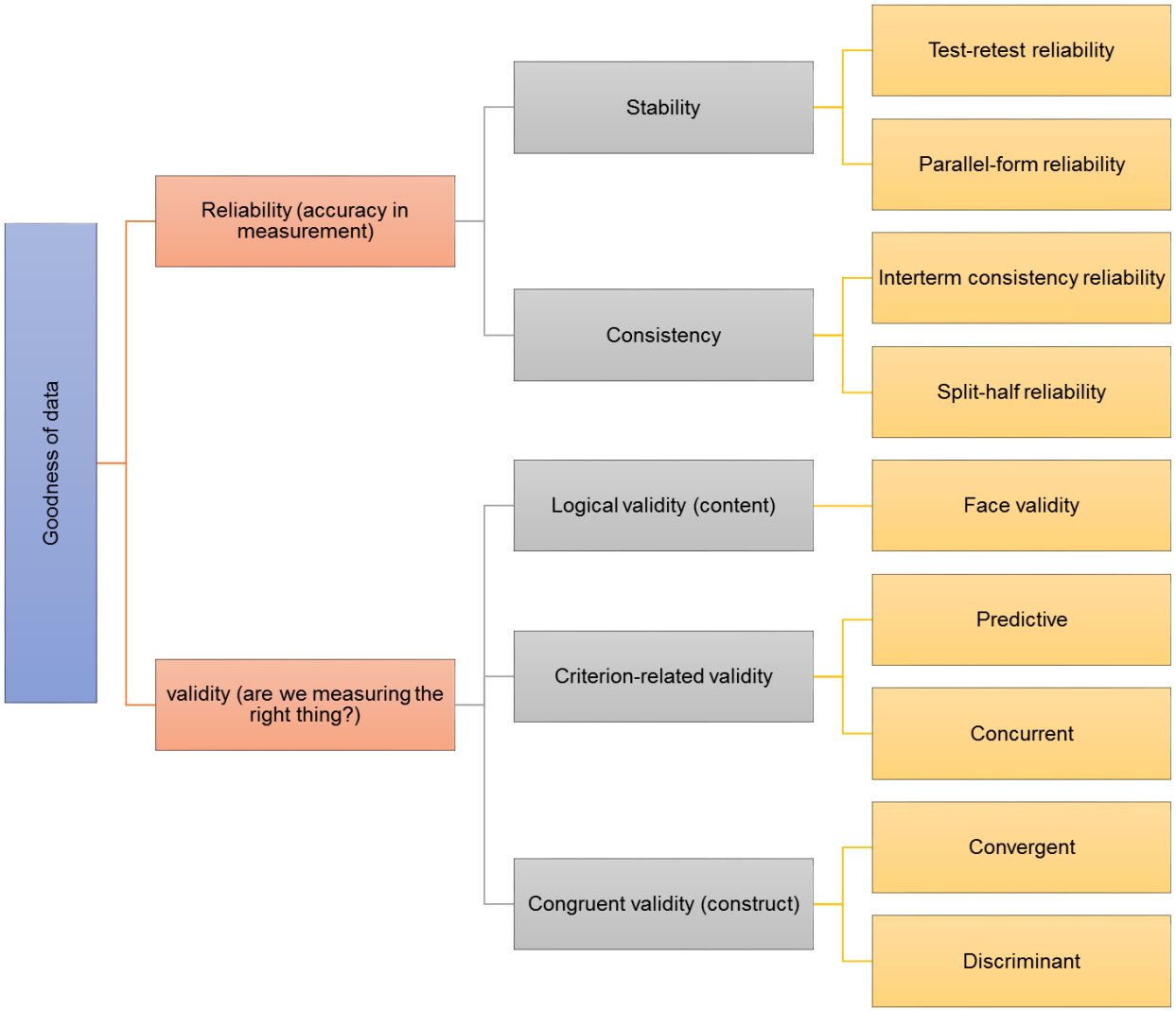
All researchers researching either qualitative or quantitative research should acquaint themselves with the challenges of validity and reliability. The primary concern for all researchers who collect educational data is the validity of the data. According to Vosloo (2014:346) validity is the most important quality of a measured dependent variable as it refers to the extent to which an empirical study accurately reveals the concept it is intended to measure, yielding scores that reflect the true variable being measured. Validity can be assessed by various methods; figure 3.3 elaborates on the different forms of validity.

Reliability refers to the extent to which the researcher data collection or analysis techniques will yield consistent results. According to Welman et al. (2005:9) reliability refers to a consistent and stable measurement, as well as replicability of the data. Reliability can be evaluated by posing the following three questions (Easterby-Smith *et al.*, 2008:109):

- Will the measures yield the same results on other occasions?
- Will similar observations be reached by others?
- Is there transparency in how sense was made from the raw data?

There are different methods to test reliability (accuracy in measurement) which is illustrated in figure 3.3 below.

Figure 3.3: Different types of validity and reliability



Source: (Sekran, 2003:204)

From figure 3.3 it is evident that there are several procedures in existence for determining the reliability of an instrument. The potential for compromising data reliability arises when researchers cannot consistently prove stability, reproducibility or the accuracy of data analysis. For this research, a pilot study was conducted, and the Cronbach alpha

coefficient was used to quantify the reliability of the self-developed questionnaire (measurement instrument).

3.8 RESEARCH ETHICS

Saunders *et al.* (2009:184) relate research ethics to questions retaining to how one formulates and clarifies the following points which include the write up of the research findings in a moral and accountable way:

- the research topic;
- design the research and gain access to the data;
- the collection of data;
- process and storage of the data; and
- analysing the data.

In the opinion of Mouton (2001:238) ethics of science concerns with what is wrong and what is right when conducting research. Thus, it is critical to confirm that the design of the research study is both methodological sound and morally justifiable to all the involved parties. Typical parties for the study include participants, employer and the academic institution.

The following aspects tabled below were taken into consideration for the research study.

Table 3.3: Key principles for ethical research.

1	Ensuring that no harm comes to participants.
2	Respecting the dignity of research participants.
3	Ensuring a fully informed consent of research participants.
4	Protecting the privacy of the research subjects.
5	Ensuring the confidentiality of research data.
6	Protecting the anonymity of individuals or organisations.
7	Avoiding deception about the nature or aims of the research.
8	Declaration of affiliations, funding sources and conflicts of interest.
9	Honesty and transparency in communicating about the research.
10	Avoidance of any misleading or false reporting of research findings.

Source: (Easterby-Smith *et al.*, 2012:95)

3.9 SUMMARY

In this chapter, the research methodology and process was studied for relevance. A questionnaire was developed from the literature review as a measuring instrument to address the research objectives. The questionnaires were mailed to the participants, and the data was collected through google forms. The data was verified and tested for reliability. The study population and sampling was identified by the specified criteria in chapter 1. All ethical considerations were adhered to while collecting data from the participants. The collected data will be analysed, and the finding will be interpreted in the next chapter.

CHAPTER 4: ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

The purpose of this chapter is to report on the results of the empirical study conducted as well as the validation of the questionnaire. The chapter will include statistical analysis and discussions of the results acquired from the target population identified to participate in the study to determine customer needs for a niche supplier in the South Africa mining industry. It will also address the validity, determine the reliability coefficients and elaborate on the significance of the selected criteria and its measuring items.

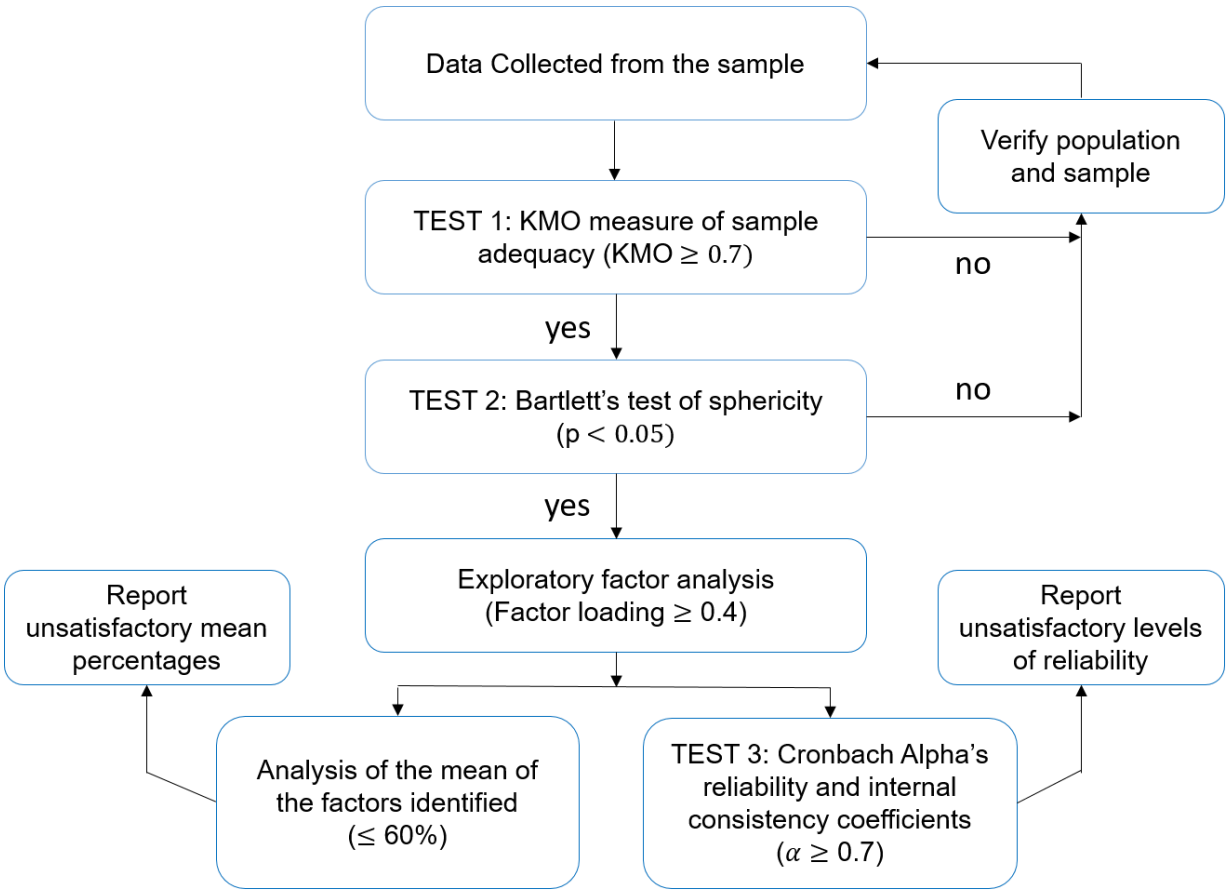
4.2 STATISTICAL ANALYSIS OF DATA

The data was collected using a self-developed questionnaire and analysed with the assistance of the North-West University's Statistical Consultation Services. The statistical program for social science (SPSS) version 24 was utilised for the study. Frequency tables were constructed to examine the demographics of the respondents of the study.

The data were tested for reliability with Cronbach alpha, and exploratory factor analysis (EFA) was used to determine the validity of the research questionnaire. The EFA identified nine underlying (or latent) variables for the empirical study. To determine the suitability of the data for the EFA the Kaiser-Meyer-Olkin (KMO) measuring of sampling adequacy and Bartlett's test of sphericity was employed. Bisschoff *et al.* (2012) suggest that factors analysis of the variables is a good idea for large values of the KMO measure. According to Field (2009:640), a poor KMO score is 0.5, scores between 0.5 to 0.7 are considered average, scores between 0.7 and 0.8 is good, 0.8 to 0.9 very good and excellent above 0.9.

The Bartlett's test of sphericity is an indicator of the significance of the study and thus express the validity and suitability of the data collected to the problem being addressed through the study (Peri, 2012:2). Field (2009:668) suggest that Bartlett's test of sphericity must be ≤ 0.005 for factor analysis to be endorsed. The KMO and Bartlett's tests were found suitable to progress with the factor analysis. Figure 4.1 below is an illustration of the decision diagram followed for the statistical method.

Figure 4.1 Decision Diagram



Source: Adapted (Naidoo, 2011:19)

4.3 RESPONSES TO QUESTIONNAIRES

The questionnaire was distributed the active engineers in the mining industry within the borders of South Africa. In accordance with the study population, the total number of respondents was 104. The results of the questionnaire are presented in Table 4.1 below.

Table 4.1: Questionnaire responses

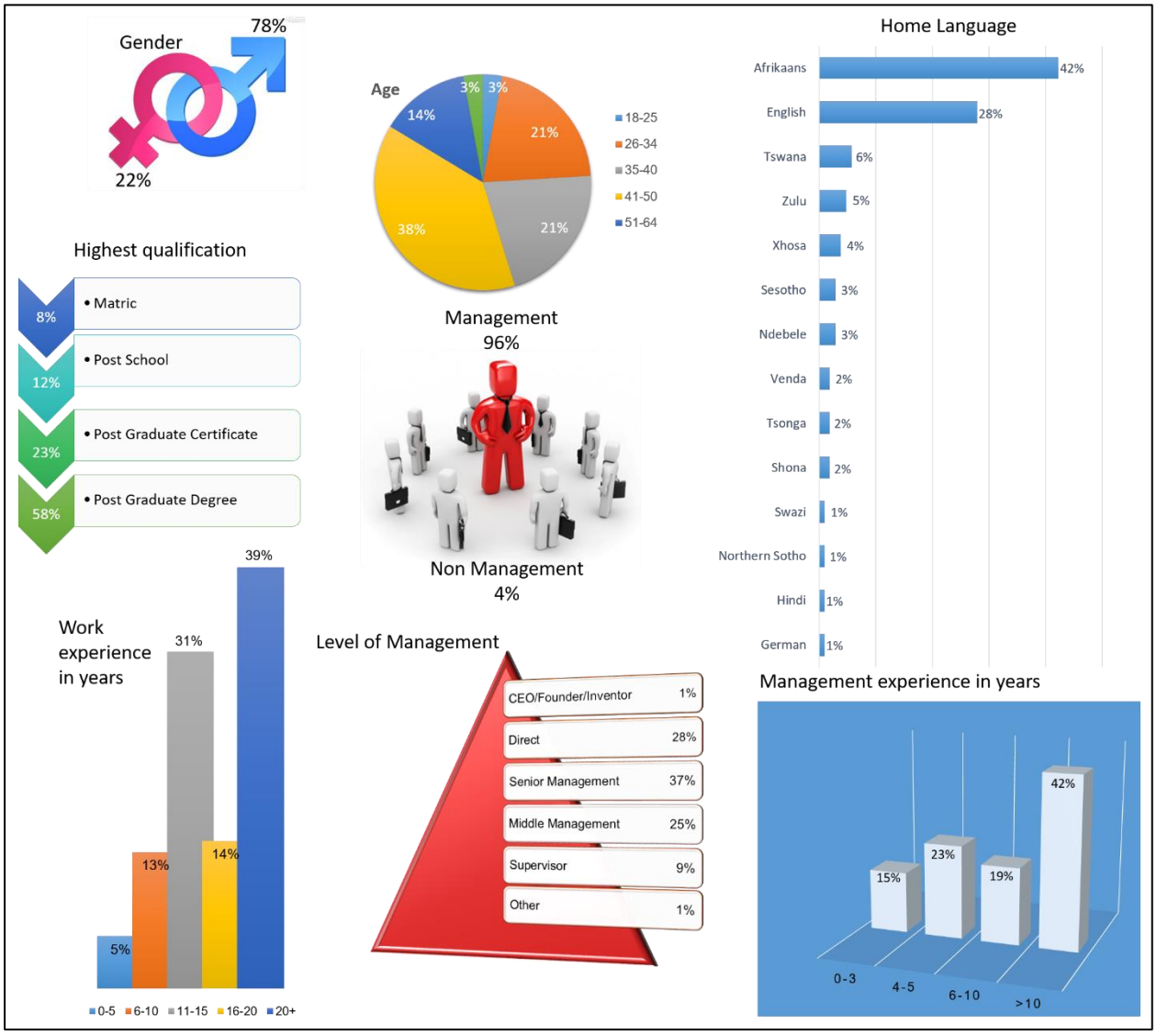
Response Type	Frequency	Percentage
Number of questionnaires distributed	500	100%
Number of questionnaires returned	104	21%
Number of questionnaires discarded	0	0%
Number of questionnaires analysed	104	21%

It is worth noting that the researcher has made several attempts to increase the number of responses. Unfortunately, the questionnaire was voluntarily, and the onus was on the respondent to complete the questionnaire.

4.4 DEMOGRAPHICS OF THE RESPONDENTS

The section includes all the demographic information of the respondents. This includes gender, age, home language, highest qualification, work experience, management, level of management and management experience. Figure 4.2 illustrates an infographics summary of the demographical profile of the respondents.

Figure 4.2: Demographic profile



As reflected in figure 4.2 above, 78% of the respondents were male and 22% female. There is a significant variation between the age groups of the engineers, 38% of the

respondents are between the age of 41 and 50. The majority of respondents are Afrikaans (42%) and English (28%). 58% of the respondents are in possession of a postgraduate degree, 23% in postgraduate certificate and 12% in post-school. 8% of the respondents reported being in possession of a matric only.

It was surprisingly found that 96% of the respondents hold a managerial position with 42% more than 10 years' experience. 28% of the respondents are directors of their organisation, but the majority (37%) of respondents are employed in senior management positions. It is worth noting that 39% of the respondents have more than 20 years' work experience.

4.5 QUANTITATIVE ANALYSIS

4.5.1 The KMO and Bartlett's test of sphericity

The KMO measure of sampling adequacy and Bartlett's test of sphericity was determined, and the results are revealed in table 4.2 below.

Table 4.2: KMO and Bartlett's test of sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.811
Bartlett's Test of Sphericity	Approx. Chi-Square	1785.702
	df	561
	Sig.	0.000

The KMO measure produced a good value of 0.811, which indicates that the sample is highly adequate. Furthermore, table 4.2 indicates favourable values for Bartlett's test of sphericity for the data. The Bartlett's test of sphericity value is 0.000, and measure lower than the required $\leq$ 0.005 value. Thus, the data is suitable to be subjected to EFA because there are no measurable relationships between the variables (Field, 2009:640).

4.5.2 Exploratory factor analysis

The EFA identified nine factors using the Varimax with Kaiser Normalisation rotational method. The Varimax method can be defined as an orthogonal rotation that minimises the number of variables which has high loadings on each factor. This typically simplifies the interpretation of the factors to describe more of the variance (Osborne, 2015:4). This

rotational method is the most common of the rotations available. According to Statistica (2006), only factor loadings ≥ 0.40 are considered to be of significance. Factor one in table 4.3 explains the most variance by a significant amount of 28.9%. The table below is a summary of all the variances explained by the factors.

Table 4.3: Variance explained the factors

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9,85	28,972	28,972	9,85	28,972	28,972	4,773	14,039	14,039
2	3,357	9,875	38,846	3,357	9,875	38,846	3,863	11,361	25,4
3	1,94	5,707	44,553	1,94	5,707	44,553	3,708	10,907	36,307
4	1,845	5,427	49,98	1,845	5,427	49,98	2,292	6,74	43,047
5	1,371	4,034	54,014	1,371	4,034	54,014	2,11	6,205	49,252
6	1,219	3,586	57,599	1,219	3,586	57,599	1,771	5,21	54,462
7	1,194	3,511	61,111	1,194	3,511	61,111	1,625	4,779	59,241
8	1,089	3,202	64,313	1,089	3,202	64,313	1,428	4,201	63,441
9	1,04	3,059	67,372	1,04	3,059	67,372	1,336	3,931	67,372

From the above table, the left-hand section shows the variance explained by the initial solution. None of the factors in the initial solution have eigenvalues smaller than one, meaning that all the factors will be retained for the analysis. The factors account for 67% of the variability in the original variables. A “good set” is regarded as anything ≥ 60%. The middle section of Table 4.3 shows the variance explained by the extracted factors before rotation. The right-hand section of table 4.3 shows the variances explained by the extracted factors after rotation.

The factor and the criteria loading are presented in table 4.4 below. The table also shows that 32 of the 33 statements loaded onto nine factors. Statement 30 was discarded since it did not meet the set criteria of ≥ 0.40.

Table 4.4: Factors loadings

	Statement	No	Factors								
			1	2	3	4	5	6	7	8	9
1. Value for money	Local OEMs equipment is good value for money.	10	0,799								
	Local OEMs products will have better value when compared to importers.	11	0,794								
	Local OEMs products will save me cost.	12	0,743								
	Local OEMs product prices are competitive.	8	0,627								
	Local OEMs have good after sales service.	29	0,543								
	Local OEMs (Original Equipment Manufacturer) manufacture quality products.	1	0,531								
	Customised product offerings are available from local OEMs to suite my needs.	7	0,500								
2. Promotion and distrubution	The product range of mining equipment for local OEMs is well known.	21		0,701							
	The manufacturers in the market operate in convenient hours and representatives are readably available.	26		0,670							
	Equipment is delivered in time in accordance to the agreement between buyer and seller.	23		0,631							
	National availability of spare parts is up to standard in the market.	25		0,626							
	Local OEMs are reliable and trustworthy.	27	.	0,595							
	There are sufficient local manufacturers in South Africa.	20		0,560							
	Local OEMs technical skills and support service are geographically distributed.	24		0,508							
3. Service delivery	Availability of spare parts for the equipment plays a major role in the selection of equipment.	15			0,859						
	Time to repair equipment plays a major role on the selection of equipment.	14			0,835						
	Cost of spare parts for your equipment plays a major role in the selection of equipment.	16			0,756						
	Customer service plays a major role in your choice of equipment supplier.	13			0,639						
	Continuous 24 hour cycle of mining operations are viable.	32			0,417						
4. Products from local OEMs	Products form local OEMs are readably available.	3				0,723					
	Local OEMs has the skills and facilities to manufacture equipment to satisfy our needs.	5				0,618					
	Local OEMs make use of the latest technology and has up to date mining products.	4				0,563					
5. Local Manufacturing	I have sufficient knowledge in regards to local OEMs product range.	28					0,654				
	Local equipment manufacturers are visible when making purchasing decisions.	17					0,647				
	Local manufactures for mining equipment are preferred above international manufacturers of mining equipment.	2					0,627				

	Statement	No	Factors								
			1	2	3	4	5	6	7	8	9
6. International purchasing	International equipment manufacturers are visible when making purchasing decisions.	19						0,766			
	Local OEMs prices for mining equipment is in line with international equipment prices	9						0,465			
7. Co-opertaion	Overhaul cost needs to be reduced to ensure survival and sustainability of the mining industry.	34							0,763		
	The product range of international mining equipment manufacturers is well known.	21							0,504		
	Local OEMs and mining organisations must form partnerships.	33							0,445		
8. Skilled Staff	Skilled personal are scarce in the mining industry.	32								0,827	
9. Quality and increased business activity	Awareness of local OEMs will increase business activity.	18									0,727
	Imported equipment is of better quality.	6									0,495

Factor 1: Value for money

A total of seven statements, namely statements number 10, 11, 12, 8, 29, 1 and 7 loaded on factor 1. The statements in factor one deal with either price or product for mining equipment. Price and product is a function of value. In factor 1 the perspective is from the customer and determines if the supplier in the industry offers good value regarding what local products cost compared to international products and if the quality is up to standard. Therefore factor 1 will be labelled as Value for money. The loading factors of the statements vary significantly; the highest is 0.799 and the lowest 0.500. Statements 10, 11 and 12 have loading factors more than 0.7, suggesting that these statements are regarded as significant. Factor 1 describes a positive variance of 14%. This finding is supported by previous research which revealed that customers who perceived that they received “value for money” are more satisfied that customers who do not perceive they received “value for money” (Zeithaml, 1988:14). The following four consumer definitions for product value is supported by previous research by Caruana *et al*. (2000:1342), namely value is low price for the consumer; value is whatever the consumer wants a product; value is the quality the consumer get for the price the consumer pay; and value is what the consumer get to what the consumer give.

It is important to note that value is defined by the consumer in the marketplace and not by the supplier in a factory (Webster, 1994:1). In a study done by Moolla (2012:106), it is

revealed that if the consumer perceived value ofe a product of a specific organisation is positive, it increases brand loyalty

Factor 2: Promotion and distribution

Factor 2 is also loaded with seven statements namely; 21, 26, 23, 25, 27, 20 and 24. All the statements relate to either promotion or distribution of products in the mining industry. In this section, the availability of products and spare parts are addressed through the questions as well as how visible local OEMs are in the market compared to an international organisation. These loading factor also varies significantly, but the majority is well above the cut off a loading factor of 0.40. The lowest and highest loading factor is 0.508 and 0.701 respectively. Factor 2 explains a variance of 11.4%. The following evidence is supplied to back the importance of factor 2. Promotion and distribution (place) form part of the “4P’s” of the marketing mix (Waterschoot & Bulte, 1992:83). Promotional and distribution strategies have a significant influence on the success of new products or services (Ulwick, 2017a:2). Therefore, the leading organisations are those that meet their customer needs cost-effectively with convenient and effective communication (Kotler & Armstrong, 2016:566).

Factor 3: Service delivery

Five statements, namely: 15, 14, 16, 13, and 32 loaded on factor 3. The factor is named service delivery because all the statements relate to service. The importance of service delivery mainly, after sales service is addressed by measuring the availability of spare part and how long it takes to repair equipment (mean time to repair). Statements 15 and 14 has the highest factors loadings in the entire rotated component matrix. The factors loadings are 0.859 and 0.835, meaning that the respondents regard them as very significant. Statements 16 and 13 has slightly lower significance but are still well above the factor loading cut off value, whereas statement 32 is on the border line. The factor has a variance of 10.9%. The finding is backed by Nenonen *et al*. (2014:1308) that justified the need for sterilisation due to transformed customer demand and increased competition. Servitisation, in essence, can be defined as a transformational journey of which involves manufacturing organisations to develop the required skills to provide services to support their traditional product offerings (Neely, 2013:1). Furthermore, manufacturing organisations have made significant progress in service provision in the past few years to align themselves with customer needs (Brax & Jonsson, 2009:541).

According to Kotler *et al*. (2005:10), service delivery has a significant influence on the purchasing behaviour of the consumer

Factor 4: Products from local OEMs

Factor 4 is loaded with the following three statements: 3, 5 and 4. In this section the perception about products that are manufactured by local OEMs are measured in comparison to international products, this includes the skills, facilities and technology used in manufacturing. This factor is named products from local OEMs. The factor has one statement (30) that have been excluded due to the loaded factor lower than 0.40. The rest of the statements have good factor loading values and are all related to the products of local OEMs. Factor 4 has a variance of 6.7%. South Africa can be proud to announce that they have developed world leading products over the past few years. For a smaller country like South Africa, they have done exceptionally regarding creating waves globally. The following list consists of some of the most innovative inventions developed in South Africa (Mowatt, 2013:2):

- The Computed Axial Tomography Scan (CAT Scan);
- Oil from Coal (Sasol);
- Kreepy Krauly;
- Pratley's Putty;
- Q20; and
- Smartlock Safety Syringe.

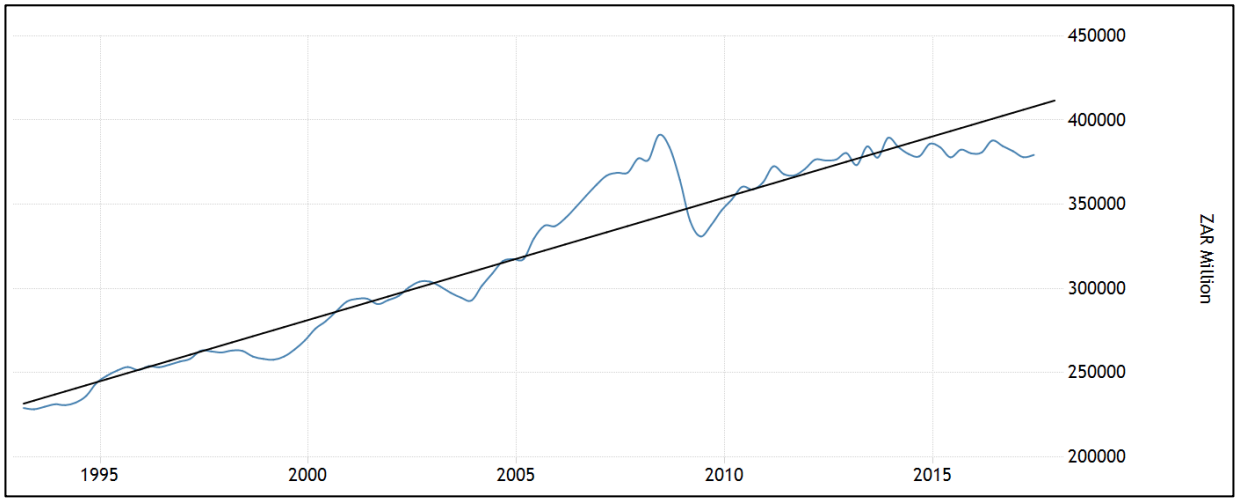
South Africa has increased and developed more local mining equipment manufactures in recent years. They have the skills and facilities to manufacture equipment that is comparable with the international manufacturing giants such as Caterpillar, Sandvik and Atlas Copco (Medupe, 2017:1).

Factor 5: Local manufacturing

There are three statements loaded on factor five namely; 28, 17 and 2. The preference of local manufacturing above the import of equipment from international equipment manufacturers is measured as well as the product range available from local OEMs. All the statements have loading factors above 0.6 and are all related to local manufacturing. The respondents regard the factor as significant in determining customer needs for a

niche supplier to the local mining industry. This factor is therefore labelled local manufacturing and explains a variance of 6.2%. The finding is supported by the Stats SA which reported a positive trend for local manufacturing over the past ten years. Figure 4.3 indicates the positive growth from the South African GDP for manufacturing. The manufacturing sector is dominated by the industries such as agri-processing, automotive, chemicals, ICT and electronics, metals and textiles, clothing and footwear (Kock, 2017:3).

Figure 4.3: South African GDP from manufacturing



Source: (Omarjee, 2017:5)

Botha (2015:3) on the other hand reported that local manufacturing is faced with a severe crisis due to dissipating skills because there is not enough done to train the workforce of tomorrow.

Factor 6: International purchasing

Factor six is loaded with only two statements. Statements 19 and 9 of which both have factor loadings above the threshold value of 0.40. These questions from the perspective of the customer measure how visible international equipment manufacturers are when making purchase decisions as well as how inline local OEMs prices are. Statement 19 has a relatively high value of 0.766 whereas statement 9 has a low value just above 0.40. The factor is labelled international purchasing and has a variance of 5.2%. Tressin and Richter (2014:129) supports the factor with previous research which revealed that the most important single issue for procuring managers is international sourcing and purchasing. Christopher *et al*. (2011:70) furthermore state that organisations purchase and source abroad for the following reasons:

- lower cost;
- Access to better/new technologies and emerging markets;
- Quality;
- Delivery schedules and flexibility;
- Guarantees regarding the availability of limited resources; and
- Introducing new competition to the local supplier base.

Petersen *et al*. (2000:30) state that organisations participate in international purchasing because they want to increase competitions between suppliers, to fulfil local needs or to support the origin of a foreign presence.

Factor 7: Co-operation

There are three statements loaded on factor seven namely; 34, 21 and 33. The co-operation between customers and local OEMs is tested and the importance of partnerships highlighted. All the statements have loading factors above 0.4 and are all allied to the co-operation between local suppliers and mining houses. The respondents regard the factor as important for the sustainability and survival of local mining houses. This factor is therefore labelled co-operation and explains a variance of 4.8%. Research by Fessehaie (2015:3) concluded that mining houses are under huge pressure to lower cost and increase productivity. For them to realise these objectives, they need to reduce the number of suppliers and establish a more intense buyers-supplier relationship. Singh (2016b:4) also supports the factor by reporting that a “like-minded” individuals environment must be created to share ideas on mining technology, manufacturing and sustainable growth. The Department of Trade and Industry has recently launched Mining Equipment Manufacturers South Africa (MEMSA) to complement the co-operation between OEMs and mining houses (Slater, 2016:5).

Factor 8: Skilled staff

Factor eight is only loaded with one statement namely; statement 32. Because of the perception that skilled labour is a scares resource in the mining industry, this section tests whether the skilled staffed shortage is a reality. The factor is labelled as skilled staff and has a variance of 4.2%. Statement 32 has a significant high loading factor of 0.827 meaning that the respondents regard the statement to be of critical importance. Some resources relating and supporting this factor, Hall and Sandelands (2009:215) reported

that South Africa has a skill shortage across a range of market sectors but that engineering and construction, in particular, are suffering growth and effectiveness as a result. The South African labour reform reported a major concern with the unemployment rate and that is due to the skill shortage in the country (Baard, 2013:7). They requested vision and leadership from government to assist in resolving the matter. Pokroy (2016:46) acknowledges the ongoing skill shortage in South Africa, uttering that the local educational system has gone horribly wrong in two specific disciplines namely, mathematics and science. These are the key disciplines for individuals in the mining and engineering sector.

Factor 9: Quality and increased business activity

Factor nine is loaded with only two statements. Statements 18 and 8 of which both have factor loadings above the threshold value of 0.40. To determine if the business activity will be increased the market segment is tested for awareness for local OEMs as well as the level of quality perceived regarding imported equipment. Statement 19 has a relatively high value of 0.727 whereas statement 8 has a lower value of 0.495. The factor is labelled quality and increased business activity with a variance of 3.9%. Factor nine is supported by Behmer *et al*. (2016:964) which has in recent research concluded that quality improves customer satisfaction and increase business activity for engineering organisations. On the other hand, according to Paharia *et al.* (2014:647) smaller OEMs are perceived more favourable in purchasing decisions compared to large OEMs with similar quality products. This empirical research verified that smaller OEMs could improve business activity and sales through the strategical positioning of their quality products.

The next section will determine and discuss the correlations between the factors

4.5.3 Pearson Correlation coefficients between the factors

Table 4.5 below is a summary of the computed Pearson correlation coefficients for the demographical information and the nine factors. These values were calculated with the results acquired from the respondents and the computer statistical program SPSS.

The Pearson correlation coefficients, also known as the Pearson product movement correlation coefficient (r) measures the relative strength and direction of the linear relationship between the two numerical variables (Levine *et al.*, 2014:167). The values of

r range from -1 (negative correlation) to $+1$ (positive correlation). The mathematical notation is thus $-1 \leq r \leq 1$.

- Negative correlation: For the two variables to have a strong negative linear correlation, r would be close to -1. If $r = -1$, it implies a perfect negative correlation. Negative value indicates a relationship were, if one of the variable would increase the other would decrease (Welman et al., 2005:230)
- Positive correlation: For the two variables to have a strong positive linear correlation, r would be close to $+1$. If $r = +1$, it implies a perfect positive correlation. Positive value indicates a relationship were, if one of the variable would increase the other would also increase (Welman et al., 2005:230).

The following guidelines are used to determine the strength of the correlation coefficients.

- No correlation: $0 \leq r \leq 0.3$
- Medium correlation: $0.3 \leq r \leq 0.5$
- Strong correlation: $r \geq 0.5$

Furthermore, for a correlation to be statistically significant the probability value should be 0.05 or less. For the study, only significant correlations $(p \leq 0.05)$ were considered. The table below indicates the significant correlations identified between the variables (Ratner, 2009:141).

Table 4.5: Pearson correlation coefficients

		Value for money	Promotion and Distribution	Service Delivery	Products from local OEMs	Local Manufacturing	International Purchasing	Co-operation	Skilled Staff	Quality and increased business activities
Value for money	Pearson Correlation	1,00	0,65	0,36	0,67	0,51	0,17	0,52	0,26	0,05
	Sig. (2-tailed)		0,00	0,00	0,00	0,00	0,42	0,00	0,58	0,55
	N	104	104	104	104	104	104	104	104	104
Promotion and Distribution	Pearson Correlation	0,65	1,00	0,39	0,59	0,55	0,08	0,73	0,20	0,16
	Sig. (2-tailed)	0,00		0,00	0,00	0,00	0,44	0,00	0,04	0,10
	N	104	104	104	104	104	104	104	104	104
Service Delivery	Pearson Correlation	0,36	0,39	1,00	0,23	0,34	-0,07	0,51	0,26	0,19
	Sig. (2-tailed)	0,00	0,00		0,02	0,00	0,49	0,00	0,01	0,05
	N	104	104	104	104	104	104	104	104	104
Products from local OEMs	Pearson Correlation	0,67	0,59	0,23	1,00	0,44	0,01	0,35	0,19	-0,06
	Sig. (2-tailed)	0,00	0,00	0,02		0,00	0,93	0,00	0,05	0,55
	N	104	104	104	104	104	104	104	104	104
Local Manufacturing	Pearson Correlation	0,51	0,55	0,34	0,44	1,00	0,04	0,46	0,18	0,10
	Sig. (2-tailed)	0,00	0,00	0,00	0,00		0,66	0,00	0,08	0,32
	N	104	104	104	104	104	104	104	104	104
International Purchasing	Pearson Correlation	0,17	0,08	-0,07	0,01	0,04	1,00	0,08	-0,09	0,18
	Sig. (2-tailed)	0,42	0,44	0,49	0,93	0,66		0,43	0,37	0,08
	N	104	104	104	104	104	104	104	104	104
Co-operation	Pearson Correlation	0,52	0,73	0,51	0,35	0,46	0,08	1,00	0,22	0,23
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,43		0,02	0,02
	N	104	104	104	104	104	104	104	104	104
Skilled Staff	Pearson Correlation	0,26	0,20	0,26	0,19	0,18	-0,09	0,22	1,00	0,07
	Sig. (2-tailed)	0,58	0,04	0,01	0,05	0,08	0,37	0,02		0,51
	N	104	104	104	104	104	104	104	104	104
Quality and increased business activities	Pearson Correlation	0,05	0,16	0,19	-0,06	0,10	0,18	0,23	0,07	1,00
	Sig. (2-tailed)	0,55	0,10	0,05	0,55	0,32	0,08	0,02	0,51	
	N	104	104	104	104	104	104	104	104	104

From Table 4.5 the following correlations were identified above ($r \geq 0.5$; $p \leq 0.05$) and ranked sort/factor

1. Value for money – Promotion and distribution ($r \geq 0.65$; $p \leq 0.05$):
2. Value for money – Products from local OEMs ($r \geq 0.67$; $p \leq 0.05$):
3. Value for money – Local manufacturing ($r \geq 0.51$; $p \leq 0.05$):
4. Value for money – Co-operation ($r \geq 0.52$; $p \leq 0.05$):
5. Promotion and distribution – Products from local OEMs ($r \geq 0.59$; $p \leq 0.05$):

6. Promotion and distribution – Local manufacturing $(r \geq 0.55;\ p \leq 0.05)$:
7. Promotional and distribution – Co-operation $(r \geq 0.73;\ p \leq 0.05)$:
8. Service delivery – Co-operation $(r \geq 0.51;\ p \leq 0.05)$:

Value for money positively correlated with promotion and distribution, products from local OEMs, local manufacturing and co-operation. Promotion and distribution are positively correlated to products from local OEMs, local manufacturing and co-operation. Service delivery positively correlates with co-operation.

4.5.4 Reliability of the data

The Cronbach alpha coefficient is used to determine the level of reliability and internal consistency of the data. Table 4.6 below describes the significance level of the Cronbach alpha coefficients.

Table 4.6: Cronbach alpha coefficients

Cronbach's Alpha Coefficient	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$\alpha < 0.5$	Unacceptable

Source: (Tavakol & Dennick, 2011:54)

The Cronbach alpha coefficient for the complete data set was calculated at 0.906, and therefore the internal consistency of the data obtained from the questionnaire is considered reliable. In general, a score higher than 0.7 is usually considered acceptable. Table 4.7 below indicates the calculated reliability coefficients for each factor.

Table 4.7: Reliability statistics

No	Description	Alpha
Factor 1	Value for money	0,876
Factor 2	Promotion and distribution	0,818
Factor 3	Service delivery	0,810
Factor 4	Products from local OEMs	0,715
Factor 5	Local manufacturing	0,646
Factor 6	International purchasing	0,271
Factor 7	Co-operation	0,257
Factor 8	Skilled staff	-
Factor 9	Quality and increased business activity	0,096

From the above table, it is clear that some calculated Cronbach alpha values for the factors are below the satisfactory reliability coefficients. When studying the Cronbach alpha, one must take into consideration that the increasing value of Cronbach alpha is partially reliant on the number of items represented in the scale. The low reliability coefficients in the study indicate that if the study is repeated in a different setting, these low factors will most probably not represent themselves. For future research, these factors can be either altered or removed.

4.5.5 Analysis of the mean of the factors identified

The questionnaire used to determine customer needs for the mining industry in Southern Africa was designed on a five-point Likert scale. The five-point scale offered the respondents five different options to select from for each statement.

- Totally disagree: 1
- Somewhat disagree: 2
- Neutral: 3
- Somewhat agree: 4
- Totally agree: 5

The mean values from the Likert scale for the nine factors were calculated and converted into percentages to determine the customer needs for the mining industry. A percentage ≥ 70% indicates a definite influence. The different percentages can be interpreted as follow (Bisschoff & Hough, 1995):

- < 60%: Lower importance
- 60 - 70%: Important
- ≥ 70%: Very important

All nine factors identified together with their variables will be discussed in the following tables below.

Table 4.8: Value for money

No	Statement	Mean %
10	Local OEMs equipment is good value for money.	74,6%
11	Local OEMs products will have better value when compared to importers.	67,5%
12	Local OEMs products will save me cost.	73,1%
8	Local OEMs product prices are competitive.	76,9%
29	Local OEMs have good after sales service.	72,1%
1	Local OEMs (Original Equipment Manufacturer) manufacture quality products.	77,9%
7	Customised product offerings are available from local OEMs to suite my needs.	78,7%
	Average	**74,4%**

There are no statements that scored less than 60% about value for money when defining customer needs. This suggests that all the statements have a high level of significance.

Table 4.9: Product and Promotion

No	Statement	Mean %
21	The product range of mining equipment for local OEMs is well known.	60,0%
26	The manufacturers in the market operate in convenient hours and representatives are readably available.	73,1%
23	Equipment is delivered in time in accordance to the agreement between buyer and seller.	69,4%
25	National availability of spare parts is up to standard in the market.	69,8%
27	Local OEMs are reliable and trustworthy.	70,4%
20	There are sufficient local manufacturers in South Africa.	56,7%
	Average	**66,6%**

A majority of statements in product and promotion are equal or above 60%. There is only one statement (no. 20) that have a value lower than 60%. This would suggest that the statement is less important to the respondents. This is the only value below the threshold.

Table 4.10: Service delivery

No	Statement	Mean %
15	Availability of spare parts for the equipment plays a major role in the selection of equipment.	89,8%
14	Time to repair equipment plays a major role on the selection of equipment.	89,8%
16	Cost of spare parts for your equipment plays a major role in the selection of equipment.	86,7%
13	Customer service plays a major role in your choice of equipment supplier.	88,3%
32	Continuous 24 hour cycle of mining operations are viable.	77,5%
	Average	**86,4%**

All the statements are above 70%, indicating a very high level of agreement regarding service delivery in defining customer needs. This factor is considered of extreme significance by the respondents.

Table 4.11: Products from local OEMs

No	Statement	Mean %
30	Mechanisation of mining operations will increase the efficiency of mining operations.	82,5%
3	Products form local OEMs are readably available.	71,5%
5	Local OEMs has the skills and facilities to manufacture equipment to satisfy our needs.	76,9%
4	Local OEMs make use of the latest technology and has up to date mining products.	71,0%
	Average	**75,5%**

All the statements are above 70%. This suggests that the respondents are in agreement with products from local OEMs. The statements rate very important for determining customer needs.

Table 4.12: Local manufacturing

No	Statement	Mean %
28	I have sufficient knowledge in regards to local OEMs product range.	72,5%
17	Local equipment manufacturers are visible when making purchasing decisions.	67,7%
2	Local manufactures for mining equipment are preferred above international manufacturers of mining equipment.	67,1%
	Average	**69,1%**

All the statements of factor five have values above 60%, which mean they are important to the respondents. The respondents of this study were all engineers employed within the mining sector of South Africa. South Africa currently has a big initiative to drive and support local manufacturing.

Table 4.13: International purchasing

No	Statement	Mean %
19	International equipment manufacturers are visible when making purchasing decisions.	75,6%
9	Local OEMs prices for mining equipment is in line with international equipment prices	68,8%
	Average	**72,2%**

The two statements of factor six are above 60%, indicating once again that they are important to the respondents.

Table 4.14: Co-operation

No	Statement	Mean %
34	Overhaul cost needs to be reduced to ensure survival and sustainability of the mining industry.	88,5%
21	The product range of mining equipment for local OEMs is well known.	60,0%
33	Local OEMs and mining organisations must form partnerships.	82,9%
	Average	**77,1%**

Two out of the three of the statements for this factor rated extremely important to the respondents with values above 80%. The other statement rated significantly lower but is still categorised under important with a value of 60%.

Table 4.15: Skilled Staff

No	Statement	Mean %
31	Skilled personal are scarce in the mining industry.	77,5%
	Average	**77,5%**

Factor 8 consist of only one statement which has a mean value of 77.5%, suggesting it is a very important statement to the respondents.

Table 4.16: Quality and increased business activity

No	Statement	Mean %
18	Awareness of local OEMs will increase business activity.	81,9%
6	Imported equipment is of better quality.	68,7%
	Average	**75,3%**

Factor 9 deals with quality and increased business activity and both the statements have mean values above 60%.

Table 4.17: Summary – Mean values of the factors

No	Description	Mean %
Factor 1	Value for money	74,4%
Factor 2	Promotion and distribution	66,1%
Factor 3	Service delivery	86,4%
Factor 4	Products from local OEMs	73,1%
Factor 5	Local manufacturing	69,1%
Factor 6	International purchasing	72,2%
Factor 7	Co-operation	77,1%
Factor 8	Skilled staffed	77,5%
Factor 9	Quality and increased business activity	75,3%
	Average	**74,6%**

Table 4.17 above is a summary of the mean values for all the factors in determining customer needs for a niche supplier in the mining industry within South Africa. All these factors are above the 60% threshold, suggesting that they are all important to the respondents of this self-developed questionnaire.

4.6 SUMMARY

The chapter serves as the descriptive and informative section of the empirical study conducted to determine the customer needs for a niche supplier in the mining industry. The main focus of this chapter was the statistical analysis and the discussion of the results obtained from the questionnaire. The results also address the validity, determine the reliability and discuss the importance of each criterion. Various statistical techniques were utilised to determine the customer's needs which provided meaningful results. All the results were discussed in detail.

In the next chapter, conclusions and recommendations are drawn and presented for the study. The chapter will also include the identification and discussion of the limitations and future fields of study.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The interpretation of the empirical findings obtained from the quantitative research study was presented and discussed in the previous chapter. This chapter will pursue to identify whether or not the objectives established in chapter one has been met. This will be followed by the conclusion where all the important aspects of the findings will be highlighted.

Based on the findings and conclusion of the study, recommendations will be outlined to provide feedback with regards to determining customer needs for a niche supplier in the mining industry. The chapter will be concluded with limitations of the study and future fields of study.

5.2 RESEARCH OBJECTIVES

The attainment of the research objectives of the study will be discussed in the following section. The main objectives of the study were to determine the customers' needs of the mining companies in South Africa. Despite all the challenges faced by the mining industry, there are still opportunities for local OEMs. This study will assist local OEMs to be more competitive as well as contribute to the sustainability of mining companies in South Africa.

5.2.1 Research objective 1: Perform a literature study to conceptualise customer needs in the mining industry.

Research objective 1 was met during the study. A literature review and research analysis were executed leading to the comprehension of the problem statement. The study was conducted using evaluating the theory combined with practical application.

5.2.2 Research objective 2: Determine the perceptions of mining companies towards local OEMs regarding quality, technology and availability.

Because of international pressure on the mining industry in South Africa, three major factors contributing to this pressure is grouped about the customer perception. Contrarily to popular believe quality and technology in this instance is perceived to be superior in the local market as opposed to the international players. 78% of respondents confirmed local quality to be either on par or superior to international manufacturer's quality,

furthermore more than 71% of respondents acknowledge local manufacturers to make use of up to date and cutting edge technology

Currently international OEMs occupies about 70% of the market share in South Africa, with this being said, respondents identified a gap in the market for local OEMs. This was indicated by the tendency of respondents to favour local OEMs, as the lack of this organisation in South Africa supports the opportunity for local OEMs to increase market share.

5.2.3 Research objective 3: Determine the level of service required by the mining industry for local OEMs.

The benchmark for mines in South Africa regarding service delivery is the relative efficiency of mining operations. OEMs provide critical services, such as technical support during breakdowns, geographical distribution of parts, mean time to repair and after-sales service. These services contribute to the successful operations of mines and directly affects the efficiency of the mine and consequently the profitability of the operation. It was determined that the customer segment evaluated in this market, places a high value on service delivery from local and international OEMs.

5.2.4 Research objective 4: Measure the level of service delivered to the mining industry for a local OEMs.

Respondents identified that the current service levels in the market are substandard irrespective of the OEM being local or international. Two major aspects contributing to the unsatisfactory service levels identified by the respondents are the shortage of skilled labour and limited local manufacturing facilities. More than 70% of respondents indicated that skilled labour in the industry is scarce, contributing to this concern is the fact that 57% of respondentsse claimed that not enough local manufacturing facilities exist.

5.2.5 Research objective 5: Determine the shortcomings and problems with the current equipment in the mining industry.

The South African mining industries operating procedures and mining conditions were found to be unique when compared to the international industries. The situation in South Africa requires tailor-made solutions and equipment. The research found that local OEMs

are more willing to adapt to unique and isolated cases explaining the tendency found in the research of respondents leaning towards the support of local OEMs.

It was found that a need exists with the respondents for collaboration between OEMs and mining companies. A needs analysis identifies specific conditions on each mine and can lead to adapting equipment for optimal operations in these conditions.

5.2.6 Research objective 6: Identify new technologies currently researched or employed in mining operations

A present trend globally, which is attracting increasing research, is the use of fuel cells to replace traditional prime movers (internal combustion engines). Fuel cells use platinum in its operation, and its widespread employment worldwide will create an additional market for the vast platinum resources of South Africa.

Due to continued strained labour relations and political influences in the mining labour force, mining companies are increasing the level of mechanisation at their plants, thereby reducing labour costs and inefficiencies. Furthermore, long-term sustainability depends highly on the implementation of a 24-hour cycle in operations, with minimal downtime.

5.2.7 Research objective 7: Perform an in-depth analysis of the local OEMs competitiveness and service levels in the current market.

Considering the overall results of the research, it can be concluded that local OEMs are competitive in the market. Although the presence of international manufacturing companies complicates growth in market share, the research indicates the customers tend to support local OEMs. The reason for the support from the customers in the market can be explained by the high score given to the quality of products (78%), preference of customers (67%), after-sales services (72%) and pricing (77%) (Total cost of ownership).

Because of accessibility of local OEMs to the market higher service levels are easier to maintain than international manufacturing companies based abroad.

5.3 CONCLUSIONS

The study was conducted on a national level involving operational mines in South Africa. To retrieve usable and accurate results mining engineers were targeted during the study.

The data was collected by means of a questionnaire distributed through google forms. Results are collected and analysed through various statistical analysis methods and the data was received between 1 October 2017 and 20 October 2017. The data was tested for reliability using Cronbach alpha, and it was found to be relevant and reliable.

The results indicated a relatively strong perception of favour of local OEMs; it is clear that customers in the market segment are willing and able to support these local manufacturers. The 70% market share occupied by international manufacturers may become under threat when local OEMs focus on exploiting the positive perception of customers to gain market share.

5.4 RECOMMENDATIONS

To provide practical recommendations, it is important to note that small variance may occur depending on the specific OEM implementing these recommendations. From the research conducted it is highly recommended that local OEM focus on the following factors at a strategic/ management level:

- Value for money: Management must ensure that products can be supplied at a better value (product and price) than their international counterparts.
- Promotion and distribution: Management can focus on the face value of the organisation to be in the mind of the consumer.
- Service delivery: According to the research a deciding factor of the customer perception is the service provided by the manufacturer. Satisfactory service delivery/customer service should be a major focus for management.
- Products from local OEMs and local manufacturing: Customer in this market segment are prone to support the local organisations. Furthermore government policies also encourage local manufacturing. Management of local OEMs should see this as favourable external market conditions and capitalise on possible first-mover advantages to create sustainable competitive advantage and lock in market share.
- International purchasing: The results of the research indicated that the management of local OEMs could be assured that the perception of international players being stronger in pricing and quality is false. They do however believe that there is not sufficient local manufacturers to support the mining industry.

- Co-operation: Local manufacturing by quality OEMs lead to a symbiotic relationship between the OEM and its clients. Local OEMs know and understand local market conditions like foreign manufacturers cannot, and the local manufacturer has the opportunity of increasing market share because of proximity to the market, local knowledge, beneficial labour - and material costs, and government incentives. Research has shown that mining customers also favours such relationships because of short-arm cooperation opportunities and the ability to find mutually beneficial product solutions. All of these contribute to the competitive advantage of local OEMs.
- Co-operation is initiated by successful and meaningful customer relationships between customer and supplier. It is recommended that management focuses on building relationships and solving problems rather than attempting to imitate large international firms.
- Skilled staff: The nature of the mining industry has in effect, a large number of unskilled and uneducated workers. The research indicated that highly sophisticated international equipment oppose challenges to the workforce, contrary to the local equipment which can be designed to meet the needs of the specific workforce in question. Internationally based companies also comply with strict rules and high levels of red tape when it comes to designing or altering equipment.
- Management of local OEMs must concentrate on tailor-made products to suit their exact needs of their customers. Because of the complications mentioned for international manufacturers to alter equipment, local OEMs has a distinct advantage when building products specifically suited to the workforce in South Africa.
- Quality and increased business activity: It was evident from the research that customers would like to see local OEMs concentrate more on promotion and visibility to increase awareness in the market. Customers believe that a focus on visibility and face value will increase business activity, revenue and subsequently profitability. It is recommended that local OEMs and their management teams employ strict promotion and marketing policies to be more visible in the market.

5.5 FUTURE RESEARCH AND LIMITATIONS

Limitations experienced during this study was isolated to the collection of research results.

Even though an online platform was used to complete surveys, it still proofed challenging to gather all the required needs for the research.

Regarding future research, the following suggestions can be made to contribute to this field of study and on this topic. The study could also assist in forming future researchers to pay attention to aspects addressed in this document which may also contribute to their findings. Factors to be considered for future research:

- Further research can be narrowed down to cover only specific types of mines such as gold, platinum, coal or iron ore mines;
- Further research may be conducted only on specific regions or provinces; and
- Respondents in future research can be expanded to include not only mining engineers but also employees influencing purchasing decisions.

5.6 SUMMARY

The mining industry in South Africa is one of the major contributors to the GDP of the country and supported by the government. The mining sector accounts for approximately 30% of the market capitalisation of the Johannesburg Stock Exchange (JSE) and continues to attract foreign direct investment (FDI) into the country. With some of the largest amounts of underground deposits, the South African mining sector shows significant potential for development and local OEMs should capitalise on this major external environmental factor.

The market is currently led by international equipment manufacturers that occupy above 70% of the market share. The objective of this study is to measure the perception of the target market with regards to supporting local OEMs as opposed to international manufacturers present in the country. This study could assist the local OEMs to understand their customers' needs better and how to develop a meaningful relationship with both parties.

With only four major local mining equipment manufacturers in South Africa, namely: Rham Equipment; Aard Mining; Fermel; and GHH, the potential for growth in this market

is undeniable. With the possibility of gaining market share, the needs of the customer must be determined to attract sales, one of the major objectives of this study.

This study consists of two phases, namely a literature review and an empirical study. A quantitative approach with regards to the research was selected, and results indicated the perception of some consumers in the target market. The measuring instrument utilised was a questionnaire developed from the literature.

It is common for a local market to automatically assume that international or imported products, especially from 1st world countries, are superior to similar products manufactured locally. The research indicated the exact opposite and showed that the consumer will support and, in fact, prefer the products and service of local OEMs.

Factors such as Value for money, promotion and distribution, service delivery, products from local OEMs and local manufacturing, international purchasing, co-operation, skilled staff and quality and increased business activity was evaluated and found to be mostly in favour of local OEMs. This study aim to contribute to the local manufacturing market by assisting local firms to identify gaps in the market. Furthermore, it was identified that firms could use three highly effective theories to identify customer needs and gained access to the market

The findings and recommendations in this document contradict the traditional section of local versus international and state that the management teams of local OEMs can capitalise on opportunities in the market.

REFERENCE LIST

Adams, J., Khan, H.T.A., Raeside, R. & White, D. 2007. Research methods for graduate business and social science students. New Delhi: Response Books.

Anon. 1952. Oxford. Advanced learner's dictionary of current English. London: Oxford.

Baard, J. 2013. Rethinking South Africa's labour market. Johannesburg: Centre for Development

Baxter, P. & Jack, S. 2008. Qualitative case study methodology: study design and implementation for novice researchers. *The Total Qualitatvive Report*, 13(4):544-559.

Baxter, R. 2016. The future of the South African mining industry. Johannesburg: Chamber of Mines. .

Behmer, F., Jochem, R. & Hanke, H. 2016. Planning and reorganising quality management organisations - an empirical analysis of current practice. *Total Quality Management & Business Excellence*, 27(7-8):963-978.

Bisschoff, C.A. & Hough, J. 1995. Retaining the competitive edge in SA organized agriculture through customer service management. Paper presented at the International conference on management, Pretoria.

Bisschoff, C.A. & Kade, A. 2012. Validation of customer service measuring instrument for ophthalmology industry. Paper presented at the South African Institute of Management Sciences, Mpekweni, South Africa.

Botha, A. 2015. The skills gap in manufacturing. Johannesburg: Deloitte.

Brax, S.A. & Jonsson, K. 2009. Developing integrated solution offerings for remote diagnostics: A comparative case study of two manufacturers. *International Journal of Operations & Production Management*, 29(5):539-560.

Caruana, A., Money, A.H. & Berthon, P.R. 2000. Service quality and satisfaction - the moderating role of value. *European Journal of Marketing*, 34(11/12):1338-1352.

Chirikure, S. 2010. Indigenous mining and metallurgy in Africa. Cape Town: Cambridge University.

Christensen, C.M., Hall, T., Dillon, K. & Duncan, D.S. 2016. Know your customers' jobs to be done. *Harvard Business Review*, 2016:54-62. September

Christopher, M., Mena, C., Khan, O. & Yurt, O. 2011. Approaches to managing global sourcing risk. *Supply Chain Management: An International Journal*, 16(2):67-81.

Clark, K. 2001. Kimberly-Clark corporation announces cottonelle fresh rollwipes, america's first dispersible pre-moistened wipe on a roll. Dallas, TX: Kimberly-Clark.

D'Souza, J. & Gurin, M. 2016. The universal significance of Maslow's concept of self-actualization. *The Humanistic Psychologist*, 44(2):210-214.

Davenport, J. 2013. Digging deep: a history of mining in South Africa. Jeppestown: Jonathan Ball.

Deshmukh, A. & Karandikar, A. 2007. The net-promoter score movement. *Brand Strategy,* 4:40-41.

Dillon, K. 2011. I think of my failures as a gift. *Harvard Business Review*, 88(3):62-68.

Easterby-Smith, M., Thorpe, R., Jackson, P. & Lowe, A. 2008. Management research. 3rd ed. London: Sage.

Edwards, S. 2008. Customer needs analysis. [PowerPoint presentation]. Unpublished.

Entrepreneurs. 2017. I know your customers. http://www.infoentrepreneurs.org/en/guides/know-your-customers--needs/ Date of access: 16 June 2017.

Fessehaie, J. 2015. The regional value chain for mining capital equipment: linkages and firm upgrading in South Africa and Zambia. Johannesburg: CCRED.

Field, A. 2009. Discovering statistics using SPSS. 3rd. London: Sage.

Government, T.S.A. 2016. Mineral resources. http://www.gov.za/about-sa/minerals Date of access: 14 April 2017.

Grönlund, J., Sjödin, D.R.n. & Frishammar, J. 2010. Open innovation and the stage-gate process: a revised model for new product development. *Califorinia Management Review*, 52(3):106-131.

Guru, C. 2017. Net promoter score benchmarks by industry. https://customer.guru/net-promoter-score/benchmarks Date of access: 2 September 2017.

Hahn, A.. 2016. Data collection. Salem Press Encycopedia. Beirut: Salim Press.

Hall, J. & Sandelands, E. 2009. Addressing South Africa's engineering skills gaps. *Education and Training*, 41(3):215-219.

Insights, C. 2017. When corporate innovation goes bad — the 110 biggest product failures of all time. https://www.cbinsights.com/research/corporate-innovation-product-fails/ Date of access: 9 August 2017.

Hill, C.W.L. & Jones, G.R. 2010. Strategic mangement theory: an integratwed approach. 9th ed.. New York, NY: South-Western Cengage.

Kano, N., Tsuji, N.,Seraku, F. & Takahashi, S. 1984. Attractive quality and must-be quality. *Hinshitsu: The Journal of Japanese Society for Quality Control*, 14(2):39-48.

Kearney, L. 2012. Mining and minerals in South Africa. https://www.brandsouthafrica.com/investments-immigration/business/economy/sectors/mining Date of access: 14 April 2017.

Kock, P.d. 2017. Manufacturing in South Africa. https://www.brandsouthafrica.com/investments-immigration/business/economy/vsectors/manufacturing-in-south-africa Date of access: 1 November 2017.

Kothari, C.R. 2004. Research Methodology. 2nd ed. New Delhi: New Age International.

Kotler, P. & Armstrong, G. 2016. Principles of marketing. 16th ed. London: Pearson Education.

Kotler, P., Wong, V., Saunders, J. & Armstong, G. 2005. Principles of marketing. 4th ed. Upper Saddle River, NJ: Pearson Education.

Lamb, C., Hair, J.F., McDaniel, C., Boshoff, C., Terblance, N., Elliot, R. & Klopper, K. 2015. Marketing. 5th ed. Cape Town: Oxford.

Lee, Y.-C., Lin, S.-B. & Wang, Y.-L. 2010. A new Kano's evaluation sheet. *The Total Quality Management Journal*, 2(23):179-195.

Levine, D.M., Stephan, D.F. & Szabat, K.A. 2014. Statistics for managers. 7th ed. Harlow: Pearsons.

Levitt, T. 1983. Organisations frequently make the mistake of defining the markets they serve around technology with their product offerings. Ill-advisedly, this technology will one day become out-dated. *Harvard Business Review,* 23:1-12.

Markey, R. & Reichheld, F. 2011. Introduction: the net promoter system. http://www.bain.com/publications/articles/introducing-the-net-promoter-system-loyalty-insights.aspx Date of access: 12 August 2017.

Markham, G.C.A.S.K. 2013. Perspective: New product failure rates: influence of argumentum ad populum and self-interest. *Journal of Product Innovation Management*, 30(5):976-979.

Medallia. 2017. Net promoter score. http://www.medallia.com/net-promoter-score/ Date of access: 2 September 2017.

Media, A. 2002. New toilet paper alternative leaves company all wet. http://lubbockonline.com/stories/042102/bus_0421020018.shtml - .WYq8YK2B1P0 Date of access: 9 August 2017.

Medupe, S. 2017. The DTI pleased with efforts to develop mining equipment manufacturers https://www.thedti.gov.za/editmedia.jsp?id=3989 Date of access: 31 October 2917.

Chamber of Mines.. 2016. Facts and Figures. Johannesburg: Chamber of Mines.

Chamber of Mines Mines. 2017. Modernisation towards the mine of tomorrow. Johannesburg: Chamber of Mines.

Moebius, R. & Staack, V. 2015. Strategic product value management: How companies can improve innovation, reduce costs and mitigate risk. Johannesburg: PWC.

Monette, D.R., Sullivan, T.J., Dejong, C.R. & Hilton, T.P. 2014. Applied social research. New York, NY: Brooks/Cole.

Moolla, A.I. & Bisschoff, C.A. 2012. Validating a Model to Measure the Brand Loyalty of Fast Moving Consumer Goods. *Social Science*, 31(2):101-115.

Moolla, A.I. & C.A. 2012. Validating a model to measure the brand loyalty of fast moving consumer goods. *Journal of Social Sciences*, 2(31):101-115.

Mostert, P.G., Petzer, D.J. & Weideman, A. 2016. The interrelationships between customer satisfaction, brand loyalty and relationship intentions of Generation Y consumers towards smartphone brands. *South African Journal of Business Management*, 47(3):25-34.

Mouton, J. 2001. How to succeed in your master's and doctoral studies: A South African guide and resource book. Pretoria: Van Schaik.

Mowatt, G. 2013. 10 pretty cool inventions you may not have known come from South Africa. https://www.thesouthafrican.com/the-top-10-south-african-inventions/ Date of access: 31 October 2017.

Naidoo, K. 2011. Stress management and its impact on work performance of educators in public schools in KwaZulu-Natal. Potchefstroom: North-West University. (Theisis - PhD).

Neely, A. 2013. What is servitization? http://andyneely.blogspot.co.za/2013/11/what-is-servitization.html Date of access: 29 October 2017.

Nenonen, S., Ahvenniemi, O. & Martinsuo, M. 2014. Image risks of servitization in collaborative service deliveries. *The Service Industries Journal*, 34(16):1307-1329.

Neren, U. 2016. How Avaya Turned Around Its Customer Ratings. *Harvard Business Review*, October: 2-5

Omarjee, L. 2017. Manufacturing sector continues to underperform. https://www.fin24.com/Economy/manufacturing-sector-continues-to-underperform-20170314 Date of access: 1 November 2017.

Osborne, J.W. 2015. What is rotating in exploratory factor analysis? *Practical Assessment, Research & Evaluation*, 20(2).

Paharia, N., Avery, J. & Keinan, A. 2014. Positioning Brands Against Large Competitors to Increase Sales. *Journal of Marketing Research*, LI: :647-656, December

Peri, S. 2012. Factor analysis - KMO - Bartlett's Test & rotated component matrix. http://badmforum.blogspot.co.za/2012/08/factor-analysis-kmo-Bartletts-test.html Date of access: 28 October 2017.

Petersen, K.J., Frayer, D.J. & Scannell, T.V. 2000. An empirical investigation of global sourcing strategy effectiveness. *Supply Chain Management: An International Journal*, 36(2):29-38.

Pickett-Baker, J. & Ozaki, R. 2008. Pro-environmental products: marketing influence on consumer purchase decision. *Journal of Consumer Marketing*, 25(5):281-293.

Pisano, G.P. 2015. You need an innovation strategy. *Harvard Business Review*(June 2015).

Pokroy, J. 2016. Is the skills shortage in South Africa still a myth? www.hrfuture.net Date of access: 4 November 2017.

Ratner, B., 2009. The correlation coefficient: Its value range between +1/-1. *Journal of targeting, measurement and analysis for marketing*, 17(2):139-142.

Reichheld, F.F. 2003. The One number you need to grow. *Harvard Business Review*, December: 1-9.

Ruth, M. 2016. Customer satisfaction. Salem Press Encyclopedia. Beirut: Salim Press.

SA, S. 2015. Statistics South Africa presents the Mining industry, 2015 results. Pretoria: SSA

Saunders, M., Lewis, P. & Thornhill, A. 2009. Research methods for business students. tth ed. England: Pearson.

Sauro, J. 2015. Tips for measuring customer loyalty. *ABA Bank Marketing and Sales, August:* 1-4.

Schiffman, L.G., Kanuk, L.L. & Hansen, H. 2012. Consumer Behaviour. 2nd ed. Upper Saddle River, NJ: Pearson.

Sekran, U. 2003. Research Methods for Business. Fourth. New York, NY: Wiley.

Selltiz, C. 1962. Research Methods in social Science. New York, NY: Holt, Rinehart and Winston.

Shamoo, A.E. & Resnik, D.R. 2003. Responsible conduct of research. Cape Twon: Oxford.

Simuforosa, M. & Wiseman, M. 2015. A guide to conducting research: A student handbook. New York, NY: Strategic Books.

Singh, C. 2016a. Mining equipment market by equipment type (mineral processing, surface mining, underground mining, mining drills & breakers, crushing, pulverizing, screening) and application (metal, mineral, coal mining).. Global Opportunity Analysis and Industry Forecast, 2015-2022. Johannesburg: Chamber of Mines.

Singh, N. 2016b. New initiatives aims to take South Africa mining into a modernised future [personal, Johannesburg.

Slater, D. 2016. New initiative aims to take South Africa mining into a modernised future. http://www.miningweekly.com/article/new-initiative-aims-to-take-South-Africa-mining-into-a modernised-future Date of access: 4 November 2017.

Smith, C. 2015. The Role of Mining in the South African Economy. https://www.sablog.kpmg.co.za/2013/12/role-mining-south-african-economy/ Date of access: 16 April 2017.

Solomon, M., Bamossy, G., Askegaard, S. & Hogg, M.K. 2006. Consumer behaviour. 3rd ed. London: Prentice Hall.

Sorensen, P. 2011. Mining in South Africa: a mature industry? *International Journal of Environmental Studies*, 68(5):625-649.

Statistica. 2006. Data analysis software system. www.statsoft.com Date of access: 28 October 2017.

Tavakol, M. & Dennick, R. 2011. Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2:53-55.

Teaching, C.f.I.i.R.a. 2012. Basic research designs. https://cirt.gcu.edu/research/developmentresources/tutorials/researchdesigns Date of access: 24 Septemeber 2017.

Tourism, S.A. 2017. A brief history of mining in South Africa. http://www.southafrica.net/za/en/articles/entry/article-a-brief-history-of-mining-in-south-africa Date of access: 14 April 2017.

Tressin, T. & Richter, N.F. 2014. Determinants of international purchasing success: an analysis of the status quo of research. *Management and Organizational Studies*, 1(2):129-147.

Tyblewska, N. 2012. Three-way Fight for Underground equipment market share. Engeneering and Mining Journa. http://www.e-mj.com/features/2372-three-way-fight-for-underground-equipment-market-share.html#.Wgr6JbWxXcs Date of access: 10 Nov. 2017..

Ulwick, A.W. 2017a. Outcome-driven innovation (ODI): Jobs to be done theory in practice. San Francisco, CA: Strategyn.

Ulwick, T. 2017b. 10 Characteristics of The "Perfect" Customer Need Statement. http://customerthink.com/10-characteristics-of-the-perfect-customer-need-statement/ Date of access: 31 August 2017.

Verduyn, D. 2013. Discovering the Kano Model. New York, NY: Emerald.

Vosloo, J.J. 2014. A sport management programme for educator training in accordance with the diverse needs of South African schools. Potchefstroom: North-West University. (Dissrtation - MBA).

Walliman, N. 2011. Research Methods The Basics. New York, NY: Routledge.

Walsh, J. 2017. 'My electronic Swiss army knife': readers on 10 years of the iPhone. https://www.theguardian.com/technology/2017/jun/29/my-electronic-swiss-army-knife-readers-on-10-years-of-the-iphone Date of access: 10 May 2017.

Ward, D. & Larsen, M. 2009. An overview of needs theories behind consumerism. Munich: European School of Economics.

Waterschoot, W. & Bulte, C.V.D. 1992. The 4P classification of the marketing mix Revisited. *Journal of Marketing*, 56:83-93.

Webster, F. 1994. Market-driven management. New York, NY: Wiley.

Welman, K.a.M. 2005. Research methodology. 3rd ed. Cape Town: Oxford Univerity.

Witell, L. & Lofgren, M. 2007. Classification of quality attributes. *Managing Service Quality*, 17(1):54-73.

Witell, L., Lofgren, M. & Dahlgaard, J.J. 2013. Theory of attractive quality and the Kano methodology – the past, the present, and the future. *Total Quality Management*, 24:1241-1252.

Wunker, S., Wattman, J. & Farber, D. 2016. Jobs to be Done. New York, NY: Amacom.

Zeithaml, V.A. 1988. Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of Marketing*, 52:2-22.

ANNEXURES

Annexure 1: Determining customer needs for a niche supplier in the mining industry

Dear Respondent

Thank you for sparing your precious time to complete this questionnaire. It is being distributed to you purely for an academic purpose in partial fulfilment of the requirements for the degree Master of Business Administration at the Potchefstroom Campus of the North-West University.

This questionnaire is to determine the customer needs for a niche supplier in the mining industry. The questionnaire will take approximately 5-10 minutes to complete. Your unbiased selection of answers will be highly appreciated and makes a valuable contribution to this research. You are not obligated to complete the questionnaire, nor will any penalty come from refusal to partake, but it will be immensely appreciated if you will complete the entire questionnaire. Your individual responses will, of course, be kept strictly confidential. The overall statistical analysis will, however, be available to all respondents from the 20th November.

Results will be presented in a collective format. The study will help all market role-players to understand the customer needs for the mining sector. The questionnaire is divided into the following two sections:

Section A: Demographics

Section B: Customer Needs

For the purpose of this study, the statements are scrambled to ensure objectivity from the respondent.

Study leader: Mr Martin Botha.

Contact details: Martin.Botha@nwu.ac.za or alternatively 018 299 2500

Section A: Demographics

(Please indicate by marking an **X** in the relevant column).

Gender	Male	Female

Age Group	18-25	26-34	35-40	41-50	51-64	65 and older

Ethnicity	African	Coloured	Indian/Asian	White

Home Language	English	Afrikaans	Zulu	Xhosa	Sesotho	Tswana
	Swazi	Tsonga	Venda	Ndebele	Northern Sotho	Other
If other, please specify						

Highest Qualification	Matric	Post School	Post graduate certificate	Post graduate degree

Work Experience (years)	0-5	6-10	11-15	16-20	20 +

Management Experience?	Yes	No

If Yes, how many years	0-3	4-5	6-10	>10

Level of management	Supervisor	Middle management	Senior Management	Director	Other
If other, please specify					

Section B: Customer needs

(Please indicate by marking an **X** in the relevant column).

The following 5-point scale must be used:

1	2	3	4	5
Totally disagree	Somewhat disagree	Neutral	Somewhat agree	Totally agree

Product	1. Local OEMs (Original Equipment Manufacturer) manufacture quality products.	1	2	3	4	5
	2. Local manufactures for mining equipment are preferred above international manufacturers of mining equipment.	1	2	3	4	5
	3. Products form local OEMs are readably available.	1	2	3	4	5

	4. Local OEMs make use of the latest technology and has up to date mining products.	1	2	3	4	5
	5. Local OEMs has the skills and facilities to manufacture equipment to satisfy our needs.	1	2	3	4	5
	6. Imported equipment is of better quality.	1	2	3	4	5
	7. Customised product offerings are available from local OEMs to suite my needs.	1	2	3	4	5
Price	8. Local OEMs product prices are competitive.	1	2	3	4	5
	9. Local OEMs prices for mining equipment is in line with international equipment prices	1	2	3	4	5
	10. Local OEMs equipment is good value for money.	1	2	3	4	5
	11. Local OEMs products will have better value if compared to importers.	1	2	3	4	5
	12. Local OEMs products will save me cost.	1	2	3	4	5
Service	13. Customer service plays a major role in your choice of equipment supplier.	1	2	3	4	5
	14. Time to repair equipment plays a major role on the selection of equipment.	1	2	3	4	5
	15. Availability of spare parts for the equipment plays a major role in the selection of equipment.	1	2	3	4	5
	16. Cost of spare parts for your equipment plays a major role in the selection of equipment.	1	2	3	4	5

Promotion	17. Local equipment manufacturers are visible when making purchasing decisions.	1	2	3	4	5
	18. Awareness of local OEMs will increase business activity.	1	2	3	4	5
	19. International equipment manufacturers are visible when making purchasing decisions.	1	2	3	4	5
	20. There are sufficient local manufacturers in South Africa.	1	2	3	4	5
	21. The product range of mining equipment for local OEMs is well known.	1	2	3	4	5
	22. The product range of international mining equipment manufacturers is well known.	1	2	3	4	5
Distribution	23. Equipment is delivered in time in accordance to the agreement between buyer and seller.	1	2	3	4	5
	24. Local OEMs technical skills and support service are geographically distributed.	1	2	3	4	5
	25. National availability of spare parts is up to standard in the market.	1	2	3	4	5
	26. The manufacturers in the market operate in convenient hours and representatives are readably available.	1	2	3	4	5
Local OEM	27. Local OEMs are reliable and trustworthy.	1	2	3	4	5
	28. I have sufficient knowledge in regards to local OEMs product range.	1	2	3	4	5
	29. Local OEMs have good after sales service.	1	2	3	4	5

Consumer needs	30. Mechanisation of mining operations will increase the efficiency of mining operations.	1	2	3	4	5
	31. Skilled personal are scares in the mining industry.	1	2	3	4	5
	32. Continuous 24-hour cycle of mining operations are viable.	1	2	3	4	5
	33. Local OEMs and mining organisations must form partnerships.	1	2	3	4	5
	34. Overhaul cost needs to be reduced to ensure survival and sustainability of the mining industry.	1	2	3	4	5

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

Annexure 2: ETHICAL CLEARANCE

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15 June 2017

ETHICAL CLEARANCE

This letter serves to confirm that the research project of **REYNDERS, K** has undergone ethical review. The proposal was presented at a Faculty Research Meeting and accepted. The Faculty Research Meeting assigned the project number **EMSPBS16/11/25-01/63** This acceptance deems the proposed research as being of minimal risk, granted that all requirements of anonymity, confidentiality and informed consent are met. This letter should form part or your dissertation manuscript submitted for examination purposes.

Yours sincerely

Prof CJ Botha

Manager: Research - NWU Potchefstroom Business School

Original details: Wilma Pretorius(12090298) C:\Documents and Settings\Administrator\My Documents\Briewe MBA\2017\

Annexure 3: Language editing

Dynamic Language & Translation Specialists

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Monday, 13 November 2017

To whom it may concern,

Re: Letter of confirmation of language editing

The MBA dissertation **Determining customer needs for a niche supplier in the mining industry** by **Kevin Reynders (26608162)** was language and technically edited. The referencing and sources were checked as per NWU referencing guidelines. Final corrections remain the responsibility of the author.

Antoinette Bisschoff

Officially approved language editor of the NWU since 1998
Member of SA Translators Institute (no. 100181)