

A competitive intelligence framework for the sustainability of metals manufacturers in South Africa

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DECLARATION

I declare that:

A competitive intelligence framework for the sustainability of metals manufacturers in South Africa

is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references, and that this dissertation has not previously been submitted by me at any other university.



SIGNATURE

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November 2017

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LETTER FROM THE LANGUAGE EDITOR

DECLARATION OF LANGUAGE EDITING



I, Mari Grobler, hereby declare that I have language edited the research study with the title:

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for **Herman Smit** for the purpose of submission as a research study.

Changes were suggested in the form of electronic track changes and comments. Implementation was left to the discretion of the author.

Please contact me, should there be any questions concerning the language editing of this study.

Yours sincerely

Mari Grobler
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ABSTRACT

South Africa is a country rich in mineral resources. It has more than 50 underground commodities with the world's largest reserves of manganese, chrome, vanadium and platinum. It also holds major reserves of titanium, iron ore and coal. In addition, South Africa has an abundant labour resource, good infrastructure and world-class manufacturing expertise. However, the economic growth rate – more than 20 years after democracy – is lower than what many South Africans may have hoped for. One of the strategies to improve the economic growth rate is to export less of South Africa's mineral resources at a low value-adding factor and to promote the export of value-adding products. Metals manufacturers, being part of the manufacturing industry in South Africa have a good upstream commodity supply and a good logistics chain for the acquisition of unprocessed products for further processing, and can fulfil an important role in adding value to mineral resources while contributing to South Africa's economic growth. Despite seemingly favourable conditions, the metals manufacturers in South Africa are barely surviving or are suffering severe losses. The main reason for this is that metals manufacturers are not competitive, according to the “new” and increasingly stricter global competitiveness yardstick.

The main problems that this study addressed are: 1) that the competitive intelligence practices by metals manufacturers are currently unknown; and 2) it is unknown to what extent and how the competitive intelligence of metals manufacturers can be improved to lead to business sustainability. The main objectives of this study were to identify current practices and develop a competitive intelligence framework that can aid metals manufacturers in South Africa to improve sustainability. Competitive intelligence focuses on the external environment of companies whereas integrated intelligence includes the elements of competitive and customer intelligence and integrates with other disciplines in the supply chain such as finance and the planning cycle of companies. This research study made use of an explanatory sequential mixed methods design. The empirical study consisted of a quantitative phase followed by a qualitative phase. For the quantitative phase a new questionnaire was developed and used to collect primary data from employees of metals manufacturers in South Africa to test for competitive intelligence practices, a competitive intelligence framework and theories. The Kaiser-Meyer-Olkin coefficient from a total of 63 responses from metals manufacturers was good and the sampled data were adequate for this research. Frequencies, descriptive statistics, factor analysis, analysis of means and correlation analysis of the collected data enabled the testing of the results during the quantitative phase against the objectives of the questionnaire. This in turn, enabled the development of an appropriate interview guide that was used during data collection in the qualitative phase.

The seven representatives from the metals manufacturing fraternity who were interviewed confirmed or clarified aspects that transpired from the quantitative phase of this research. The results from the qualitative empirical phase enabled the formulation of conclusions. The information and insights gained from the literature reviews and the empirical phases of this research enabled the development of a competitive intelligence framework that is scalable and can be implemented by small to large metals manufacturers in South Africa. This competitive intelligence framework – when used as indicated in the description of its building blocks – contributes to the increased competitiveness and sustainability of metals manufacturers in South Africa. Competitive intelligence practices and a framework to aid the metals manufacturers in South Africa with competitive intelligence have not previously been researched. In practical terms: the increased competitiveness and sustainability of metals manufacturers in South Africa will contribute to the South African economy, job creation and security and lastly, the South African National Development Plan.

KEY TERMS: Competitive intelligence; Competitiveness; Integrated intelligence; Metals manufacturers; Sustainability; Value chain analysis

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LIST OF ABBREVIATIONS

AMSA	ArcelorMittal South Africa
GDP	Gross domestic product
MEIBC	Metals and Engineering Industry Bargaining Council
SAISI	South African Iron and Steel Institute
SEIFSA	Steel and Engineering Industries Federation of Southern Africa

CHAPTER 1

NATURE AND SCOPE OF THE STUDY

1 INTRODUCTION

1.1 Background to the research

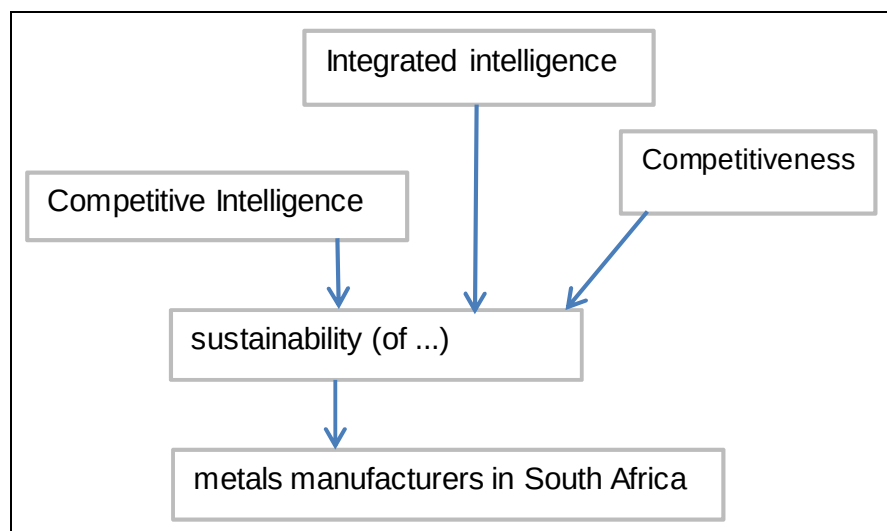
South Africa is a country rich in mineral resources. However, the economic growth rate – more than 20 years after democracy – is lower than what many South Africans may have hoped for. According to South Africa's Deputy Minister of Trade and Industry, Elizabeth Thabethe, one of the strategies to improve the economic growth rate is to export less of our mineral resources at a low value-adding factor and to promote the export of value-adding products (Thabethe, 2013). According to Cypher (2014:361), countries should strive towards the production of goods with higher value-add compared to domestically-owned resources, since it is the production of these commodities for the domestic market and for export, which adds most to a country's gross domestic product (GDP).

South African companies, however, face challenges associated with globalisation and they need to compete on a global level. Many companies in South Africa have, therefore, established a competitive intelligence function that they use in support of operational decision-making strategies (Sewdass & Du Toit, 2014:2). According to Sewdass (2012:24), the basis for competitive intelligence is to understand the difference between information and intelligence. An understanding of these two concepts is important for companies to service their markets and clients in future due to the importance of companies obtaining a sustainable and guaranteed client base. Porter (1990:25-40) developed the diamond model of competitiveness that helps individuals to understand the competitive position of companies in the global economy. Porter identified four classes of company attributes that provide the underlying conditions or platform for the determination of a competitive advantage. These classes are 1) factor conditions; 2) demand conditions; 3) related and support industries; and 4) company strategies, structure and rivalry. "Strategies" are, therefore, identified as an important element of industry competitiveness. This concept is well known and various studies and publications on this topic exist (Slack, 2015:12-44; Dixit & Skeath, 2015:9-53; Baldwin *et al.*, 2012:21-78). One of the various definitions of the concept is that strategies are 1) methods or plans chosen to bring about a desired future, such as achieving goals or solutions to problems; or 2) the art and science of planning and aligning resources for their most efficient and effective use (Thompson *et al.*, 2013:26).

The metals industry in South Africa is one of the industries that can contribute to an increased value-adding factor in its value chain by not selling products purely as raw materials. For example, iron ore, lime and coal are used as the three basic components to manufacture iron. During some of the downstream processes other elements, such as nickel and chrome, are added to manufacture steel. Steel is used during additional downstream processes to create specific qualities and shapes of steel that are used in a variety of other manufacturing processes. Car manufacturers use sheet metal with specific pliable qualities. Manufacturers of refrigerators and stoves use coated sheet steel products, referred to as “white appliances” steel. The value-add of the aforementioned examples continues further downstream and leads to South Africa exporting various brands of cars, such as Volkswagen and Mercedes. From 2005 to 2015 the production of vehicles for the export market of South Africa has increased from 139 554 units to 332 032 units and the projection is to achieve more than 500 000 units by 2020 (Pretorius, 2016).

Companies should not only develop and have competitive strategies in order to deliver superior and sustainable performance but should also adapt and improve their strategies on a continual basis in order to remain competitive and sustainable (Schuller & Lidbom, 2009:935). For companies to remain competitive and sustainable, they should maintain systems in the long term, according to environmental, economic and social considerations (Crane & Matten, 2007:23). The keywords used in this background will be used through-out this research.

Figure 1.1: Inter-relationship of keywords



Source: Author, 2015.

In Figure 1.1, the inter-relationship amongst the key concepts of this study is illustrated. The bottom part of the figure illustrates that the value-add discussed in this study focuses on achieving improved sustainability for metals manufacturers in South Africa. The core of this

study pivoted on the concept of competitive intelligence. The end goal of the illustration in Figure 1.1 is that this study aimed to develop a competitive intelligence framework that can contribute to the sustainability of South African metals manufacturers. Value chain analysis is also included in the literature review as it can contribute to competitive intelligence (Bose, 2008:510-528). Furthermore, strategies are also included in the literature review as these can contribute to sustainability (Vecchiato & Roveda, 2010:99-112). Strategies are important when competitiveness is discussed. An integrated intelligence has a wider view than competitive intelligence and includes internal elements of companies.

An introductory review of literature on the mentioned topics follows below.

1.2 Literature review of the research area

1.2.1 Competitiveness, strategies and competitive intelligence

In today's changing and dynamic environment, companies need to continually assess, develop and implement strategies to ensure they position themselves for growth and to harness future opportunities whilst ensuring costs are kept under control (KPMG, 2014). The world is highly competitive and quite often there are more businesses in operation than a healthy market demand calls for (Djekic, 2014:14-18). In order for companies to survive in such an aggressively competitive environment, a better understanding of their competition and forces that affect their success is required. Companies should know how to remain competitive and how to anticipate and react to changes inside and outside of their industry. In order to manage such an achievement, companies should have a process in place for turning data into information and information into actionable intelligence from which strategic and tactical decisions can be made. Gathering data and turning raw data into information and intelligence is a fundamental aspect of conducting business (Laudon & Laudon, 2012:17-45). Intelligence therefore is information content that is analysed, interpreted and infused with implications for development (Fleisher & Bensoussan, 2007:46). The concept of competitiveness is key to the performance and survival of companies. Competitiveness is, however, a multifaceted concept and according to Schuller and Lidbom (2009:935), competitiveness refers to the competitive environment that the companies of a country face. Furthermore, the economic success of a country depends on its capacity to apply activities that create a competitive advantage, its ability to create an environment of transformation and progress and its capacity to innovate (Canongia, 2006:58).

Vecchiato and Roveda (2010:99-112) argue that the formulation of strategies is directly linked to an analysis of the likely evolution within the business environment and it is important to timeously detect opportunities and threats caused by developing trends in order to deal with them appropriately. Business landscapes are continually changing. It is, therefore, important to

track these changes and to incorporate new changes when decisions are made (Vecchiato & Roveda, 2010:99-112). In this context, strategies can be viewed as the action plan of management in order to compete successfully and to operate profitably, based on an integrated array of considered choices (Thompson *et al.*, 2012:12-88). Competitive intelligence is, therefore, a component of business intelligence aimed at gaining a strategic advantage (Porter, 1980:15).

Competitive intelligence is better understood when the difference between information and intelligence is explained. Decision makers usually have to read through several reports and proposals before making decisions, and it is often found that although they are overwhelmed with information, the reports lack intelligence that can enable them to make more efficient decisions. It can, therefore, be stated that companies that are able to turn information into intelligence, will succeed (Sewdass, 2012:24).

Strategic intelligence is concerned with placing the right information in the hands of the right individuals at the right time so that these individuals are able to make informed business decisions about the strategic direction of their business (Xu, 2007:33-51). Strategic intelligence assists in providing insight into what is influencing the industry. It can handle vast volumes of information to help identify and develop new business opportunities and by making use of new opportunities and implementing effective strategies, a business advantage is created. Strategic intelligence – by leveraging internal and external intelligence from business intelligence, competitive intelligence, market intelligence and knowledge management – can assist companies in maximising their strategic goals (Marchand & Hykes, 2007:31-33).

Since competitive intelligence is a relatively new management concept, it is necessary to ensure that an accurate understanding and definition of this concept is obtained. Several terms, such as business intelligence, competitor intelligence and even industrial espionage, are found in literature to explain the concept of competitive intelligence (Calof & Wright, 2008:717-730). According to Calof and Skinner (1999:2), Competitive intelligence is actionable information arising from a process involving planning with collecting, analysing and disseminating information available in the external environment for opportunities that have the potential to affect the competitive position of companies. This multistage process is also referred to as the “competitive intelligence wheel” (Calof, 1997:22). The basis of competitive intelligence is, therefore, knowing the difference between information and intelligence. Streamcrest (2003:2) believes that competitive intelligence provides a framework of knowledge to organise coordinated activities in a group, to share information, to allow for analyses and to incorporate active collection techniques.

A comprehensive definition of competitive intelligence is “the legal collection and analysis of information regarding the capabilities, vulnerabilities and intentions of business competitors conducted by using ‘open sources’ and ethical inquiry” (SCIP, 2012). Kahaner (1997:31-45) eloquently discusses what competitive intelligence is by showing how companies efficiently, systematically and economically collect information, analyse and use it to make decisions. This understanding can assist decision makers in companies to make more informed decisions concerning the improvement of the quality of services or products offered to citizens. Most companies and individuals alike, confine competition to other companies performing the same function as they are, and literature usually refers to this view as “direct competitors” or “traditional competitors”.

1.2.2 A value chain analysis

Porter (1985:27) defines the term “value chain” as a series of value-adding activities. This series consist of primary activities related directly to the manufacture, sales and distribution of products and secondary activities that support the primary activities, such as planning, finance, research and development, and human resources. This separation of functions can also be applied in inter-company systems from raw material inputs to consumption (Shank & Govindarajan, 1992:181; McGuffog & Wadsley, 1999:241). A value chain analysis, however, extends the line of sight to include input suppliers and service providers and their contribution to the creation of value and the generation of waste (Fearne *et al.*, 2012:575-581).

Porter and Kramer (2011:62-77) argue that to be relevant in the current business context, existing approaches to a value chain analysis should adopt more holistic (sustainable) perspectives that must include addressing external factors, such as health, environmental damage and poverty, that can offer opportunities in creating a shared value. A value chain analysis is also one of the tools that can contribute to competitive intelligence (Bose, 2008:510-528), and can also be viewed from an intra-chain perspective where components inside a single chain are analysed for a single company (Dekker, 2003:1-23) or from an inter-chain perspective (Lambert & Cooper, 2000:65-83) where components between multiple chains can be analysed for multiple companies and where an upstream and downstream value chain analysis is possible. A value chain analysis was used in this research study to confirm the various contributing factors to the value chain of businesses and to confirm a relationship between a value chain analysis and competitive intelligence.

1.2.3 Integrated intelligence

Integrated intelligence is a great new term that can add value to companies’ competitiveness (Calof, 2016). Integrated intelligence includes elements of competitive and customer intelligence

and integrates with other disciplines in the supply chain of companies, such as finance and the planning cycle of companies (Bulger, 2015). According to Bulger (2015), these pieces of integrated intelligence aim to assist companies making decisions about how to be competitive in a market. Integrated intelligence therefore aims to take into account all the dimensions of companies, their markets and customers and adds value to the strategic planning processes of companies.

According to Bulger (2016:64), companies should develop robust decision-influencing functions with teams of experts who collectively integrate varying points of view and recommendations by making use of systems that result in synergistic and integrated competitive intelligence or integrated intelligence capabilities. Bulger (2016:64) continues to describe that intelligence functionality and skills must include the methodical collective nature of all considerations about markets from a variety of intelligence pools, including economic, market, competitor, customer, and technological intelligence insights from the myriad of complex datasets that exist. Bulger (2016:81) concludes by highlighting that this multifaceted intelligence viewpoint – conducted in partnership with other disciplines – is critical in solving issues and to create opportunities for companies around the world that aim to be business leaders.

1.3 Motivation of topic actuality

South Africa is known for its vast deposits of mineral resources, which account for a significant proportion of world production and reserves (Deloitte, 2013:5). There have been many calls by various leaders over the years to rather add value to raw minerals and products and to economically engage on a higher level with manufacturing industries (Cypher, 2014:361; Thabethe, 2013).

International manufacturing statistics show the dominant position of the United States of America, China and to a lesser extent Japan as world manufacturers. Statistics also show how China increased their manufacturing output from a mere 3% in 1990 to 18.9% in 2010 (Small Enterprise Development Agency, 2015). The manufacturing sector in South Africa is growing slower in comparison to other sectors and has shrunk from 19% of the GDP in 1993 to 17% of the GDP in 2010 (Small Enterprise Development Agency, 2015). In 2013, the South African manufacturing sector contributed 15.2% to South Africa's GDP, making it the third-largest contributor to the country's economy (Statistics South Africa, 2015). The percentage contribution of the manufacturing industry towards the South African GDP has slightly declined from 2004 to 2010. However, the manufacturing industry still contributes significantly to the South African GDP with 17.1% in 2010, which can be translated to a contribution of

approximately R282 billion (United Nations, 2015; Small Enterprise Development Agency, 2017).

South Africa has developed an established, diversified manufacturing base that is showing its resilience and potential to compete in the global economy (Statistics South Africa, 2016). The manufacturing sector provides a locus for stimulating the growth of other activities, such as services, and achieving specific outcomes, such as employment creation and economic empowerment. The manufacturing sector in South Africa is dominated by agro-processing, automotive, chemical, information and communication technology, electronics, metals, textiles, clothing and footwear industries. Underpinning this sector is the Industrial Policy Action Plan of the Department of Trade and Industry, which aims to achieve structural development and to increase the competitiveness and sustainability of the South African manufacturing sector (Statistics South Africa, 2016).

This study will include competitiveness in a global context although currently, South Africa is weakly integrated with the global economy (Sewdass & Du Toit, 2014:187). Since competitive intelligence analyses focus on the business environment, which includes competitors and markets, an understanding of the direction of competitors in the future is key to be able to counteract them timeously (Sewdass & Du Toit, 2014:188). The manufacturing sector in South Africa covers the following sub-industries (Statistics South Africa, 2016):

- Metals and engineering
- Agri-processing
- Automotive
- Chemicals
- ICT (information and communication technology) and electronics
- Textiles, clothing and footwear

The metals and engineering industry, which includes metals manufacturers, represents roughly a third of South Africa's manufacturing sector (Statistics South Africa, 2015).

2 PROBLEM STATEMENT

The manufacturing sector has seen some significant changes during the past decade with various macro-environmental effects characterised by changing technologies and markets that represent both threats and opportunities (Deloitte, 2013:3; Thornton, 2015:22-37). During this changing environment the struggle to create a sustainable competitive advantage has become a common denominator for many companies and requires increased strategic flexibility, speed

and innovation to manage environmental discontinuities and unpredictable changes for the creation or maintenance of any competitive advantage (Thornton, 2015:23-41).

Continual engagement in competitive intelligence will assist leaders in overcoming blind spots where decision makers do not notice or understand pitfalls, such as misjudging industry boundaries, competitor challenges and customer issues (Buchel, 2010:2).

This research study proposes that the ability of competitive intelligence to absorb sources of information, a synergy of competitive intelligence elements can provide manufacturing companies a sustainable, competitive business advantage.

To summarise the research problem: With regard to competitive intelligence i) the current practices of South African metals manufacturers are currently unknown, and ii) it is unknown to what extent and how these manufacturers can improve their competitive intelligence to lead to improved business sustainability.

The research questions are:

- i) How do strategic intelligence, a value chain analysis and competitive strategies contribute to the competitive intelligence of metals manufacturers in South Africa?
- ii) How does competitive intelligence contribute to business performance and sustainable profitable growth for metals manufacturers?
- iii) What is the degree to which competitive intelligence is used by metals manufacturers?
- iv) What value does competitive intelligence add to strategic planning and decision-making for metals manufacturers?
- v) How does competitive intelligence form a pivotal component of strategic management?
- vi) How will a framework look that accommodates all mentioned variables (competitive intelligence, strategic intelligence, strategic planning and sustainable profitable growth)?

This research also tested four theories and in all four cases was the theories confirmed for metals manufacturers in South Africa. The research objectives of the study are outlined below.

3 RESEARCH OBJECTIVES

The two main objectives of this research were to i) determine the current practices and ii) develop a competitive intelligence framework that can aid towards the improved sustainability of the metals manufacturers in South Africa. The secondary objectives of this research are to answer the research questions stated in the previous section.

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

4 SCOPE OF THE STUDY AND INDUSTRY

The concepts of competitive intelligence, a value chain analysis and competitive strategies are broad. The manufacturing sector also covers a broad range of manufacturers and service providers. Mouton (2015:137-142) proposes a three worlds framework to understand the differences in levels of an analysis in scientific reasoning. These three worlds are 1) the world of everyday life and general knowledge, 2) the world of science and scientific research, and 3) the world of meta-science.

This research study – with reference to Mouton's first world – primarily focused on the use of competitive intelligence and its contribution to business performance, strategic planning and decision-making for the metals manufacturing industry in South Africa. Similarly, the study – with reference to Mouton's second world – focused on aspects as listed in chapters 2 to 6 and depicted in Figure 1.3: the research methodology and design, literature study, development and testing of the hypothesis and theories, conclusions and recommendations. Thirdly, this study focused on aspects, such as positivism and interpretivism, discussed in the quantitative and qualitative research phases in section 5.3 of this chapter and can be linked to Mouton's third world.

The University of Melbourne (2011) proposed a four capital model as a theory of sustainability and argues that these four capitals must be balanced in order to achieve sustainability in any society. These four capitals are: 1) human capital; 2) financial capital; 3) environmental capital; and 4) manufactured capital. Human capital refers to human beings and their capabilities whereas financial capital relates to money, its policies and instruments. Environmental capital refers to natural resources while manufactured capital refers to human-made infrastructure, machines, tools and factories.

This study evaluated relevant existing theories, test theories and proposed conclusions based on the outcomes of the empirical research for metals manufacturers in South Africa.

The research method/design used for the study is briefly discussed below.

5 RESEARCH METHODOLOGY

5.1 Literature review

For this study a comprehensive literature review was conducted by means of relevant scientific journals, articles, books and research documents.

The following databases were used:

- SACat – a national catalogue of books and journals available in South Africa.
- Nexus – databases compiled by the National Research Foundation containing current and completed research done in South Africa.
- SAEpublications – South African journals.
- SAMEDIA – newspaper articles.
- EbscoHost – international journals available on Academic Search Premier and Business Source.
- Premier, Communication and Mass Media Complete and EconLit.
- Emerald – international journals.
- ProQuest – international dissertations in full text.
- Internet – Google Scholar.

The purpose of the literature review was to determine what has already been researched on this specific topic and to determine the need for the study by identifying gaps that exist in current literature. The literature review assisted in determining how these gaps can be filled and to demonstrate the underlying assumptions of the study.

The final part of the literature review aimed to investigate all aspects required for the empirical part of the study. This included detail regarding the instruments used for data collection, the requirements of a statistical analysis and the process followed to interpret the analysed data to obtain findings.

5.2 Empirical research

This research study made use of an explanatory sequential mixed methods design, which consisted of a quantitative phase followed by a qualitative phase. A questionnaire was completed by the employer population of metals manufacturers based in South Africa. Interviews were conducted with representatives from companies in the metals manufacturing

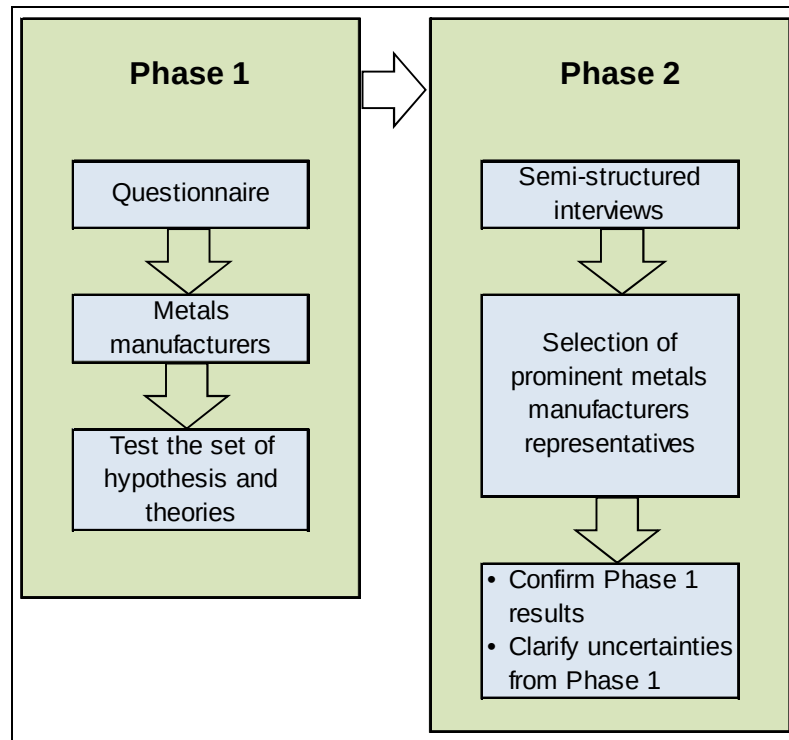
fraternity in South Africa. For the quantitative phase of the study a questionnaire was developed and used to collect primary data from metals manufacturing employers in South Africa to test for competitive intelligence practices, a competitive intelligence framework and theories. Frequencies, descriptive statistics, factor analysis, analysis of means and correlation analysis of the collected data enabled the testing of the results during the quantitative phase against the objectives of the questionnaire. This in turn enabled the development of an appropriate interview guide, which was used during the data collection in the qualitative phase. Theories were tested during the quantitative phase and the results from the qualitative empirical phase enabled the formulation of conclusions.

The empirical study was based on the requirements for a valid research approach and design, a definition of the study population, the incorporation of suitable measuring instruments and reliable statistical techniques for the analysis of data (Welman & Kruger, 2001:250). According to Cooper & Schindler (2014:153), no specific questions are asked during unstructured interviews and no specific topics are discussed. Each interview is customised to fit each of the participants. However, during structured interviews a detailed interview guide similar to a questionnaire is used to guide the order in which questions are asked and the specific way the questions are asked – the questions generally remain open-ended. Structured interviews permit a direct comparability of responses; question variability is eliminated and answer variability is, therefore, assumed to be real. In structured interviews, the neutrality of interviewers is maintained. A semi-structured interview also has a structure to guide the interview process but a free discussion of topics is allowed. In this study, both questionnaires and semi-structured interviews were used.

5.2.1 The research approach and design

The research approach and design made the use of questionnaires appropriate during the first phase. Interviews were conducted during the second phase of the empirical part of the research.

Figure 1.2: Research approach and design



Source: Author, 2015.

Figure 1.2 depicts the research approach and design used in this study. During phase 1 a questionnaire was used to determine the current competitive intelligence practices as these current practices formed the basis of this research. The questionnaire targeted employers working at metals manufacturing fraternities in South Africa.

During phase 2 in-depth, semi-structured interviews were conducted to obtain information from a number of the employers in the metals industry in South Africa with regard to their awareness and use of concepts investigated in this study. The information obtained during the interviews was used in conjunction with the quantitative phase information and the literature review to develop a framework to increase competitive intelligence in improving the sustainability of the metals manufacturers in South Africa.

5.2.2 The research tools

A. Questionnaire

The questionnaire was distributed by industry organisations such as SEIFSA and it was completed by the employer group working in the metals manufacturing fraternity in South Africa. Employer representatives were requested to voluntarily participate and it was qualified that the study was about competitive intelligence practices in companies. A questionnaire developed by

Saayman *et al.* (2008) that tests for competitive intelligence practices was used as a conceptual reference. A new questionnaire was developed to test for competitive intelligence practices and aspects thereof, items related to a competitive intelligence framework and existing theories. This questionnaire is presented in Appendix A. The following theories were tested:

- i) The resource-based theory of companies.
- ii) The knowledge-based theory of companies.
- iii) The theory of constraints.
- iv) The theory of sustainable development.

The reliability and validity of the questionnaire were tested during multiple practical sessions, including a structured pilot study.

B. Interviews

Semi-structured, in-depth interviews were conducted with seven senior members of metals manufacturing fraternities in South Africa. In the metals industry, the sample group for the structured interviews was selected by market research from metals manufacturers, such as:

- Evraz Highveld Steel
- AMSA
- Cape Gate
- Columbus Steel
- Scaw Metals
- Various others from the member lists of representative organisations

The objective of the interviews was to confirm some aspects and to clarify any uncertainties from the first phase of the empirical research. The information and insights obtained from the empirical phase were used to make additional conclusions regarding the objectives of this study. The interview guide was constructed from areas in the quantitative phase where aspects needed to be confirmed or clarified. The interview guide is presented in Appendix B.

5.2.3 Data collection, analysis and interpretation

A. Quantitative phase

A questionnaire was used for the quantitative phase of this research. The actual number of responses from employers in the metals manufacturing fraternity was 63. The data were

interpreted by making use of the Statistical Package for Social Sciences (SPSS) and interaction with the Statistical Consultation Services of the North-West University, Potchefstroom Campus.

The following techniques were used to analyse the data:

- Frequency analysis of the data.
- Descriptive statistics including means and standard deviations.
- Factor analysis was used to reduce the dimensions.
- An analysis of means (t-tests) was used.
- A correlation analysis was used.

B. Qualitative phase

The researcher conducted seven interviews with senior representatives from the metals manufacturing fraternities. The seven interviews were scheduled as a first batch of interviews and were all conducted although data saturation was obtained after the first five interviews. The data interpretation techniques (identified during the research design discussed in Chapter 2) were used. The preliminary literature review indicated that triangulation can be used to ensure interpretive validity (Terre Blanche & Durrheim, 2004:34) and data trustworthiness (McMillan & Schumacher, 2001:48). Jansen (2007:36) argues that both triangulation and crystallisation can be used in research – there are multiple techniques that can be used to interpret data accurately. The use of Atlas.ti (Atlas.ti, 2016) was considered but the information obtained from the interviews was clear and was interpreted without making use of additional tools.

The employer group representing metals manufacturers in South Africa are mostly also members of the MEIBC and SEIFSA. The researcher made contact with senior level representatives in both these companies to arrange interviews with the target employer group. The researcher liaised with the chief economist of SEIFSA, Dr Michael Ade, and his two predecessors, Tafadza Chibanguza and Henk Langenhoven, who committed their support to this research project. The researcher liaised with Johann Nel from SAISI who also committed support for specifically the ferrous metals industry.

5.2.4 Ethical considerations

The following ethical considerations were included for this research:

- The research was conducted under the guidance of the North-West University Ethical Committee of the Potchefstroom Campus and a research ethics number was obtained

before the empirical phase of the research study took place. The research ethics number is: EMSPBS16/08/08-01/01.

- The interviews were conducted with a sample group representing metals manufacturers.
- The questionnaire was completed by employers from the metals manufacturing fraternity.
- The employer group from the metals manufacturing fraternity was identified by interactions with three popular member organisations (MEIBC, SEIFSA and SAISI).
- The participants were notified of their rights, such as voluntary participation and the option to withdraw from the research at any time.
- The quantitative phase focused on the employer group from the metals manufacturing fraternity in South Africa. The necessary approval was obtained from SEIFSA and MEIBC to perform the study and to liaise with their employer members on behalf of the researcher. The chief economist and chief executive officer of SEIFSA as well as the secretary general of SAISI have pledged their support for this research. Additional industry representative bodies were not considered.
- The qualitative phase focused on a sample group from employers from the metals manufacturing fraternity of South Africa. The sample group size was initially set at five individuals for purposes of scheduling interviews and it was planned to continue with additional interviews until data saturation is obtained during the interviews. The sample group consisted of individuals who have mostly had experience with small to large metals manufacturers. The total employer group consists of approximately 11800 employers (Statistics South Africa, 2016) of which the vast majority is small in size.

The researcher used to be employed by AMSA and subsequently by a prominent information technology service provider in South Africa but did not have formal ties with any employer organisation at the time of this research. A plan of action to mitigate possible sensitive parts of this research study was drawn up to deal with issues. The mitigating plan included how the mitigation of sensitive issues will be handled and by whom and the sign off on such plans. The plan of action was discussed and finalised by the researcher and the promoter of this study.

5.2.5 Limitations of the study

The following limitations of this study were considered:

- This study only focused on employers from the metals manufacturing fraternities in South Africa.
- Manufacturers of precious metals, such as gold and silver, were excluded.

5.3 Philosophical paradigm

This researcher made use of both a quantitative research methodology and a qualitative research methodology (mixed methods). Phase 1 made use of a questionnaire (Figure 1.1) and relied on quantitative research design principles whereas phase 2 made use of in-depth interviews (Figure 1.2) and relied on qualitative research design principles.

5.3.1 Phase 1 – Quantitative research

From an ontological perspective, the nature of reality is considered to be objective and removed from researchers. From an epistemological perspective, researchers tend to be more independent from the research participants. This correlates with a positivist research paradigm where the aim is to understand relationships that can be generalised.

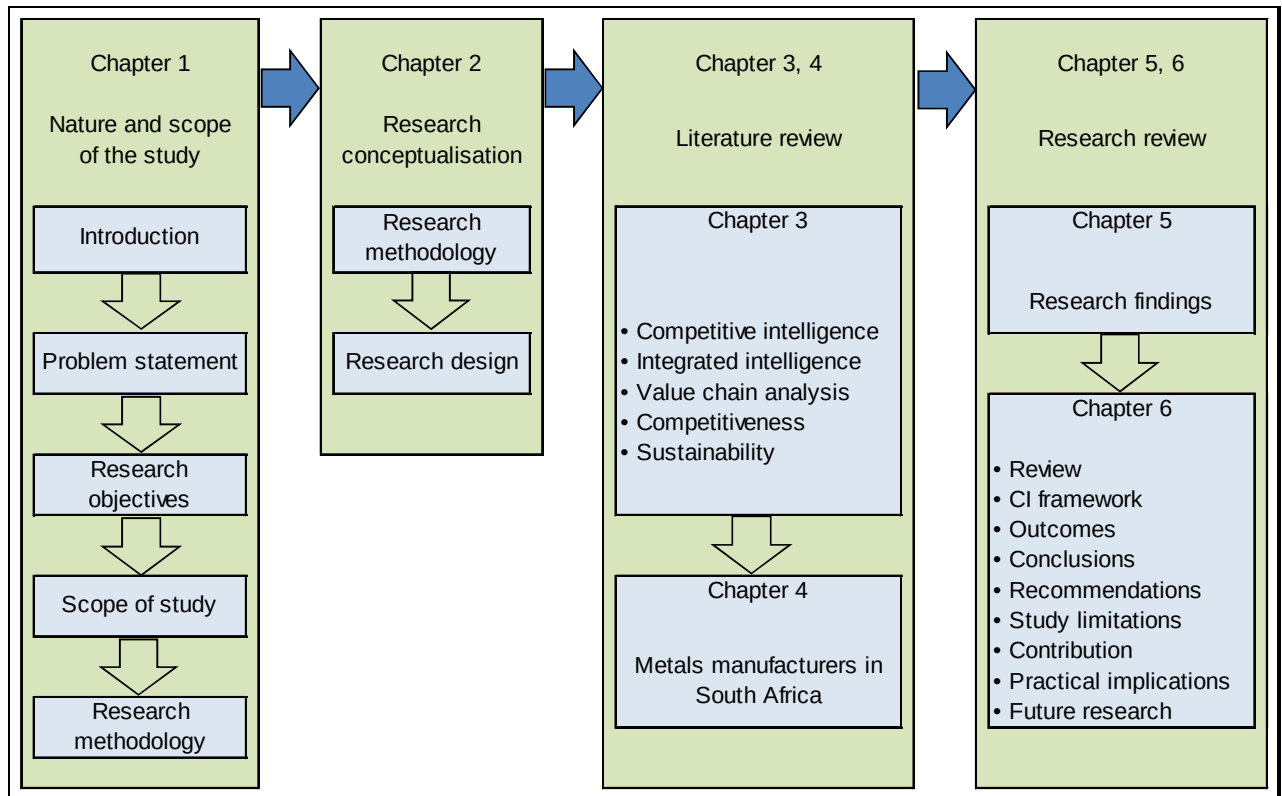
5.3.2 Phase 2 – Qualitative research

From an ontological perspective, the nature of reality is considered to be more subjective and is interpreted by researchers. From an epistemological perspective, researchers tend to interact with the research participants. This correlates with an interpretivist research paradigm where the aim is to probe unexplored aspects of a research phenomenon. The goal of interpretivist research is to understand and interpret the meanings of a phenomenon rather than to generalise and predict causes and effects (Neuman, 2000:23-78).

6 LAYOUT OF THE STUDY

The layout of the study is presented in Figure 1.3 below:

Figure 1.3: Layout of the study



Source: Author, 2015.

Chapter 1 presents the nature and scope of the study. The remaining chapters are structured as follows:

RESEARCH CONCEPTUALISATION

Chapter 2 focuses on the research methodology and research design to position the empirical study.

LITERATURE STUDY

Chapter 3 includes a comprehensive literature review concerning the concepts related to the objectives of this study.

MANUFACTURING INDUSTRY

Chapter 4 concentrates on a comprehensive literature review of the South African manufacturing industry.

RESEARCH FINDINGS

Chapter 5 highlights the findings from the literature reviews and the empirical study.

CONCLUSIONS AND RECOMMENDATIONS

Chapter 6 presents the conclusions and a competitive intelligence framework to benefit the sustainability of metals manufacturers in South Africa. Recommendations for further research are provided. The practical value of this research study for the manufacturing industry in South Africa is reviewed.

The last chapter is followed by:

- A reference list
- Appendices

7 SUMMARY

This chapter provided the background and motivation for the research study, including the problem statement, research objectives, the scope of research, the methodology followed and layout of the study. The research problem is i) that the current competitive intelligence practices of South African metals manufacturers are currently unknown, and ii) it is unknown to what extent and how these manufacturers can improve their competitive intelligence to lead to improved business sustainability. The two main objectives of this research were to i) determine the current practices and ii) develop a competitive intelligence framework that can aid towards the improved sustainability of the metals manufacturers in South Africa. This research study made use of an explanatory sequential mixed methods design, which consisted of a quantitative phase followed by a qualitative phase. The next chapter will consider the research methodology and design.

CHAPTER 2

RESEARCH METHODOLOGY AND RESEARCH DESIGN

1 INTRODUCTION

The research study is positioned in Chapter 1 – the problem statement, research objectives, the methodology followed in this study and a layout of the overall research process. The objectives of this research were to determine current competitive intelligence practices and to develop a competitive intelligence framework to improve the sustainability of metals manufacturers in South Africa. When the sustainability of metals manufacturers is improved, a positive contribution can be made to the manufacturing industry and overall to the South African economy. The aim of this chapter is to provide insight into the methodology and design of this study. The methodology includes the research philosophy, research approach and research strategy. The design includes data collection and data analysis. This study was correctly positioned by selecting the most appropriate basis in terms of its methodology and design, and the research was, therefore, effectively steered towards reaching the research objectives.

This research followed a descriptive design and consisted of a literature review and empirical research that was divided into a quantitative phase followed by a qualitative phase. During the quantitative phase a questionnaire was used to determine current competitive intelligence practices of metals manufacturers in South Africa. During the qualitative phase interviews were conducted with seven senior representatives of the metals manufacturing fraternities to further investigate current competitive intelligence practices and to gather views on idealised practices. Throughout this research theories were investigated while hypotheses were tested. The main aim of this study was to develop a competitive intelligence framework and to communicate this framework to the South African metals manufacturing industry in order to improve their sustainability.

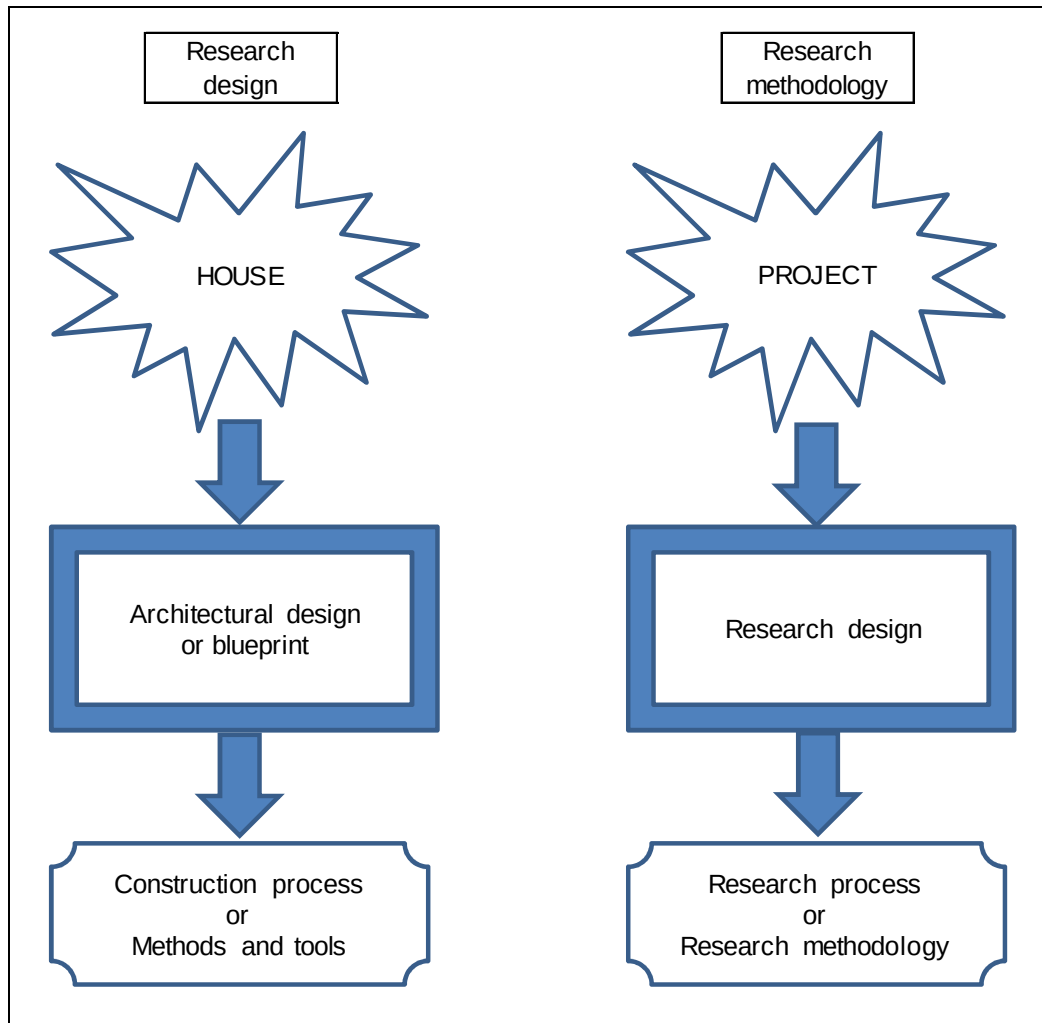
A comprehensive literature study on the concepts concerning the objectives of this study is presented in Chapter 3.

2 RESEARCH METHODOLOGY AND RESEARCH DESIGN

2.1 Research methodology versus research design

Research methodology and research design are both important but differ when a research study is conceptualised.

Figure 2.1: A metaphor for a research methodology and design



Source: Adapted from Mouton (2015:56).

With reference to Figure 2.1, Mouton (2015:56) uses the analogy of building a house to demonstrate the difference between a research methodology and research design and summarises the differences as indicated in Table 2.1.

Table 2.1: A summary of differences between a research design and methodology

Research design	Research methodology
Focus on the end product: What kind of study is being planned and what kind of result is aimed at?	Focus on the research process and the kind of tools and procedures to be used
Point of departure: Research problem or question	Point of departure: Specific tasks (data collection or sampling) at hand
Focuses on the logic of research: What kind of evidence is required to address the research question adequately?	Focus on the individual (not linear) steps in the research process and the most “objective” (unbiased) procedures to be employed

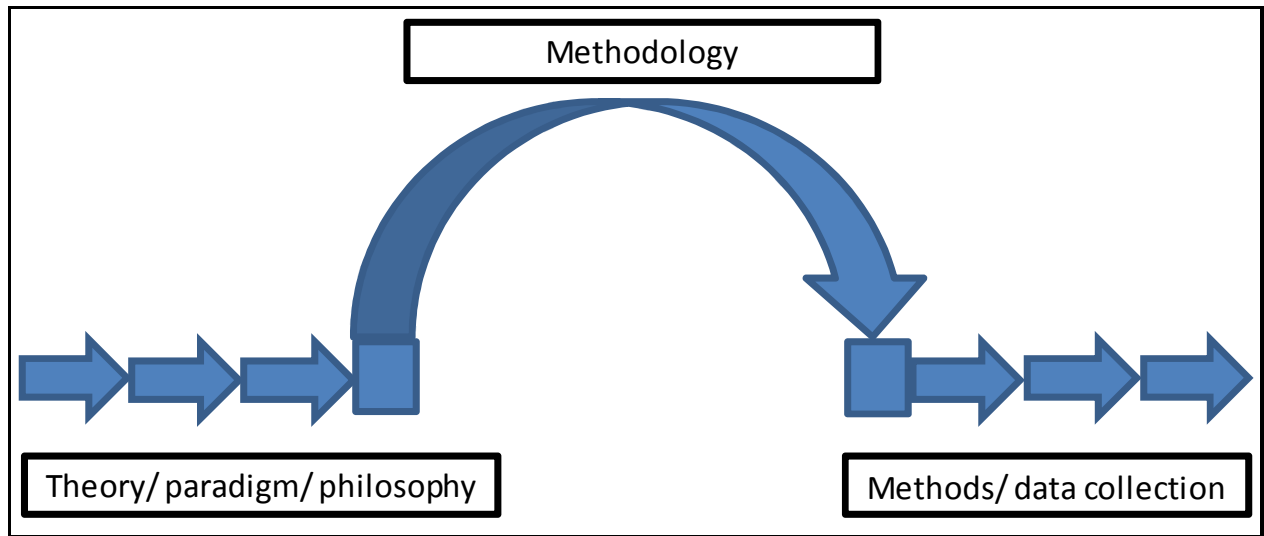
Source: Adapted from Mouton (2015:56).

The difference between a research methodology and design is that a methodology focuses on the research process and the tools and procedures used while a design focuses on the end product (Middelberg, 2011:109; Mouton, 2015:56). Similarly, the difference between a research methodology and a research method should also be highlighted.

2.2 Research methodology versus research method

A research methodology can be illustrated as a bridge that connects two worlds.

Figure 2.2: Conceptualising theory, a methodology and methods



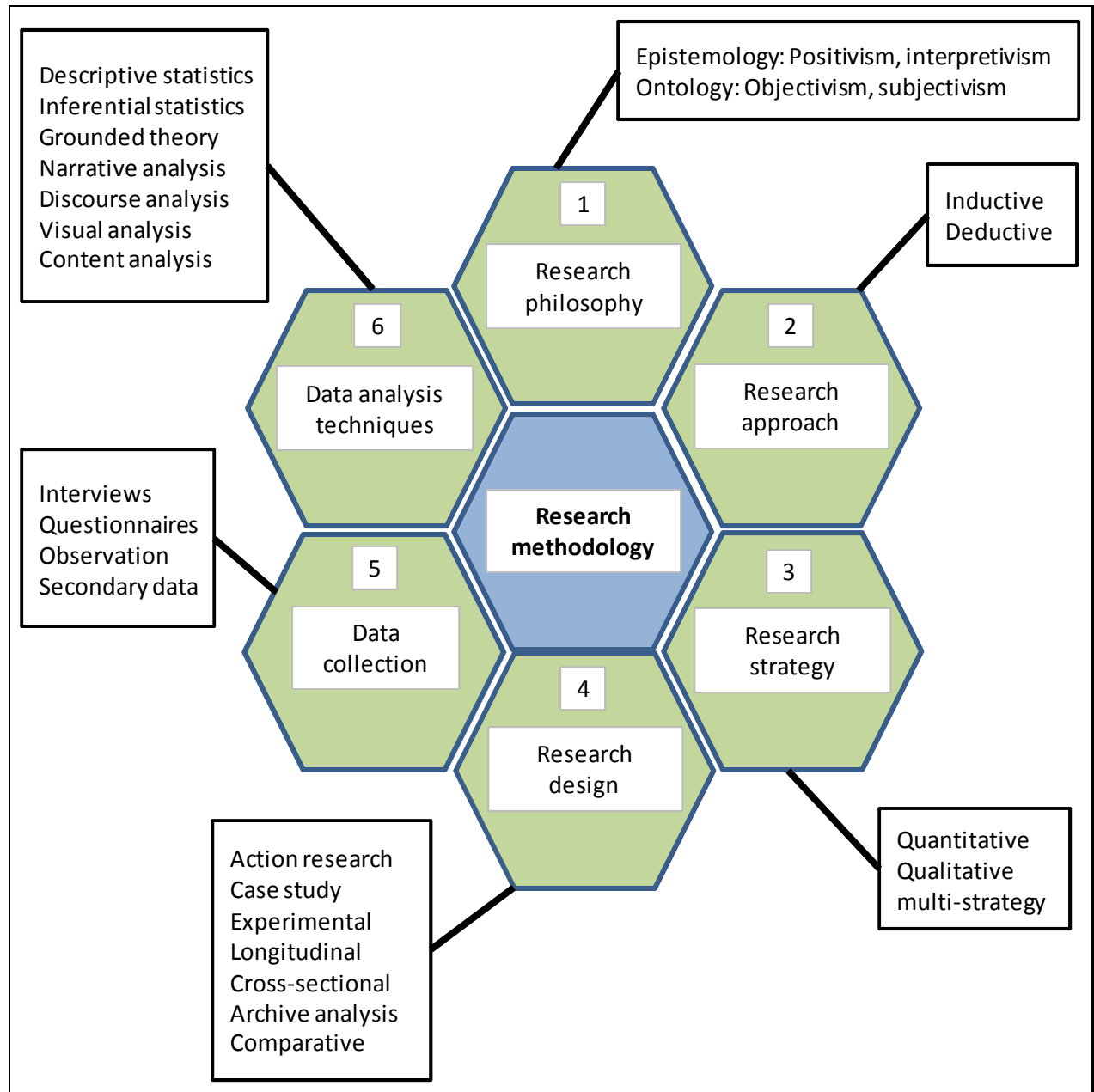
Source: Adapted from Nieuwenhuis (2014:50).

With reference to Figure 2.2, Nieuwenhuis (2014:49-70) describes a research methodology as the bridge that brings the philosophical standpoint (on ontology and epistemology) and the research method together. According to Collis and Hussey (2009:11), the starting point in a research design is to determine a research paradigm. A paradigm can be described as a framework that guides the research – how it should be conducted and based on the philosophies and assumptions of researchers about the world and the nature of knowledge. The overall approach to the entire process of a research study is known as the research methodology (Collis & Hussey, 2009:11). According to Wilson (2014:7), a research methodology is the approach and strategy used to conduct research. This chapter firstly, focuses on the aspects of a research methodology and secondly, on the aspects of a research design and a honeycomb model is used to illustrate the various research components.

2.3 A honeycomb model of research components

Wilson (2014:8) uses a honeycomb model to illustrate the difference between a research methodology and a research design.

Figure 2.3: A honeycomb illustration of research methodology components



Source: Adapted from Wilson (2014:8).

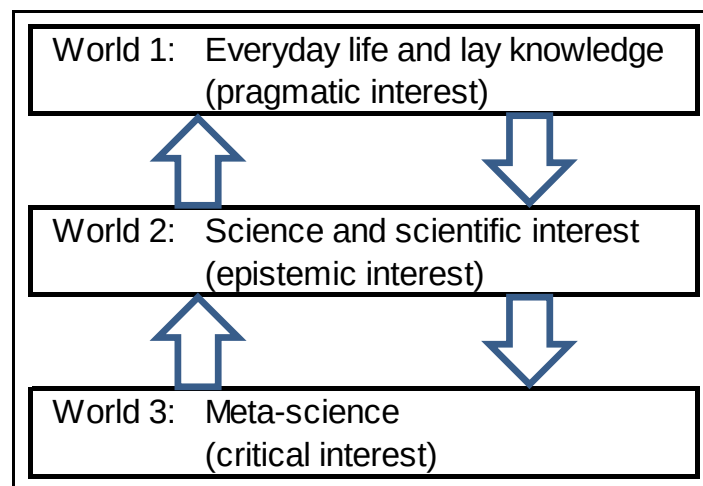
This chapter focuses on the components of a research methodology in the form of a honeycomb model as illustrated in Figure 2.3. Firstly, attention is given to the first three elements of the model, namely a research philosophy, a research approach and a research strategy. Secondly, the last three elements of the model, namely a research design, data collection and a data analysis are discussed.

3 RESEARCH PHILOSOPHY FRAMEWORK

3.1 Three worlds framework of research

Mouton (2015:137-142) proposes a three worlds framework consisting of 1) the world of everyday life and general knowledge, 2) the world of science and scientific research and 3) the world of meta-science to understand the differences in levels of analyses in scientific reasoning. With reference to Figure 2.4 and in the context of this study, the first world is associated with pragmatic interests, which refer to competitive intelligence, company strategies and competitiveness. The second world is associated with epistemic interests, which refer to the body of knowledge with regard to concepts, questionnaires and interview guides. The third world is associated with a critical reflection of science – paradigms and philosophies.

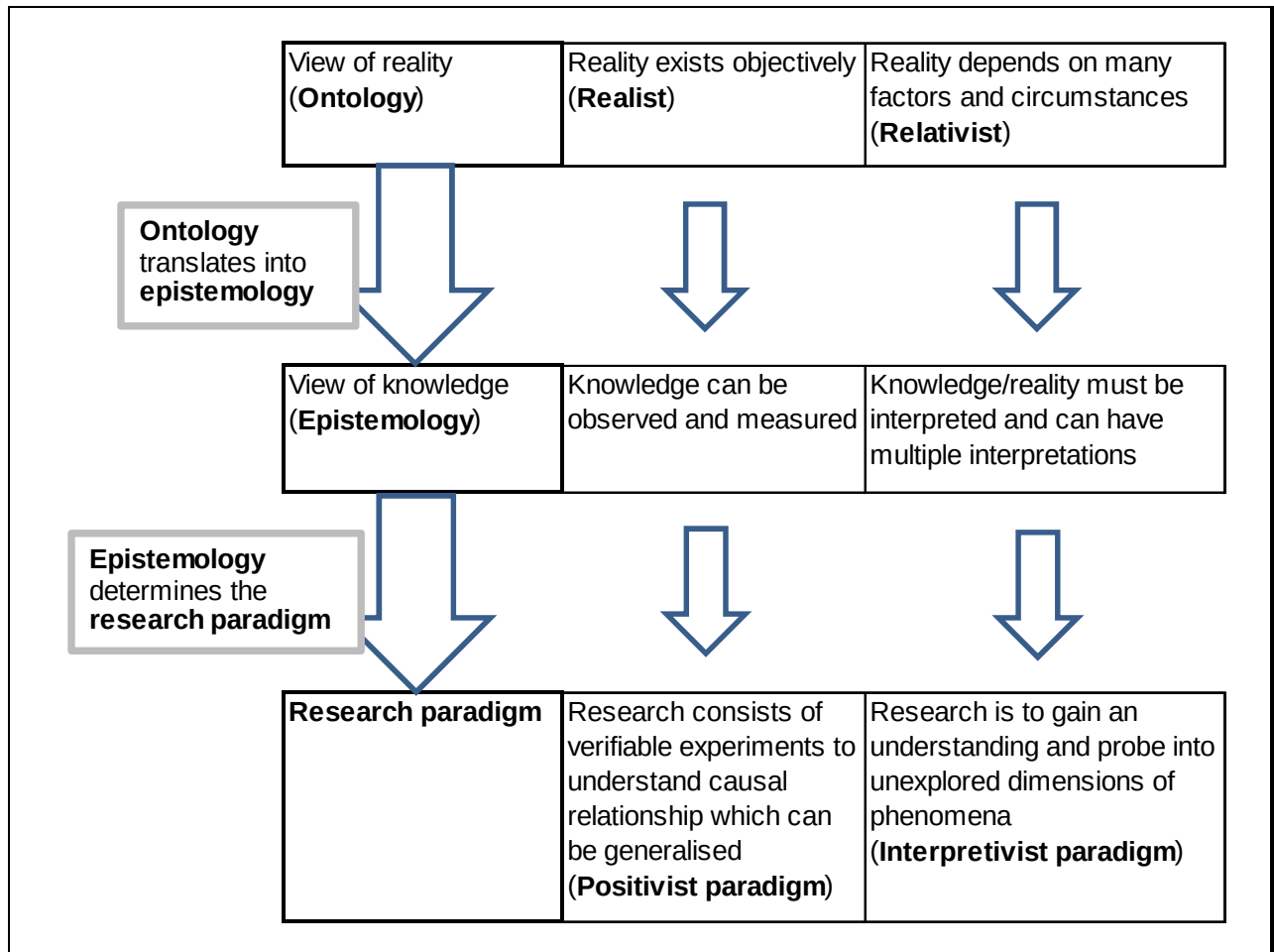
Figure 2.4: The three world's framework



Source: (Mouton, 2015:137-142)

Mouton's (2015:137-142) third world of meta-science or the philosophical framework includes concepts, such as interpretivism and positivism. Creswell (2014:35) states that interpretivism and positivism are two different "worldviews" or paradigms in research where positivism includes empirical observations and measurements of phenomena whilst interpretivism focuses more on the social and historical construction of phenomena. According to Mouton (2015:46-78), these different paradigms are underpinned by different research methods due to different assumptions of reality (ontology) and of knowledge (epistemology). In Figure 2.5, the different perspectives of ontology and epistemology lead to either a positivism paradigm or an interpretivist paradigm.

Figure 2.5: An illustration of research philosophy terms



Source: Adapted from Collis & Hussey (2009:58).

3.2 A research paradigm

A positivist paradigm is associated with quantitative research methods and deductive reasoning whilst an interpretivist paradigm is associated with qualitative research methods and inductive reasoning (Creswell, 2014:75). With inductive reasoning, researchers strive for conclusions derived from empirical data. With deductive reasoning, researchers strive for conclusions derived from theory and experience (Cooper & Schindler, 2014:64). Different research paradigms also have different perspectives towards theories.

Quantitative research is often used for theory testing requiring that the researcher maintain a distance from the research to avoid biasing the results whilst qualitative research (sometimes labelled interpretive research because it seeks to develop understanding through detailed description) often builds theory but rarely tests it (Cooper & Schindler, 2014:146).

This research study made use of an explanatory design where the literature review is followed by a quantitative phase and then a qualitative phase. During the quantitative phase a questionnaire was used and theories and phenomena were tested. During the qualitative phase interviews were conducted. The outcome of the empirical phase was used to contribute to the research conclusions.

4 THEORY TESTING

This study made use of a case study design. Some authors advocate case study research as a useful strategy for theory testing (Johnston *et al.*, 1999:44; Wilson & Woodside, 1999:83; Hillebrand *et al.*, 2001:72). Yin (2009:23) defines case study research as an empirical inquiry that “investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used”. Dul and Hak (2008:34) defines a theory as a set of propositions about an object of study with each proposition in the theory consisting of concepts and specifications of relations between concepts while Doty and Glick (1994:230-251) defines a theory as a series of logical arguments that specify a set of relationships among concepts, constructs or variables.

Unlike a statistical analysis, there are very few fixed rules for analysing case study data. During a theory-testing analysis, one of the possible techniques is pattern-matching – comparing the empirically-based pattern with a predicted one (Yin, 2009:23, 62). According to Dul and Hak (2008:63), theory-testing research tests propositions and consists of:

- i) Choosing a research strategy for the test (an experiment, a survey or a case study).
- ii) Selecting an object for the study (a single case study, a group of individuals for a comparative case study or a population for a survey).
- iii) Formulating a hypothesis derived from the proposition of the theory.
- iv) Conducting measurements (qualitative, quantitative or both).
- v) Conducting a data analysis by comparing the observed pattern of scores with the predicted pattern.

Dul and Hak (2008:9) continue to state that a theory can only be tested properly if its propositions are specified in detail. Propositions can be divided into four possible types, namely:

- i) A is a sufficient condition for B (“if there is A, there will be B”).
- ii) A is a necessary condition for B (“B exists only if A is present”).
- iii) A deterministic relationship exists between A and B (“if A is higher, then B is higher”).

- iv) A probabilistic relationship exists between A and B (“if A is higher, then it is likely that B is higher”).

Dul and Hak (2008:9) list seven steps to be followed when theory testing is done for a necessary condition, namely:

- i) Formulate the theoretical statement that will be tested.
- ii) Select an appropriate case study.
- iii) Specify the hypothesis for the case study.
- iv) Measure the relevant variables.
- v) Test the hypothesis.
- vi) Formulate the test results (either a disconfirmation of the hypothesis or a confirmation).
- vii) Formulate the implications of the test results with regard to the theory (Hak & Dul, 2009:56)

Theories, such as the theory of sustainable development and the theory of constraints, were tested during this research. The general approach to test these theories was to incorporate specific questions in the questionnaire. The following theories were tested:

- i) The resource-based theory of companies.
- ii) The knowledge-based theory of companies.
- iii) The theory of constraints.
- iv) The theory of sustainable development.

Theory building was considered after the quantitative phase of this research study.

5 RESEARCH PHILOSOPHY

Both a quantitative methodology and a qualitative methodology (mixed methods) were used. During phase 1 – the quantitative phase – a questionnaire was used to determine current competitive intelligence practices by South African metals manufacturers. During phase 2 – the qualitative phase – in-depth interviews were conducted with seven senior representatives working in the metals manufacturing industry in South Africa.

5.1 Phase 1 – Quantitative research

From an ontological perspective, the nature of reality is considered to be objective and removed from researchers. From an epistemological perspective, researchers tend to be more

independent from the research topic. This correlates with a positivist research paradigm where the aim is to understand relationships that can be generalised. In this research study, this phase entailed the collection of data by means of a questionnaire. Theories were investigated and tested.

5.2 Phase 2 – Qualitative research

From an ontological perspective, the nature of reality is considered to be more subjective and is interpreted by researchers. From an epistemological perspective, researchers tend to interact with research participants. The aim of an interpretivist research paradigm is to probe unexplored aspects of a research phenomenon. In this phase, data were collected by conducting interviews and the outcomes were used to generate conclusions.

6 RESEARCH APPROACH

The researcher made use of both an inductive and a deductive approach. A deductive approach is concerned with developing a hypothesis or hypotheses based on existing theory. A research strategy is then designed to test this hypothesis or hypotheses (Wilson, 2014:13). This approach is often associated with quantitative research (Ghauri & Grohaug, 2005:15) and investigates theories, develops a hypothesis or hypotheses and tests both the theories and a hypothesis or hypotheses for applicability. The theory of constraints, for example, highlights the most important limiting factors or constraints in companies that prohibit them from achieving set goals and are usually identified and systematically addressed until these constraints are not limiting companies anymore (Goldratt, 1990). The following was hypothesised from the theory of constraints:

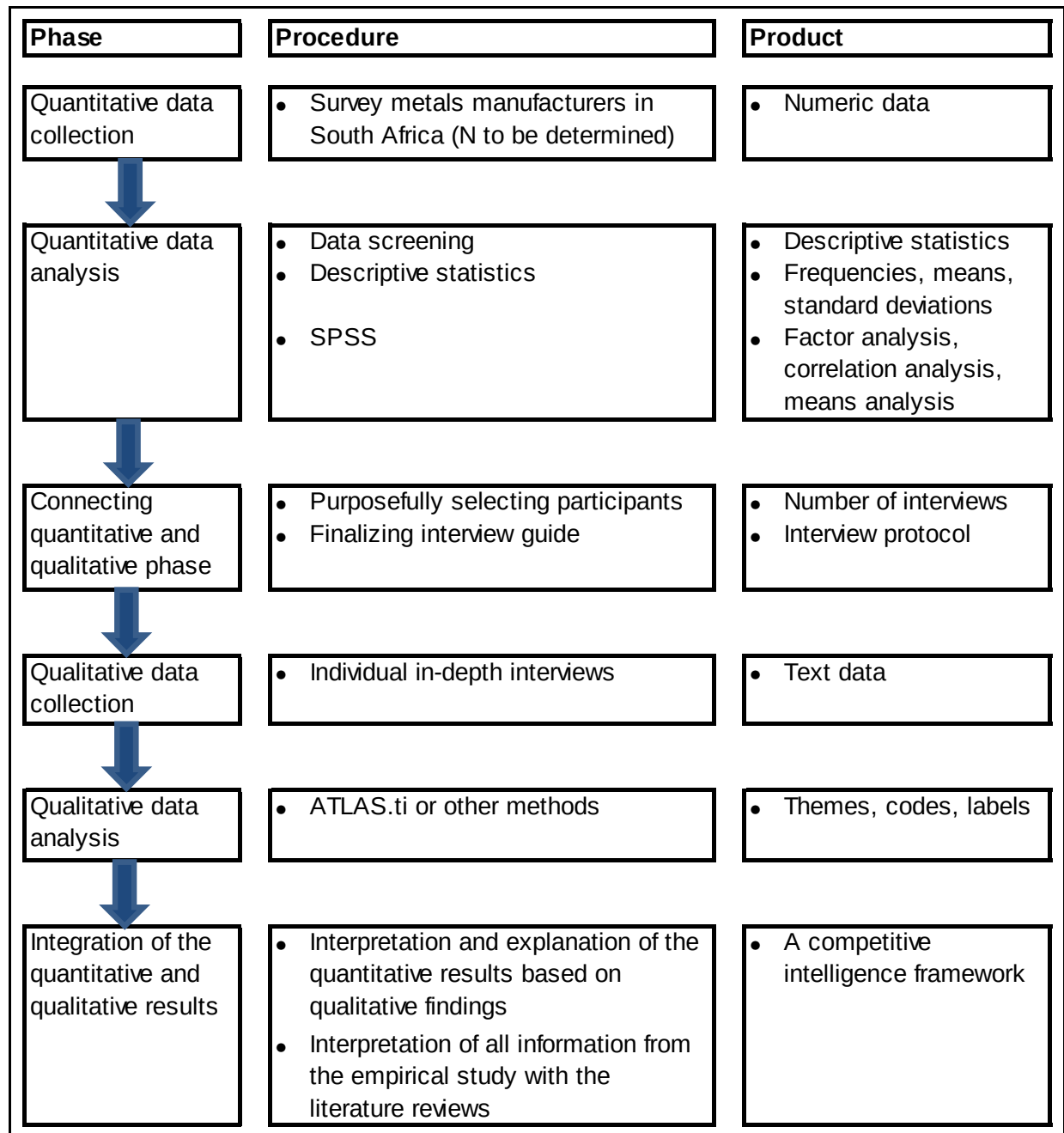
- South African companies in the metals manufacturing industry regularly identify their most debilitating constraints.
- When companies in the South African metals manufacturing industry identify their most debilitating constraints, these constraints are addressed until they are no longer inhibiting factors.

To test these two hypotheses, data were collected, analysed and interpreted. The results from testing these hypotheses are reported on in Chapter 5. Typically, some of the other theories and hypotheses in the quantitative phase support questions why competitive intelligence is not eagerly adopted as a top priority by metals manufacturing companies. Hypotheses were developed and tested during the qualitative phase of the study.

7 RESEARCH STRATEGY

The appropriate selection of a research strategy was of the utmost importance.

Figure 2.6: An explanatory sequential mixed methods research strategy



Source: Adapted from Creswell *et al.* (2014:305-336).

A research strategy leads to either a quantitative or qualitative phase or a combination, called mixed methods. During this research and as depicted in Figure 2.6, a quantitative research phase was followed by a qualitative research phase, which is referred to as an explanatory

sequential mixed methods strategy (Creswell *et al.*, 2016:305-336). A research design is discussed in the following section.

8 RESEARCH DESIGN

A research design is derived from a research paradigm, which can be described as a framework that guides research – how research is conducted and how it is based on the philosophies and assumptions of individuals about the world and the nature of knowledge (Collis & Hussey, 2009:11). A research design is a blueprint for the collection, measurement and analysis of data based on the research questions of a study (Sekaran & Bougie, 2013:95). This blueprint is based on the elements of a honeycomb model presented in section 2.3 of this chapter. This study made use of a quantitative phase followed by a qualitative phase (mixed methods). A mixed methods design can be defined as the procedure followed for collecting, analysing and combining (or “mixing”) both quantitative and qualitative data at some stage of a research process within a single study or series of studies to understand research problems more completely (Creswell *et al.*, 2014:305-336). Bryman (2001:34) argues that a “multi-strategy” is a more suitable term for “mixed methods” as the meaning of “mixing” can cause ambiguity when two different strategies are used in a single research project.

8.1 Quantitative phase

A quantitative phase mainly correlates with a case study design. Yin (2009:13) defines case study research as an empirical enquiry that investigates a contemporary phenomenon within its real-life context. In business research, a case study design often involves an in-depth analysis of specific problems pertaining to individuals, a group of individuals, companies or a particular sector (Wilson, 2014:121). During this phase the unit of analysis was the metals manufacturers in South Africa.

8.2 Qualitative phase

According to Creswell (2014:32), the distinction between qualitative research and quantitative research is often framed in terms of using words (qualitative) rather than numbers (quantitative) or using closed-ended questions (quantitative hypotheses) rather than open-ended questions (qualitative interview questions). The qualitative phase of this study correlated with a case study design. A paradigm of two sequential single case studies was followed. During the second phase the unit of analysis was senior representatives of metals manufacturing fraternities in South Africa.

9 DATA COLLECTION

In both phases of this study, data were collected. During the primary data collection, data were collected by making use of a range of tools, such as a questionnaire and interviews, rather than simply relying on existing data sources (Wilson, 2014:151).

9.1 Quantitative phase

Data were collected by making use of a questionnaire. The questionnaire was used to test current competitive intelligence practices of metals manufacturers in South Africa and to test for aspects such as a competitive intelligence framework. According to McIntyre (2005:151), good research questions have three qualities in common:

- i) They are unambiguous.
- ii) They make sense given the context of the research.
- iii) They ask for information that is accessible.

Current statistics set the number of metals manufacturers in South Africa at approximately 11800 (Statistics South Africa, 2016). It can be argued that the use of competitive intelligence as a discipline cannot be entrenched across the full metals manufacturing fraternity. A counter-argument can, however, be that metal manufacturers cannot afford to not engage in competitive intelligence practices in this age of competitiveness. This research, however, focused on the sub-set of metals manufacturers that formally engage in competitive intelligence practices and one can expect that the target sub-set of manufacturers are companies employing formal business processes. The population for this phase of the research was South African metals manufacturers. The sampling frame was companies from metals manufacturing fraternities that uses formal business process and would typically formally engage with the industry and industry bodies. In general, sampling techniques can be divided into two different types, namely 1) probability or random sampling and 2) non-probability or non-random sampling (Wilson, 2014:214). Probability sampling was used for this phase of the research. The membership databases from MEIBC, SEIFSA and SAISI were used to determine the final most appropriate sampling frame of metals manufacturers. From the size of the sampling frame a sampling size was determined to deliver statistical results that conformed to the following:

- Margin of error: 5%
- Confidence level: 95%
- Response distribution: 50%

For example: Metals manufacturing fraternities in South Africa employed approximately 38 860 workers in quarter 4 of 2016 (Statistics South Africa, 2016). About 15% of these employees or 5 829 employees are employed in management, engineering and other supervisory roles targeted by the questionnaire (Dednam, 2017). Given the above-mentioned acceptable margin of error, confidence level and response distribution, the sample size was calculated to be 361. A sample size of 361 was recommended should the questionnaire be distributed not only to employers but also to appropriately profiled employees in companies. A questionnaire that tests competitive intelligence practices developed by Saayman *et al.* (2008) was used as a conceptual reference. Other leading authorities on the terrain of competitive intelligence (SCIP and Prof Jonathan Calof) were also consulted for additional questionnaire examples to use as a basis. A new questionnaire was, however, developed to test for competitive intelligence practices, items related to a competitive intelligence framework and to test competitive intelligence theories. This questionnaire is presented in Appendix A. The following theories were tested:

- i) The resource-based theory of companies.
- ii) The knowledge-based theory of companies.
- iii) The theory of constraints.
- iv) The theory of sustainable development.

The reliability and validity of the questionnaire were tested during multiple practical sessions, including a structured pilot study. It is vital that a covering letter – setting out the nature of the research, what the research is hoping to achieve, addressing any ethical issues and stating benefits of participating in the study – accompanies a questionnaire (Wilson, 2014:167). The final questionnaire accompanied by a covering letter was submitted to the relevant Ethical Committee of the North-West University, Potchefstroom Campus, for approval. Close-ended questions were asked in the questionnaire. The answering options were aligned with a five-point Likert scale. A Likert scale format has many advantages that account for its popularity – it is easy and quick to construct and most probably more reliable and provide a greater volume of data than many other available scales (Cooper & Schindler, 2014:278). The questionnaire was distributed via email. SEIFSA assisted in identifying possible participants and to email the questionnaire to the group of participants. SAISI also assisted in distributing the questionnaire to the participants. The Ethical Committee of the North-West University, Potchefstroom Campus, approved of distributing the questionnaire via email. The collection of data was also done via email. A time frame for answering the questionnaire and sending the questionnaire back was set and communicated in the cover letter. Depending on the rate of response within the set time frame, a reminder email was also available or the participants could have been

contacted directly. All of the data collected during the quantitative phase were captured and collated in order to prepare the data for a further analysis.

The Statistical Consultation Services Department of the North-West University, Potchefstroom Campus, had an active link to the questionnaire on invitation. The participants accessed the questionnaire via this active link. The feedback from the participants was captured via cloud services by the Department. By collecting data in this way, the security of data was ensured and human error was eliminated during the capturing of data. In total, 63 responses were received. The responses are discussed in a later section in this study.

9.2 Qualitative phase

Data were collected by making use of in-depth interviews during this phase of the research. According to Tracey (2013:143), the interview process can be either structured or unstructured and the following interview types are most common:

- Ethnographical interviews
- Interviews in which informants are used
- Interviews in which participants are used
- Narratives (oral history, life story, biography)
- Discursive interviews

Semi-structured, in-depth interviews were conducted with senior representatives of South African metals manufacturing fraternities to investigate current competitive intelligence practices, to obtain views on idealised practices and to confirm or clarify aspects from the quantitative phase of the research. The sampling frame was senior and active participants from metals manufacturing fraternities. Non-probability (non-random) sampling was used for this phase of the research. The membership databases from the MEIBC, SEIFSA and SAISI were used to determine the most appropriate sampling frame of metals manufacturers. In the steel manufacturing industry, more sizeable companies include AMSA, Cape Gate, Columbus Steel and Scaw Metals but smaller companies are the majority members of SEIFSA and SAISI. An interview guide was used to direct the interviews and is presented in Appendix B. SCIP and Prof Jonathan Calof was consulted to develop the final interview guide. Information from the semi-structured interviews was used to 1) test hypotheses and theories, 2) determine current competitive intelligence practices of metals manufacturers, 3) determine idealised competitive intelligence practices, and 4) contribute towards the conclusions of this study. Seven interviews were conducted during this study. The seven interviews were scheduled as a first batch of interviews and were all conducted although data saturation was obtained after the first five

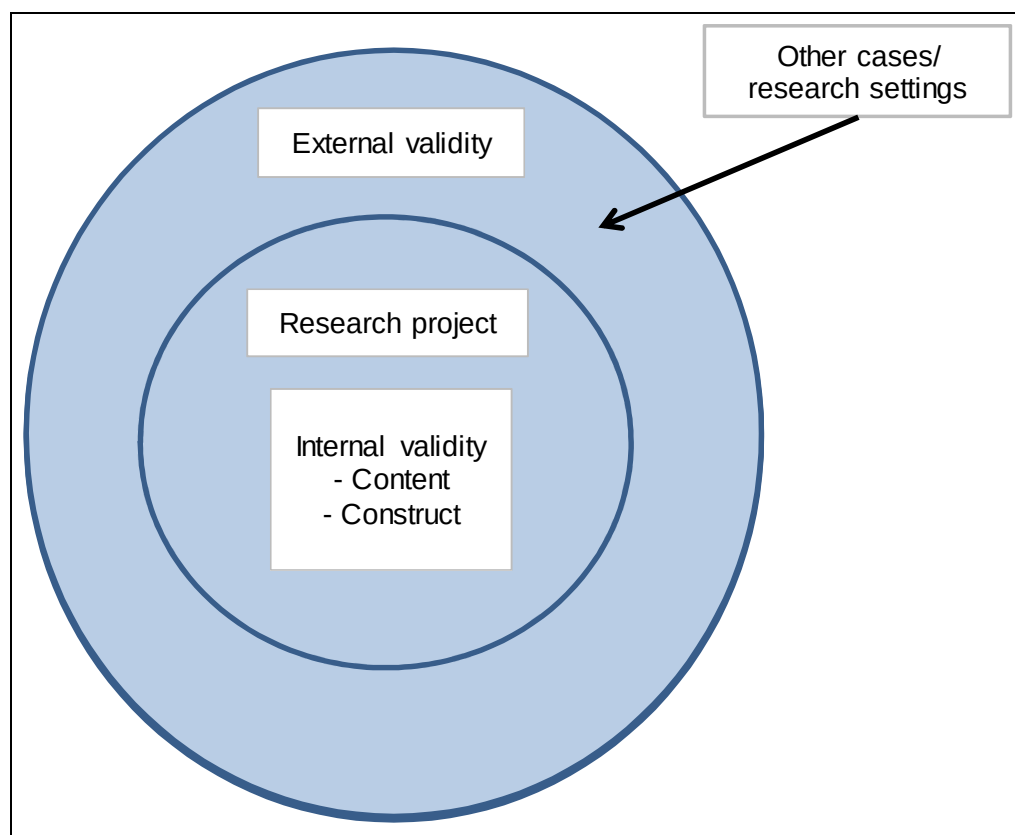
interviews. According to Fusch and Ness (2015:1408) data saturation is reached when there is enough information to replicate the study when the ability to obtain additional new information has been attained, and when further coding is no longer feasible. All of the data collected during the qualitative phase were captured and collated in order to prepare the data for a further analysis.

10 DATA ANALYSIS

10.1 Quantitative phase

The analysis and interpretation of the data was done via coding and SPSS software was used together with useful feedback from the Statistical Consultation Services of the North-West University, Potchefstroom Campus. The research design elaborated on two items that could have impinged upon the quality of the study, namely reliability and validity. Reliability refers to the extent to which a measurement of a phenomenon provides stable and consistent results and is repeatable (Carmines & Zeller, 1979:45). The researcher, therefore, made use of testing and retesting.

Figure 2.7: Internal and external validity



Source: Adapted from Wilson (2014:133).

Figure 2.7 illustrates internal and external validity. The two main types of internal validity are content validity and construct validity. External validity was dealt with in a holistic manner (Wilson, 2014:133). Face content validity refers to the extent an instrument measures what it is supposed to measure while sampling content validity refers to all relevant areas within the nature of the research topic that is measured (Wilson, 2014:133). Construct validity is of particular importance in quantitative research and establishes whether a construct is valid – it measures what it is supposed to measure (Yin, 2009:34). External validity refers to the findings of a study – if these findings can be generalised to other cases or settings (Wilson, 2014:134). The researcher employed all of the above-mentioned validity techniques. Face content validity and sampling content validity were mainly used during the quantitative phase and external validity was used during the final integration of the quantitative and qualitative results in order to generalise. Reliability was also tested. According to Yin (2009:45), the objective of reliability testing is to ensure that, if another researcher follows the same procedures as described by an earlier researcher, then the second researcher should also be able to arrive at the same findings and conclusions.

The following techniques were used to analyse the data:

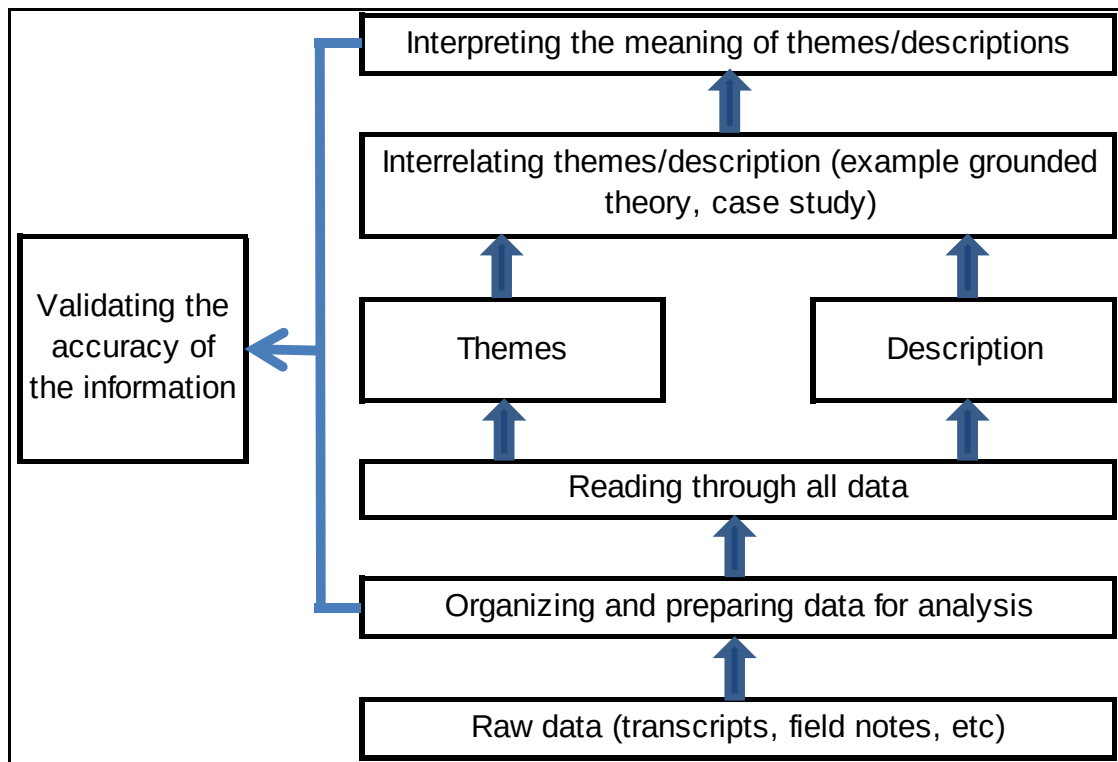
- Frequency analysis of the data.
- Descriptive statistics including means and standard deviations.
- Factor analysis was used to reduce the dimensions.
- An analysis of means (t-tests) was used.
- A correlation analysis was used.

In addition, the Cronbach's alpha coefficient, Kaiser-Meyer-Olkin coefficients, eigenvalues, communalities, factor means and standard deviations were used. The analysis is discussed in Chapter 5 and the analysed data are presented in a report.

10.2 Qualitative phase

A structured process should be used to change captured data into meaningful information.

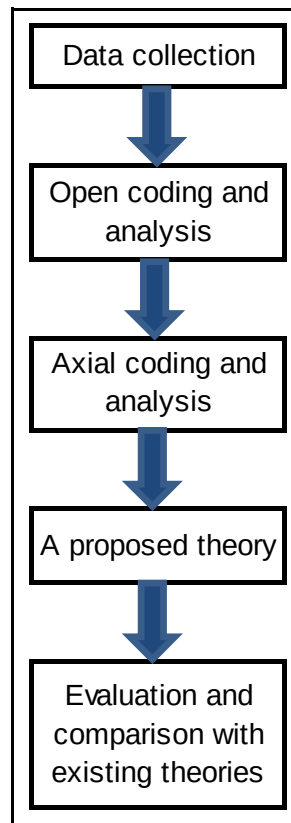
Figure 2.8: A data analysis in qualitative research



Source: Adapted from Creswell (2014:247).

A data analysis in qualitative research follows steps as depicted in Figure 2.8 where raw data are interpreted to yield meaningful information. A qualitative data analysis is defined as “any kind of analysis that produces findings or concepts and hypotheses, as in grounded theory, that are not arrived at by statistical methods” (Glaser, 1992:45). Wilson (2014:282) proposes four steps when qualitative data are analysed: 1) transcribing the data, 2) reading and generating categories, themes and patterns, 3) interpreting the findings and 4) writing a report. The generation of themes is called “coding” and the goal with coding is to fracture the data and rearrange information into categories that facilitate the comparison of data within and between these categories and this process aids the development of theoretical concepts (Strauss, 1987:29). Some of the more common approaches to a qualitative data analysis include 1) a visual analysis, 2) grounded theory, 3) a narrative analysis, 4) a discourse analysis and 5) a content analysis (Wilson, 2014:280). Grounded theory is defined as “the systematic generation of theory from data, that itself is systematically obtained from social research” (Glaser, 1992:2).

Figure 2.9: Stages in grounded theory



Source: Adapted from Wilson (2014:289).

Figure 2.9 illustrates that grounded theory is a method in which theory is developed from data and, therefore, an inductive approach. During a content analysis, text is systematically converted to numerical variables for a quantitative data analysis (Collis & Hussey, 2009:250). Both grounded theory and content analysis methods were used for this phase of the research to derive some conclusions. Validity can be viewed as one of the strengths of qualitative research and is based on determining whether the findings are accurate from the standpoint of researchers, participants or readers when evaluating the account (Creswell & Miller, 2000:147). Validity terms in qualitative research, include trustworthiness, authenticity and credibility (Creswell & Miller, 2000:148). When sensory experiences consistently produce the same results, data is viewed as trustworthy, because the data can be verified (Cooper & Schindler, 2014:85). The more experience researchers has with participants in their setting, the more credible or valid the findings (Cooper & Schindler, 2014:252). The interview guide as presented in Appendix B was constructed from aspects in the quantitative phase that needed to be confirmed or clarified. The data collected during the qualitative phase of this research were also evaluated for trustworthiness.

10.3 Final analysis

Triangulation is defined as “collecting information from a diverse range of individuals and settings using a variety of methods” (Denzin, 1970:52). Methodological triangulation is when both quantitative and qualitative methods of data collection are used (Easterby-Smith *et al.*, 1991:83). Methodological triangulation was used for the data and information obtained from the two empirical phases of this research. The analysed results were interpreted and presented in order to ensure maximum meaning. Conclusions are proposed based on the findings from the empirical phase of the research. All of the results from the analyses of the data from the quantitative phase and the qualitative phase of this research are reported on.

11 ETHICS

Ethics are norms or standards of behaviour that guide moral choices about our behaviour and our relationships with others (Cooper & Schindler, 2014:28). Researchers need to anticipate ethical issues that may arise during their studies as research involves collecting data from and about people (Punch, 2005:45). Researchers need to protect their research participants, develop a trust relationship with them, promote the integrity of research, guard against misconduct and impropriety that may reflect on their company or institution and cope with new and challenging problems (Israel & Hay, 2006:47). A questionnaire was used during the quantitative phase and seven semi-interviews were conducted during the qualitative phase with senior representatives from metals manufacturing fraternities in South Africa. The participants were notified of their rights, such as voluntary participation and the option to withdraw from the research at any time. This research study was conducted under guidance of the North-West University, Potchefstroom Campus, and complied with the prescriptions of the relevant Ethics Committee of the North-West University.

12 SUMMARY

Research is a wide topic in itself and consists of various components. It is, however, important that the various components form a synergistic whole with each component chosen for the specific function it should have in the overall research. The various components of research were illustrated using a honeycomb model where the research methodology was presented with an emphasis on the research philosophy, the research approach and the research strategy. This was followed by a presentation of the research design, data collection and data analysis with all three these components presented for the quantitative phase and the qualitative phase of the research. The objectives and value of this study were stated. The philosophical aspects were presented. The reliability, validity, creditability and trustworthiness of the quantitative

phase and the qualitative phase were discussed. The approach and methods of collecting and analysing the data during the empirical phases were presented. Data collection techniques (a questionnaire and semi-structured interviews) were reviewed. This chapter aimed to provide an understanding of the research methodology followed in this study and to present a detailed roadmap of the research and the study was, therefore, correctly positioned in order to be effectively steered towards reaching the research objectives. A research methodology refers to the methods or tools used to obtain answers to research questions to achieve set objectives. A research methodology focuses on the research process and the kind of tools and procedures used. Case study research was selected, because this type of research is descriptive and can be applied in both qualitative and quantitative research. The aim of this chapter was, therefore, achieved. A literature study on the concepts to reach the objectives of this study is presented in the next chapter.

CHAPTER 3

LITERATURE REVIEW OF COMPETITIVE INTELLIGENCE AND RELATED FIELDS

1 INTRODUCTION

This chapter presents a literature review on competitive intelligence and a value chain analysis. A secondary literature review is presented on sustainability and integrated intelligence. Concepts, such as the South African National Development Plan, are also highlighted in this chapter. When this research is correctly positioned in terms of its literature basis, it ensures that the research was effectively steered towards reaching the research objectives by building the components on a comprehensive and solid basis. This chapter is followed by a detailed study in Chapter 4 of the metals manufacturing industry in South Africa.

According to Mouton (2015:87), the term "scholarship review" is more accurate than the term "literature review" when one is investigating current research. A number of reasons can be provided why a review of existing scholarship is important:

- i) To ensure a previous study is not merely duplicated.
- ii) To discover the most recent and authoritative theories about a subject.
- iii) To find out what the most widely accepted empirical findings in the field of a study are.
- iv) To identify available instrumentation that has already proven validity and reliability.
- v) To ascertain what the most widely accepted definitions and key concepts in the field of a study are.
- vi) To save time and avoid duplication and unnecessary repetition.

Sources of information for this literature review included 1) existing publications as catalogued by the library of the North-West University, Potchefstroom Campus, 2) Google Scholar, 3) the Society for Competitive Intelligence Practitioners, and 4) the key-word search facilities of the North-West University library services at the Potchefstroom Campus. The key-word search facilities consult with a number of databases, such as SACat, Nexus, Emerald, EbscoHost and ProQuest. Mendeley was used as a referencing and citation tool to selectively find information from as many publications as possible (Raubenheimer, 2014:22-67).

2 COMPETITIVE INTELLIGENCE

The mentioned sources consulted for this part of the literature review yielded a rich treasure of information spreading from definitions to explanations and included a number of completed research projects. Dishman & Calof (2008:25) cited a bibliography of a complete review on literature and past studies on competitive intelligence published in a four-part series by the *Journal of Competitive Intelligence and Management* indicated in Table 3.1 below:

Table 3.1: Four-part bibliography of competitive intelligence

Part in series	Covering period	Year of publication	Reference
1	1997 - 2003	2003	Dishman <i>et al</i> ., 2003
2	1990 - 1996	2003	Fleisher <i>et al</i> ., 2003
3	early - 1989	2003	Knip <i>et al</i> ., 2003
4	2003 - 2006	2007	Fleisher <i>et al</i> .,2007

Source: Adapted from Dishman and Calof (2008).

With reference to Table 3.1, it can be seen that the four-part series covered a bibliography of competitive intelligence publications from 1997 to 2006. An analysis of only part 2 (1990-1996) showed that the bibliography contained at least 1500 entries covering various publications on competitive intelligence. It is, therefore, clear that ample information exists and is available for a review on competitive intelligence. In addition to this collection of competitive intelligence-related publications, a number of later publications were reviewed as part of this literature review:

- i) In section 2.1.1: Definitions of competitive intelligence are cited up until 2012.
- ii) In section 2.1.4: Reference is made of Reinmoeller and Ansari (2016:122) who studied companies in the United States of America associated with the practice of competitive intelligence between 1985 and 2012.
- iii) In section 2.2.5: A number of institutions that promote competitive intelligence on a continual basis.
- iv) In section 2.2.5: Recent competitive intelligence-related publications up until 2016.
- v) In section 2.2.6: South African competitive intelligence-related studies up until 2014 are listing competitive intelligence-related publications that were reviewed.

2.1 Competitive intelligence concept

This section presents an overview of the concept of competitive intelligence including its definitions and processes.

2.1.1 Definition and process of competitive intelligence

Competitive intelligence boasts various definitions (Du Toit & Sewdass, 2014:2). The various definitions are however generally aimed at describing a mutually understood concept. It is also generally accepted that the competitive intelligence process consist of a number of building blocks and that competitive intelligence is aimed at a company's external environment

2.1.2 Competitive intelligence definitions

A variety of competitive intelligence definitions are listed below:

- i) Competitive intelligence is the component of business intelligence aimed at gaining a strategic advantage (Porter, 1980:15).
- ii) According to Calof and Skinner (1999a:21), competitive intelligence is actionable information arising from a process involving planning, collecting, analysing and disseminating information of the external environment for opportunities that have the potential to affect the competitive position of companies.
- iii) A comprehensive definition of competitive intelligence is “the legal collection and analysis of information regarding the capabilities, vulnerabilities and intensions of business competitors conducted by using ‘open sources’ and ethical inquiry” (SCIP, 2012).
- iv) Competitive intelligence is a process involving the gathering, analysing, and communicating of environmental information to assist in strategic decision-making and as such, it forms the fundamental basis of a strategic decision-making process (Dishman & Calof, 2008:771).
- v) A more appropriate definition of competitive intelligence is: Actionable recommendations arising from a systematic process involving planning, gathering, analysing, and disseminating information of the external environment for opportunities or developments that have the potential to affect the competitive situation of companies or countries (Calof & Skinner, 1999b:40).

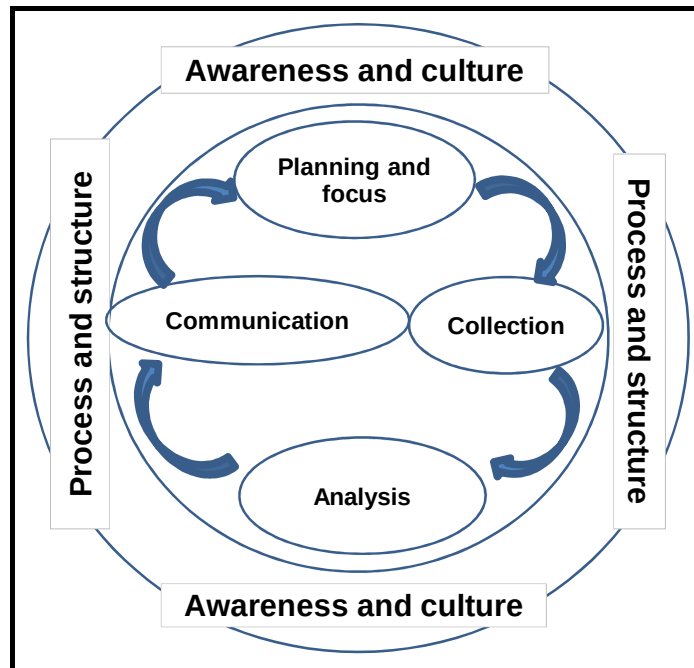
- vi) Competitive intelligence assists companies in sustaining and developing distinct competitive advantages by using the entire company and its networks to develop actionable insights about the environment (customers, competitors, regulators, technology). Competitive intelligence uses a systematic and ethical process involving planning, collecting, analysing, communicating and managing (Calof, 2008:40).
- vii) Competitive intelligence can be defined as the processes in which relevant information is gathered, analysed and interpreted and resultant intelligence is disseminated to enhance the competitiveness of companies (Viviers *et al.*, 2002:30).
- viii) Kahaner (1996a:16) defines competitive intelligence as a systematic programme in which information is gathered and analysed about the activities of competitors and general business trends to further the goals of companies.
- ix) Calof and Wright (2008:717) regard competitive intelligence as being “a system of environmental scanning which integrates the knowledge of everyone in the company”.
- x) Competitive intelligence can be defined as an ongoing and systematic evaluation of the external environment for opportunities, threats and developments that can influence the competitiveness of companies or countries (Du Toit & Strauss, 2010:21).

From the various above-mentioned definitions of competitive intelligence, it seems that there is an overall alignment of what the concept means. Similarly, an overall alignment in the steps of competitive intelligence is perceived. The various definitions of competitive intelligence are also closely linked to the competitive intelligence process.

2.1.3 Competitive intelligence process

The process of competitive intelligence has been illustrated as a “competitive intelligence wheel” in Figure 3.1 below:

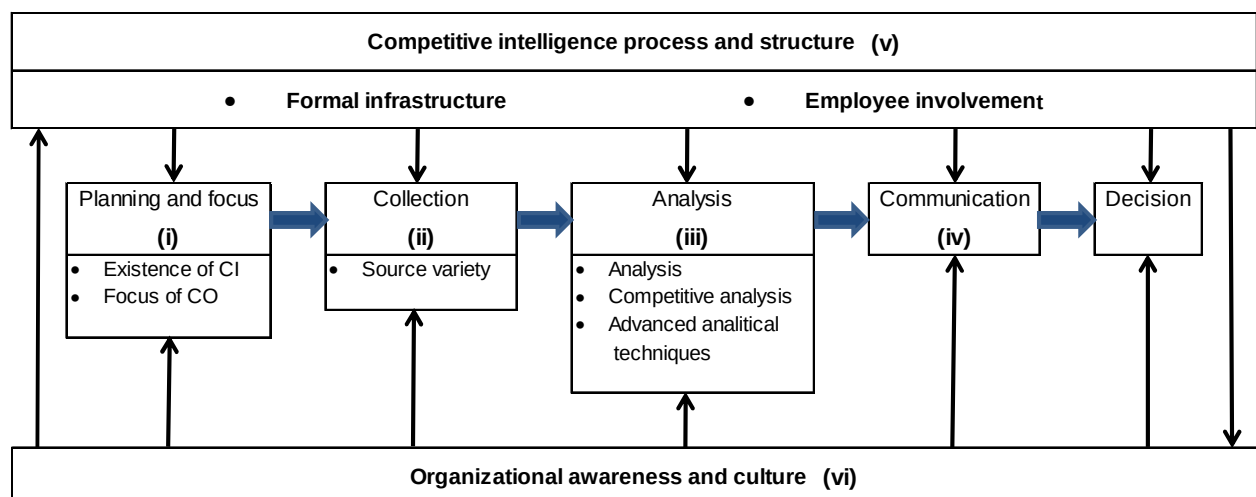
Figure 3.1: The competitive intelligence wheel



Source: Adapted from Kahaner (1996b).

The “competitive intelligence wheel” has been adapted in another illustration to demonstrate the building blocks of competitive intelligence by Dishman & Calof (2008:771) indicated in Figure 3.2 below:

Figure 3.2: Model of competitive intelligence to demonstrate the building blocks



Source: Adapted from Dishman and Calof (2008).

In Figure 3.2, the four centre building blocks (i-iv) are shown to lead towards the right-most block, called “Decision”, to illustrate that competitive intelligence aims to support decision-making processes by companies.

In general, and with reference to Figure 3.2, there are six building blocks found in competitive intelligence:

i) Planning and focusing

During this building block, decisions about what information, for what purpose and from which resources have to be taken.

ii) Collecting

During this building block, required data for a competitive intelligence exercise are collected and can be done from a variety of different sources and acquisition methods, including environmental scanning. The source of the information and information usage is collected (Dishman & Calof, 2008:781). Effective intelligence processes do not attempt to collect all possible information or to research everything related to a specific subject, but focus instead on issues of paramount importance to senior management (Porter, 1980:47).

iii) Analysing

The analysis of collected information creates “true” intelligence. Information is converted into “actionable intelligence” from which strategic and tactical decisions can be made (Calof & Miller, 1997:219).

iv) Communicating

The results of intelligence processes (or individual projects) need to be communicated to those with the authority and responsibility to act on the findings (Dishman & Calof, 2008:774).

v) Processing/structuring

Intelligence requires appropriate policies, procedures, and a formal or informal infrastructure so that employees can contribute effectively to the intelligence system and to benefit from the intelligence process (Dishman & Calof, 2008:782).

- vi) Establishing an awareness/culture

For companies to utilise their intelligence efforts successfully, there need to be an appropriate awareness of intelligence and a culture of competitiveness established (Dishman & Calof, 2008:783).

2.1.4 Competitive intelligence definitions and processes: Observations

The following observations can be made when the various definitions and processes of competitive intelligence were reviewed:

- i) Competitive intelligence has to do with the acquisition of specific information, the adding of value to acquired information and the presentation of enriched information to decision makers of companies with the goal of gaining a competitive advantage in the market for these companies.
- ii) Competitive intelligence has four core building blocks, namely 1) the planning of how information should be acquired regarding content and processes followed, 2) collecting planned information, 3) analysing collected information, and 4) communicating results.
- iii) Competitive intelligence has two supporting building blocks, namely 1) a formal or informal structure by which the competitive intelligence process should be governed, and 2) an awareness and culture that support the leveraging of additional advantages for companies.
- iv) However, there are some possible failures that can be viewed as obstacles in the competitive intelligence process. One such possible failure can occur when the “wrong” information is collected or when too much information is collected. Another possible failure can occur when all six building blocks in the competitive intelligence process perform well but when the valuable, analysed or synthesised information does not lead to a competitive advantage for companies, decision makers cannot follow through on the advantages the information present. The researcher found in practice that sometimes a rich trove of information has the potential to present competitive advantages to a company and was available on lower level to middle management in a company, but then this information could not deliver its inherent competitive advantages due to the reluctance of top management or their inability to harness available competitive advantages. One sure way to address this specific failure, is to address the required follow-through actions by top management as part of building block 5 (processing/structuring) and adding block 6 (awareness/culture) in the above-mentioned competitive intelligence process.

With reference to the above-mentioned information in this section and for the purpose of this study, competitive intelligence is defined as follows:

Competitive intelligence is the legal and ethical process supported by proper structures and organizational culture, of the gathering, enrichment and dissemination of purposeful information that could lead to an improved competitive advantage for an organisation (Author, 2017).

2.1.5 Competitive intelligence: A “stigmatised” practice

Competitive intelligence focuses on information and specifically information that can lead to a competitive advantage over other individuals/companies/countries. Competitive intelligence also calls for human involvement. This brings to the fore the age-old saga of individuals having a possible advantage over others and how these individuals can make use of this advantage. On a very humanly note, this possible advantage is further alluded to in section 2.2.5 (Competitive intelligence: global competitiveness) where psychopaths is mentioned and their use of competitive intelligence to manipulate and exploit other individuals. Reinmoeller and Ansari (2016:121) studied companies in the United States of America associated with the practice of competitive intelligence between 1985 and 2012 and found that competitive intelligence becomes highly diffused and persists despite the risk of stigmatising its adopters. Reinmoeller and Ansari (2016:138) concluded their study with the following findings:

- i) Competitive intelligence is a prominent example of a stigmatised practice that persists. Competitive intelligence refers to legal practices of gathering market information that have sometimes been associated with legal infringements and espionage.
- ii) While gathering and analysing strategic information in a legitimate practice, the way information is obtained and treated can lead rivals, clients and others to suspect illegal competitive intelligence activities.
- iii) Using competitive intelligence can be risky as even a single company's illegal espionage activities that transgress ethical and legal boundaries can also condemn the use of competitive intelligence by other companies.
- iv) In the modern, competitive business world, millions are spend on competitive intelligence information to obtain and “discover the truth”. Largely hidden industries are becoming an integral part of the way companies do business globally.
- v) Investigating rivals and industrial espionage are clearly vastly different concepts.

Wright and Roy (1999:55) studied industrial espionage and competitive intelligence and state that managers know that industrial espionage exists and that it is illegal but they have difficulty

recognising its new forms and do not necessarily know the difference between industrial espionage and competitive intelligence. Wright and Roy (1999:58) concluded their study with interesting findings:

- i) Individuals do not necessarily distinguish a difference between industrial espionage and competitive intelligence as they consider the latter concept a euphemistic name for industrial espionage. The assumption is made that the distinction lies in legality.
- ii) Complete information security is impossible, regardless of the amount of money and time invested.
- iii) The number of industrial spies and competitive intelligence specialists is likely to increase.
- iv) Human resources managers should not only consider a policy to deal with information leakages (a reactive approach), but should integrate the concept of competitive intelligence into the corporate culture of their company to make employees aware of what types of information should not be revealed, especially through public communication channels, such as public relations activities, conferences or seminars.

From the above review it is, therefore, clear that competitive intelligence can be a sensitive topic. However, when competitive intelligence is practised ethically and via acceptable processes, it can add value to companies.

2.2 South Africa: Competitiveness and competitive intelligence

Reference is often made to the concept of “the world is getting smaller”. This is not meant literally, but rather that distance is no longer an issue. The issue of distance with regard to communicating parties is, therefore, not a challenge anymore and some reasons are as follows:

- i) The exponential growth in the electronic communication industry means that communication between two distant parties is becoming easier.
- ii) The growth of social media and the acceptability of the use of social media have changed the thought processes of individuals to be more open to different forms of communication.
- iii) The travel and transport industries have globally grown over the past few decades.
- iv) The global political landscapes have changed drastically over the past few decades. During the “cold war”, Western countries would only do business with other Western

countries. Today, most countries are open to business relationships with most other countries.

2.2.1 Sensitivities

Countries globally compete for business. This has caused the issue of competitiveness to become a distinguishing factor for countries and companies that wish to increase their economic base. Whilst it is important for countries and companies to be economically competitive in order to compete in a global economy, the issue of being economically competitive also comes with sensitivities and controversies:

- i) To be economically competitive, should not come at a severe cost. Many countries and companies recognise the sensitivities of making use of child labour. The principle of ethical fairness is also recognised and companies, such as Starbucks who own coffee shops worldwide, audit their upstream supply chain to ensure that fair pricing and payments are maintained amongst the role-players in the upstream supply chain (Starbucks, 2017).
- ii) In many countries, there are regulations regarding “anti-dumping” by manufacturers. There are regular news releases concerning cases where governments endeavour to protect markets against what they deem “Chinese dumping” – Chinese-manufactured goods are available at prices that local producers cannot compete against (Trade, 2017). The steel manufacturing industry in South Africa is, for example, monitored by potential export countries to not export steel at prices that are deemed “too cheap” by export countries (SEIFSA, 2017).
- iii) The American president in 2017, Donald Trump, has made a number of statements on record regarding protecting the American economy against imports at prices that is considered “too cheap” by American manufacturers (Wolfgang, 2017:2; Sherfinski, 2017:3). The largest steel manufacturer in South Africa, AMSA, diligently keeps record of all information regarding exports in order to be prepared should they need to defend an allegation of “dumping” of steel products in other countries (AMSA, 2017).
- iv) The King Report on corporate governance is a ground-breaking guideline for structures and operations of companies in South Africa (SAICA, 2017). The report was originally issued in 1994 (King I) and revised versions were released in 2002 (King II), 2009 (King III) and 2016 (King IV). The guidelines of the King Report prescribe what acceptable and good governance is for doing business. The Institute of Directors in Southern Africa (IoDSA) accepted the King Report as a guiding set of rules on how to do business ethically – what is acceptable and not acceptable when doing business. Reports, such

as the King Report, need to be taken into account when striving for economic competitiveness. The King Report in South Africa is also not unique to South Africa as there are a number of similar reports available worldwide (Brennan & Solomon, 2008:898).

2.2.2 Global competitiveness

Global competitiveness is an important factor for all countries and companies that wish to compete for business in an “open economy”. The world is highly competitive and quite often there are more businesses in operation than a healthy market demand calls for (Djekic, 2014:14-18). Cypher (2014:361) states that countries should strive towards the production of goods with higher value-add compared to domestically owned resources, since it is the production of these commodities for a domestic market and for export, which adds most to a country's GDP. Porter's (1990:25-40) diamond model of competitiveness helps individuals to understand the competitive position of companies in a global economy. Porter (1990:55) identified four classes of company attributes that provide the underlying conditions for the determination of a competitive advantage, namely 1) factor conditions, 2) demand conditions, 3) related and support industries and 4) company strategies, structures and rivalry. Companies should not only develop and have a competitive strategy in order to maintain a superior and sustainable performance but should also adapt and innovate their strategies on a continual basis in order to remain competitive in a sustainable manner (Schuller & Lidbom, 2009:935). For companies to remain competitive in a sustainable manner, means they will in the long term have to maintain systems according to environmental, economic and social considerations (Crane & Matten, 2007:23). Competitiveness is a multifaceted concept and according to Schuller and Lidbom (2009:935), the concept refers to the competitive environment that countries and companies face. Furthermore, the economic success of countries depends on their capacity to make use of activities that create a competitive advantage, their ability to create an environment of transformation and progress and their capacity for innovation (Canongia, 2006:58).

2.2.3 South Africa versus global competitiveness

South Africa's Deputy Minister of Trade and Industry in 2013, Elizabeth Thabethe, states that one of the strategies to improve the economic growth rate of South Africa is to export less of South Africa's mineral resources at a low value-adding factor and to promote the export of value-adding products (Thabethe, 2013). The exporting of higher value-adding products will, however, only be viable if South African manufacturers are able to compete in global markets. A previous South African President, Thabo Mbeki, highlighted during the State of the Nation Address (Government Communication & Information Services, 2002/2003) that the growth of the South African economy depends on its competitiveness and that measures should be taken

to enhance competitiveness. According to Viviers *et al.* (2005:581), South Africa's Global Competitive Index ranking of the World Economic Forum was 45th out of 135 countries in 2008-2009 (World Economic Forum, 2008). The same index for the period 2015-2016 ranked South Africa 49th out of 140 countries (World Economic Forum, 2017) and qualified the 49th ranking as a positive turn-around after a four-year downward trend. South Africa's Global Competitive Index ranking did not improve in the period between the two rankings and in fact, rather decreased as the qualifier of the second ranking made mention of the ranking having turned around positively to be placed 49th.

2.2.4 South Africa

South Africa proclaimed its Competition Act (89 of 1998) and the Act commenced on 1 September 1999. The mission of the Act is stated as:

“To provide for the establishment of a Competition Commission responsible for the investigation, control and evaluation of restrictive practices, abuse of dominant position and mergers; and for the establishment of a Competition Tribunal responsible to adjudicate such matters; and for the establishment of a Competition Appeal Court; and for related matters”

There is regular media coverage in South Africa on cases of non-competitive behaviour or acts engaged in by South African companies (Competition Tribunal, 2017). Some of these cases include:

- i) Two companies charged for “alleged price fixing, market division and collusive tendering”.
- ii) Three companies charged for “alleged collusive tendering in respect of the provision of retailing of arts, curio and crafts”.
- iii) Four companies charged for “allegedly dividing markets by allocating specific type of goods”.
- iv) Two companies charged for “alleged collusive tendering in respect of two furniture removal tenders”.
- v) Eighteen banks investigated in South Africa for “having colluded to gain from the Rand/Dollar exchange rates”.

- vi) During 2016, three South African steel manufacturers were found guilty of non-competitive behaviour. One of the three companies, AMSA, was fined in excess of R1 billion.

There is general acceptance in South Africa of the importance of competitiveness – not only in terms of the South African economy but also in terms of fairness of pricing with regard to consumers (Moneyweb, 2017).

2.2.5 Global competitive intelligence

With reference to Table 3.1 (the four-part series covering the bibliography of competitive intelligence globally), the period covered the early years of competitive intelligence (1970s to 2006) – a period spanning more than 20 years. Many competitive intelligence-related publications are cited in this bibliography for this period. Moreover, a number of competitive intelligence institutions exist globally, such as:

- United Kingdom Competitive Intelligence Forum
- Society of Competitive Intelligence Professionals
- Institut für Competitive Intelligence GmbH
- Canadian Institute of Competitive Intelligence

Formal research on competitive intelligence is done on an on-going basis. Dishman & Calof (2008:772) confirm that several efforts have been made to evaluate the intelligence capabilities of companies and cite a number of sources: Antia and Hesford, 2007; Cartwright *et al.*, 1995; Daft *et al.*, 1988; Fahey and King, 1977; Gelb *et al.*, 1991; Ghoshal and Westney, 1991; Keegan, 1974; Maltz and Kohli, 1996; Montgomery and Weinberg, 1979; Prescott and Smith, 1987; Sawka *et al.*, 1995; and lastly, Zinkhan and Gelb, 1985. In addition, competitive intelligence practitioners are teaming up with specific companies in order to do competitive intelligence-related research, for example the Canadian Aerospace and Defence Organization and the Canadian Strategy and Competitive Intelligence Forum (Calof & Skinner, 1999a:22).

As confirmed in section 2 (Competitive intelligence) in this chapter, the literature sources consulted for the literature review yielded comprehensive information. A selection of the most recent articles on competitive intelligence is as follows:

- i) Muñoz-Cañavate and Hípola (2016:39) investigated and catalogued sources of information used by the European Union that can also be used for competitive intelligence specifically from the perspective of librarians.

- ii) Tuan (2016:591) used a structured questionnaire targeting 600 participants from chemical manufacturing companies in Vietnam to test four hypotheses:
- H1: Organisational ambidexterity is positively related to supply chain agility.
 - H2: Competitive intelligence positively moderates the relationship between organisational ambidexterity and supply chain agility – the relationship is stronger when competitive intelligence is high and not low.
 - H3: Organisational ambidexterity is positively related to external knowledge sharing.
 - H4: External knowledge sharing is positively related to supply chain agility.
- iii) Lemmer (2015:281) used the results of a previous survey regarding the practice-readiness of junior legal professionals, identified some gaps and proposed to cover these gaps by teaching competitive intelligence to second year law students at the Robert H. McKinney School of Law at the Indiana University.
- iv) Chevallier *et al.* (2016:1203) asked the question: “What are the levers of a CI process on knowledge management in a competitive context?” The researchers made use of a questionnaire during their research process and also tested the following three hypotheses:
- H1: The more a company adopts a competitive strategy, the more the company practises competitive intelligence.
 - H2: The more a company practises competitive intelligence, the better the company manages its knowledge.
 - H3: The more company adopts a competitive strategy, the better the company manages its knowledge.

Recently, articles were published on a global scale with competitive intelligence as the focus area:

- i) In the past decades, competitive intelligence has proliferated in the global business world.
- ii) The librarian community, supply chain community, legal fraternities and the knowledge management fraternity are receiving attention. Competitive intelligence has proven to have a rightful place in many different communities, businesses, perspectives and disciplines.

- iii) The concept of competitive intelligence can be used to test hypotheses and develop theories during research.

Well-known companies, such as General Electric, Motorola, Microsoft, Hewlett Packard, IBM, AT&T, Intel, 3M, Xerox, Merck, Coca-Cola and Chrysler all made use of competitive intelligence (Shermach, 1995). Although these are all large corporations, the necessity to obtain competitive intelligence also applies to small and medium-size organizations (Fuld, 1995:7). Small businesses practise competitive intelligence on a continual basis to survive. Good small business owners/managers are able to list competitive pricing for the products of their business; they know which other companies are potential threats; they can list possible opportunities in the market and list areas for improvement of their business. In some cases, competitive intelligence receives support from government agencies and in Japan, for example, “there has been a government-run competitive intelligence school for industry managers since the early 1960s” (Calof, 1997:20).

Informal or formal competitive intelligence or competitive intelligence-related activities are practised by all humans on an on-going basis. Darwin (cited by Freeman, 2002:16) alluded to the fact that the survival of species depends on their ability to adapt to circumstances and realities. All human beings have to learn from their reality – their environment, potential threats, potential opportunities and abilities (strengths and weaknesses). However, competitive intelligence can also be misused – psychopaths are renowned for their competitive intelligence skills with which they manipulate and exploit others on a daily basis and can be described as “intra-species predators” (Hare *et al.*, 2004). Competitive intelligence is, therefore, part of the survival skills of countries, businesses and human beings.

2.2.6 Competitive intelligence: South Africa

Competitive intelligence in South Africa has not been researched extensively.

Table 3.2: South African research on competitive intelligence

#	Year	Title	Reference
1	2014	A comparison of competitive intelligence activities in Brazil, Malaysia, Morocco and South Africa	Du Toit & Sewdass, 2014
2	2014	Current state of competitive intelligence in South Africa	Sewdass & Du Toit, 2014
3	2013	Comparative study of competitive intelligence practices between two retail banks in Brazil and South Africa	Du Toit, 2013
4	2012	The availability and use of competitive and business intelligence in South African business organisations	Venter & Tustin, 2012
5	2010	Competitive intelligence skills needed to enhance South Africa's competitiveness	Strauss & Du Toit, 2010
6	2010	Competitive intelligence and Africa's competitiveness: What's happening in South Africa?	Du Toit & Strauss, 2010
7	2008	Competitive intelligence: construct exploration, validation and equivalence	Saayman <i>et al.</i> , 2008
8	2005	Enhancing a competitive intelligence culture in South Africa	Viviers <i>et al.</i> , 2005
9	2002	Competitive intelligence practices : a South African study	Viviers <i>et al.</i> , 2002

Source: Illustration from literature search, 2017.

The list of publications in Table 3.2 is based on a search for published articles that focused on South Africa or where South African researchers were involved concerning competitive intelligence. The publications are listed according to the year in which the articles were published. The research activities on competitive intelligence in South Africa are quite limited compared to the activities and information contained in Table 3.1 (four-part bibliography of competitive intelligence publications globally). The most recent published articles in Table 3.2 were searched to determine whether competitive intelligence features and to obtain information about the state of competitive intelligence in South Africa. In article 1 listed in Table 3.2, Du Toit and Sewdass (2014:5) compared the competitive intelligence activities of Brazil, Malaysia, Morocco and South Africa and found the following:

- i) Competitive intelligence activities in all four countries are still in the early phase of development.
- ii) In all four countries, there is no available and recognised list of practicing competitive intelligence professionals. Although this finding was identified as a shortcoming of the study, it does not mean that there are no professional competitive intelligence practitioners in South Africa.

- iii) The participants in South Africa who completed the questionnaire used in this study indicated that competition in their business environment is very tense.
- iv) The South African participants mainly stated that a formal competitive intelligence function do not exist in their companies.
- v) Companies should have an appropriate awareness of competitive intelligence and a culture of competitiveness and should enhance a competitive intelligence culture by creating an awareness amongst employees by providing training to employees.

In article 2 listed in Table 3.2, Sewdass and Du Toit (2014:188) investigated the current state of competitive intelligence in South Africa and found the following:

- i) Competitive intelligence is a relatively new activity in South Africa.
- ii) About half of the participants who completed the questionnaire are of the opinion that they cope above average with changes in their business environment.
- iii) About 60% of the participants strongly agreed that the most important competitive intelligence activity in their company is to use competitive intelligence to remain cognisant of legislative trends.
- iv) The study recommended that companies should enhance a competitive intelligence culture by creating an awareness amongst employees and competitive intelligence training should be provided to new employees.
- v) South Africa as a net exporter of strategic minerals and the “gateway” to Africa, has an internal environment ideally suited to companies to make use of competitive intelligence to gain a competitive edge in a developing domestic economy and a challenging external environment.

In article 4 listed in Table 3.2, Venter and Tustin (2012:104) investigated the availability and use of competitive and business intelligence in South African companies and found the following:

- vi) When it comes to the availability of information, it seems that external information, such as competitive intelligence, has the largest gap between importance and availability despite its importance to decision makers – especially those in externally-focused functions.

- vii) In large companies (more than 1000 employees), the decision makers are least satisfied with their competitive intelligence and it seems that coordination in large companies is a problem. Large companies are finding it harder than smaller businesses to influence staff members to report back on customer needs and competitor actions.
- viii) Further research is required on measuring the value of business information, such as competitive intelligence.

The above-mentioned consulted articles stretch back to 2012 and are viewed as a sample of the most recent published South African articles on competitive intelligence. The literature consulted shows, therefore, that 1) competitive intelligence is still in its infancy stage in South Africa, and 2) opportunities exist to increase competitive intelligence activities in South Africa.

2.2.7 Competitive intelligence: the future impact of technological developments

In 2017, there is some media speculation as to what the impact of technological developments will be on the world as we know it (Goldstuck, 2017). Some of these technological developments are:

- i) Data analysts: Services are increasingly more available with regard to the analysis of data. Companies can render raw data to data analysts who analyse data by making use of the latest technologies and methods and afterwards they provide advice to companies according to the data received.
- ii) Artificial intelligence: It has been around for decades but is lately coming to the fore as a real value-adding mechanism in addressing everyday problems. There are already artificial intelligence machines available that teach new machines. The IBM “Watson” super-computer is one of a number of computers that have the capability to operate with artificial intelligence.
- iii) The fourth industrial revolution: The first industrial revolution used water and steam power to mechanise production. The second used electric power to create mass production. The third used electronics and information technology to automate production. The fourth industrial revolution is digital and characterised by a fusion of technologies that is blurring the lines between the physical, digital and biological spheres. It is expected from this fourth industrial revolution to disrupt almost every industry in every country and change the way individuals think about entire systems of production, management and governance.

- iv) Internet-of-things: The communication between electronic “things” connected to our world will become standard.
- v) Computing power: It is reported in the media that by 2030 the average human being will be able to buy a single computer that will have the computing power of a human being and that by 2050 the average human being will be able to buy a single computer that will have the computing power of the entire human population.
- vi) “On-demand” or “X-as-a-service”: The contracting of technological solutions is already a reality in 2017 where many services are available from cloud-based solution offerings. One of the major benefits of this is that the “take-on” phase for companies to embed technological solutions in their portfolio is drastically reduced.

Christensen (2003) states that new technologies can either sustain or disrupt:

- i) Sustaining technology refers to innovations or improvements to an already existing technology that does not involve a shift in the goals and target audience of companies.
- ii) Disruptive technology refers to influences on established technologies that alter industries or ground-breaking products that create completely new industries.

Will the fourth industrial revolution disrupt or sustain our technologies? Stephan Hawking, the well-known English theoretical physicist, and Ray Kurzweil, a well-known futurist, shared the following predictions:

- i) Competitive intelligence will be run by computerised systems with very little interference by human beings.
- ii) Companies who wish to make use of competitive intelligence will be able to contract this service from competitive intelligence service providers who will be trained in the successful deployment of this business tool. Companies will be able to reap the benefits of competitive intelligence by making use of competitive intelligence service providers in the short term.
- iii) Human beings who would like to engage in economic activities will subscribe to computerised systems and services to guide and assist them.
- iv) Controlling computerised systems will have their own and separate “economic system” where pecking order, values and implications of decisions will be negotiated and agreed on by computerised systems.

- v) Computerised systems will “employ” human beings to perform certain assignments. Cyber systems will employ human beings to erect fail-over electricity generation facilities to supply electricity at all times.
- vi) Human beings will enjoy a comfort zone in which ethical behaviour, the non-unethical exploitation of resources and “fairness” will favour them.

In addition, Brandenburger and Nalebuff (1996) predict that economic coopetition (cooperation + competition) will be negotiated, agreed and implemented by computerised systems. Note that “coopetition” is a neologism derived from the words “cooperation” and “competition” (Brandenburger & Nalebuff, 1996).

Given the above-mentioned technological developments and predictions made by futurists, a term, such as disruptive competitive intelligence can well be expected in the near future. This term will be realised when competitive intelligence is not only practiced by its practitioners but where competitive intelligence will be outsourced to cyber systems and where cyber systems will be contracted and rewarded by companies for competitive advantages. However, this research focuses on South Africa in 2017, and the question should be asked what the competitive intelligence roadmap should look like for South Africa going forward. Globally, competitive intelligence has an appeal to numerous researchers and practitioners due to its role in shaping the strategic decision-making of companies (Rapp *et al.*, 2011) and business performance (Mohsin *et al.*, 2015).

Table 3.3: Total number of theses and dissertations per country (2003-2006)

Country	2003	2004	2005	2006	Total
United States of America	3	7	0	0	10
South Africa	3	3	2	1	9
United Kingdom	1	2	0	1	4
Finland	0	1	2	1	4
Canada	0	1	2	0	3
Singapore	1	1	0	1	3
Total	8	15	6	4	33

Source: Adapted from Fleisher *et al.* (2007).

Dishman and Calof (2008) cited a bibliography of a complete review on literature and past studies concerning competitive intelligence published in a four-part series by the *Journal of*

Competitive Intelligence and Management. In part four of this series, Fleisher *et al.* (2007) reviewed competitive intelligence-related publications published from 2003-2006. In Table 3.3, the total number of theses and dissertations delivered per country for the same period is illustrated. This clearly shows that for the mentioned period there was relatively good academic interest in competitive intelligence in South Africa and that South Africa produced the second most theses and dissertations within this timeframe. As shown in Table 3.2, research was also done by South African professionals on competitive intelligence during the period of 2002-2014. In addition, competitive intelligence is researched on a continual basis, as referred to in previous sections of this literature review:

- i) refined definitions of competitive intelligence (section 2.1.1)
- ii) Reinmoeller and Ansari (2016) who studied organisations in the United States of America associated with the practice of competitive intelligence up until 2012 (section 2.1.4)
- iii) companies that promote competitive intelligence on an on-going basis (section 2.2.5)
- iv) recent competitive intelligence-related publications up until 2016 (section 2.2.5)
- v) South African competitive intelligence-related studies up until 2014.

Although competitive intelligence has been researched to some extent during certain periods in South Africa, the adoption of competitive intelligence in South African companies has been slow (Sewdass & Du Toit, 2014). As has been advocated already in previous studies (Sewdass & Du Toit, 2014:189; Venter & Tustin, 2012:115; Viviers *et al.*, 2002:35), there is a need for competitive intelligence activities to be accelerated in South Africa and to become a more formalised and generally practiced discipline in the business sphere.

2.3 Competitive intelligence: Summary

In this section of the literature review concerning competitiveness and competitive intelligence both globally and in South Africa, pertinent information about competitiveness and competitive intelligence was investigated and presented. This section covered definitions, processes and observations based on competitiveness and competitive intelligence landscapes both globally and in South Africa and concluded with a glimpse of what impact future developments can have on competitive intelligence. As has been advocated in previous research (Sewdass & Du Toit, 2014:189), it seems that the global position on competitive intelligence is quite healthy whereas the South African position offers much room for improvement.

3 INTEGRATED INTELLIGENCE

Integrated intelligence expanded from competitive intelligence to other areas of companies that include the internal functions of companies. Although integrated intelligence was not a core part of this research, it was nevertheless included in this review as competitiveness also relies on the internal perspectives of companies.

3.1 Integrated intelligence: Definitions and descriptions

Integrated intelligence includes elements of competitive intelligence and customer intelligence and integrates with other disciplines in the supply chain of companies, such as finance and a planning cycle (Bulger, 2015). According to Bulger (2015), these elements of integrated intelligence aim to assist companies in making sound decisions about how to really be competitive in a market. Integrated intelligence aims, therefore, to take into account all dimensions of companies – their markets and customers – and thereby adds value to the strategic planning processes of companies. Concepts of integrated intelligence can be applied to a wide variety of company challenges, including the architectures of urban management (Khan *et al.*, 2012:1). According to Bulger (2016), companies should develop robust decision-influencing functions with teams of experts who collectively integrate varying points of view and recommendations by making use of systems and designs that result in synergistic, integrated, competitive intelligence or integrated intelligence capabilities. Bulger (2016) continues to explain that intelligence functionality and skills must include the methodical collective nature of all considerations about markets from a variety of intelligence pools, including economic, market, competitor, customer, and technological intelligence insights from the myriad of complex datasets that exist. Moreover, Bulger (2016) highlights that this multifaceted intelligence viewpoint applied in partnership with other disciplines is critical in solving issues and creating opportunities for companies around the world that aims to be leaders.

With reference to the information provided in this section and for the purpose of this study, integrated intelligence is defined as follows: Integrated intelligence includes the elements of competitive intelligence and also all other components of information that can holistically contribute to a company's overall competitiveness and thus to its health towards organizational survival.

3.2 Integrated intelligence: Advantages

While competitive intelligence focuses on the quest of companies to gain competitive advantages by looking outward, integrated intelligence includes a more inward focus of companies on functions, such as planning, finance, logistics, human resources, production,

maintenance, internal communication and internal regulatory functions (safety and internal auditing). The internal compliance of companies in South Africa should at least include the following:

- i) ISO 9001 – Quality management system
- ii) ISO 14000 – Environmental management system
- iii) OHSAS 18000 – Occupational health and safety management system

With integrated intelligence, companies can gain an advantage by complying with the mentioned ISO standards, the King Report's 5 good governance guidelines and regulatory requirements set by the board of companies and gain additional competitive advantages. Furthermore, some "soft" internal factors, such as fair remuneration, fair and respectful treatment of employees, can further lead to additional competitive advantages.

4 A VALUE CHAIN ANALYSIS

The mentioned sources consulted for this part of the literature review included published books, published value chain analysis studies and articles. Fearne *et al.* (2012) listed the major value chain analysis studies that were done from 1990 until 2009 (see Table 3.4).

Table 3.4: Major value chain analysis studies (1990-2009)

Paper	Method / case study		Sector	Boundary of analysis
	Method	Case study		
Womack et al. (1990)	X		Multiple	Inter-firm
Womack & Jones (1996)				
Hines & Rich (1997)	X	X	Multiple	Inter-firm
Rother & Shook (1998)	X		Multiple	Inter-firm
Rose & Stevels (2000)	X	X	Electronics	Inter-firm
Rose et al. (2000)				
Jones & Womack (2002)	X		Multiple	Inter-firm
Kaplinsky & Morris (2001)	X		Multiple	Inter-firm
Dekker (2003)		X	Food	Inter-firm
Simons et al. (2003)	X	X	Agrifood	Inter-firm
Agriculture and food council of Alberta (2004)	X		Agrifood	Inter-firm
Dolan & Humphry (2004)		X	Agrifood, dev.	Inter-firm
Hines et al. (2004)	X		Multiple Agrifood	Inter-firm
Taylor (2005)	X		Agrifood	Inter-firm
Donaldson et al. (2006)	X	X	Health, Agrifood	Inter-firm
Lummus et al. (2006)		X	Health, Agrifood	Inter-firm
Abdulmalek & Rajgopal (2007)		X	Manufacturing	Inter-firm
Bonney et al. (2007)	X	X	Agrifood	Inter-firm
Da Silva & De Souza Filho (2007)	X		Agrifood	Inter-firm
Elloumi (2008)		X	Education	Inter-firm
Fearne et al. (2008)		X	Agrifood	Inter-firm
Roztock & Weistroffer (2008)	X	X	Services	Inter-firm
Seth et al. (2008)		X	Agrifood	Inter-firm
Clark et al. (2009)		X	Agrifood	Inter-firm
FaBe et al. (2009)	X		Multiple	External Stakeholders
Fearne et al. (2009)	X	X	Agrifood	Inter-firm
Dent et al. (2009)				Inter-firm
Gooch et al. (2009)		X	Agrifood	Inter-firm

Source: Adapted from Fearne *et al.* (2012).

The studies covered multiple sectors but had an inter-company focus. The only authors of publications on the list summarized in Table 3.4 who participated in more than three studies (the number shown after each source in the following list) were Bonney (4), Clark (4), Collins (4), Dent (4) and Fearne (6) indicating that publications on value chain analysis are well covered by only a few authors. The topic of a value chain analysis was, therefore, well researched in

practice during the mentioned time period. This study focused on competitive intelligence but a value chain analysis was also included in the literature review as it can contribute to competitive intelligence (Bose, 2008:510-528).

Porter (1985:27) defines the term “value chain” to describe a series of value-adding activities. A series consists of primary activities – related directly to manufacture, sales and distribution – and secondary activities that support primary activities, such as planning, finance, research and development together with human resources. Mentzer (2001:47) describes a supply chain as a network consisting of all parties involved (e.g., suppliers, manufacturers, distributors, wholesalers, retailers and customers), directly or indirectly, in producing and delivering products or services to customers – both upstream and downstream through physical distributions, flow of information and finances. This disaggregation of functions can also be applied to inter-company systems from raw material inputs to consumption (Shank & Govindarajan, 1992:191; McGuffog & Wadsley, 1999:54). However, a value chain analysis includes input suppliers and service providers and their contribution to the creation of value and the generation of waste (Fearne *et al.*, 2012:575-581). The upstream parts of a value chain include the parts preceding the core productions functions and the downstream parts of a value chain include the parts following the productions function (Drury, 2013).

Porter and Kramer (2011:62-77) argue that in order to be relevant to the current business context, existing approaches to a value chain analysis need to adopt more sustainable perspectives that should include the addressing of external factors, such as health, environmental damage and poverty, which can offer opportunities to a chain to create shared value. A value chain analysis can also focus on an intra-chain perspective where components inside a single chain are analysed for a single company (Dekker, 2003:1-23) or an inter-chain perspective (Lambert & Cooper, 2000:65-83) where components between multiple chains can be analysed for multiple companies and where an upstream and downstream value chain analysis are possible.

4.1 Definitions: A value chain analysis

There are various definitions available to explain the concept of a value chain analysis:

- i) Taylor (2005:751) defines a value chain analysis as a multi-dimensional assessment of the performance of value chains by examining product flows, information flows and the management and control of the chain.
- ii) Porter (1985:45) uses the term “a value chain” to describe a series of value-adding activities consisting of primary activities (related directly to manufacture, sales and

distribution) and secondary activities that support primary activities (planning, finance, research and development and human resources).

- iii) A value chain describes the full range of activities required to bring products or services from conception through the different phases of production delivery (involving a physical transformation and the input of various producer services) to the final consumers and final disposal after use (Kaplinsky & Morris, 2001).
- iv) According to Ikwouria and Gate (2008:41), a value chain is the sequence of activities required to make products or to provide services and is a linked set of value-creating activities from basic raw materials for component suppliers to the ultimate end-use products or services delivered to customers.

4.2 Observations about the definitions of a value chain analysis

It is clear that a value chain analysis has the following core meanings: 1) there are separate building blocks in this process and these building blocks are serially connected or otherwise linked, and 2) value is increased as this process moves downstream from building block to building block. The goal of a value chain analysis is to analyse the building blocks and the passing-on between these building blocks in order to determine opportunities for improvement in the overall chain. However, a value chain is defined and created per individual case and is always viewed in context. For the purpose of a specific investigation, a value chain can, therefore, exist of varying scopes and stretches. When reviewing the value chain of, for example, dentistry tools, the chain can start at receiving specialised steel rods and end at the delivery of packaged products to dentists. The chain can, however, extend upstream to the manufacturing of specialised steel rods and also extend downstream to include customer satisfaction after delivery. A value chain analysis provides an opportunity for focusing on aspects of the chain in order to optimise economically.

4.3 A value chain analysis in perspective

The concept of a value chain was first introduced by Michael Porter in 1985, emanating from his seminal work on competitive advantage (Porter, 1985:63) where Porter defined a value chain as a series of value adding actions in business. The chain, as the name implies, represents a linked set of value-added activities and Porter's (1985:65) view was that competitive advantage cannot be achieved by looking at a company in isolation and that it stems from the many different activities in designing, producing, marketing, delivering, and supporting products and services. According to Soosay *et al.* (2012:72), a value chain analysis is a diagnostic tool for supporting the process of continual improvements of the chain as a whole (rather than individual

businesses). According to Taylor (2005:758), a value chain analysis focuses on three key issues:

- i) Firstly, the dynamics of information in a value chain from primary production to final consumption and the input of suppliers – how inclusive, transparent and responsive are the information that flows through the chain; to what extent are the decisions of stakeholders influenced (what to produce, when to produce, how to produce) by what consumers value.
- ii) Secondly, the creation and flow of value in the eyes of final consumers at each stage in the value chain – how many of the production and processing activities truly add value? How much investment is made in these critical activities? How many activities are necessary but do not necessarily add value (activities should be completed with minimal resource allocation). How many of these activities are unnecessary? Wasteful activities must be eliminated and resources re-allocated to drive value creation and efficiency.
- iii) Thirdly, the nature of relationships within a value chain – how much trust exists between the various stakeholders? What is the nature of communication within and amongst companies? Is there evidence of company commitment? Are risks shared and how is the assumption of risks rewarded in the chain? How is value created in the chain?

A value chain analysis also has relationships with other tools and concepts as indicated below:

4.3.1 A value chain analysis and value stream mapping

Jones and Womack (2002:62) developed a tool, called value stream mapping, which focuses on the material and information flow within and between companies. According to Hines *et al.* (2004:1002), value stream mapping contributes to competitiveness by encouraging the application of lean thinking in which products are pulled through a value chain in response to demand with minimal waste and inventory and primarily a cost-based view of value is maintained, which focuses on efficiency. Fearne *et al.* (2012) summarise the difference between value stream mapping and a value chain analysis. Value stream mapping focuses on the manufacturing process while a value chain analysis extends the line of sight to include input suppliers, service providers and their contribution to the creation of value and the elimination of waste. The boundaries of value stream mapping can be defined as a sub-set of the boundaries of a value chain analysis.

4.3.2 A value chain analysis and supply chain thinking

Fearne (2009:1) mentions that value chain thinking differs from supply chain thinking. Value chain thinking provides an enabling (internal) business environment with the opportunity to develop a sustainable competitive advantage – the more effective information is shared within and amongst companies, the more a value chain contributes to better decision-making and resource allocation. When a value chain develops systems and products defined by consumer preferences, it becomes more difficult for competitors to imitate products (Fearne, 2009:1). From the above-mentioned discussion, it is clear that value chain thinking is more encompassing and holistic than supply chain thinking.

4.3.3 A life cycle analysis

According to Camilleri (2008:33), a life cycle analysis is often called a “cradle to grave” analysis. Since its conception in the 1960s, it is one of the most comprehensive analytical tools for quantifying environmental impacts in supply chain operations – production, processing, packaging, distribution, using and disposing of products. Soosay *et al.* (2012:72) add that the focus of a life cycle analysis is on resource utilisation (e.g., energy, water) and the environmental impact of outputs (e.g., by-products, waste and emissions) at each stage of the value chain. These stages include environmental performance measures, identifying opportunities for improving resource use, reducing environmental impacts and targeting parts of the life cycle where the greatest improvements can be made (Soosay *et al.*, 2012:73). A life cycle analysis focuses also on fringe items, such as the impacts of adjacent systems on core production systems.

4.3.4 A sustainable value chain analysis

According to Soosay *et al.* (2012:74), a sustainable value chain analysis incorporates both a value chain analysis and a life cycle analysis to determine the value that final consumers attach to the activities that contribute to emissions and the impact on consumer perceptions of value with regard to changes made to production processes and product attributes. As this analysis includes an environmental impact assessment at all of the stages of a value chain in conjunction with activities, materials and operations, it is able to facilitate the allocation of resources more effectively by identifying priority areas and bottlenecks. A sustainable value chain analysis not only incorporates a value chain analysis and a life cycle analysis but also focuses on long-term sustainability.

4.3.5 A global value chain analysis

According to Daviron and Ponte (2005:72), a global value chain analysis studies the division of labour within each value chain and, for example, looks at the specific value chain of coffee. A global value chain analyst may trace the division of labour amongst companies: companies responsible for planting, growing and harvesting the beans; transporting the beans; blending and roasting the beans; designing and manufacturing packaging; retailing; dealing with waste; and offering post-retail customer services. It is envisaged that a global value chain analysis should also form part of “ethics and fairness” in the near future.

4.3.6 Shared value creation

Porter and Kramer (2011:72) describe the concept of “shared value creation” as value that is beneficial to both the value chain and society. This coincides with the latest line of thought about a value chain analysis to have a broader approach and include ethical and economical “fairness” across the globe and for all societies. In a study done by Fearne in 2009 (Fearne, 2009:1) – a leading protagonist in the fight for a more sustainable lifestyle, societies, production processes and supply chains – he listed four perspectives that should be incorporated in a broader value chain analysis, namely:

- i) The identification of the main activities along the chain and their contribution towards value creation.
- ii) The assessment of the flow of information and the use of collective decision-making informed by appropriate evidence.
- iii) The evaluation of relationship strength, the foundation for strategic alignment, trust and commitment.
- iv) The assessment of carbon emissions at each stage of a chain – from input supply to final consumption.

The fourth perspective listed by Fearne (2009:1) highlights that the assessment of carbon emissions should receive more attention. This assessment of carbon emissions can be expanded to other issues, such as a water footprint, emissions of specific gasses, the exploitation of “vulnerable” human beings, the use and exploitation of animals and other “soft” predicaments that the global community is becoming increasingly aware of.

4.4 The “value” of a value chain analysis

The value of a value chain analysis to companies has already been highlighted. During the literature review, the “value” of a value chain analysis is increasingly emphasised. The main objective of this research study was to develop a competitive intelligence framework for the sustainability of metals manufacturers in South Africa. Sustainability is, therefore, a key component of the aim of this study. According to Fearné *et al.* (2012:578) a value chain analysis can expose strategic and operational misalignments within the chain and the consequential misallocation of resources – opportunities for improvements can, therefore, create value and economic sustainability. Another valuable factor of a value chain analysis is that it focuses on the elimination of waste, the efficient flow of materials, and can determine the strength of inter-company relationships (Taylor, 2005:752). According to Mitchell *et al.* (2015:352), a value chain analysis allows researchers to analyse complex products consumed in a specific place (e.g., a holiday package at a hotel) and by using a structured approach, the rich variety of goods and service supply chains can be traced that are required to offer these products. Drury (2008:114) emphasises that a value chain analysis can increase customer satisfaction and manage costs more effectively.

What does the term “value” in a value chain entail? Taylor (2010:458) is of the opinion that “for a literature so concerned with global distribution and production of value, there is a dearth of critical analysis of how the concept should be understood”. In the current global economic reality of 2017, the concept of “value” has more than only a monetary meaning and also has to do with the fairness of distributing wealth and equality. Kaplinsky (2004:98) in particular, is adamant about this and has expressed his views openly. During an investigation completed by Kaplinsky (2004:89) concerning the inequality between global economic growth and global economic gains, he suggested that the challenge is 1) to identify ways in which poor countries and poor producers can enter these value chains and participate in ways that can lead to a sustainable income growth, and 2) to analyse and identify value chains in order to influence within them.

4.5 The future of a value chain analysis

The impact of globalisation and new technologies has brought about an environment of radical and continual change (Conradie, 2010:1). With reference to section 2.2.7 (Competitive intelligence: The future impact of technological developments), a value chain analysis will be subjected to expected technological developments in the near future. A value chain analysis incorporates aspects, such as 1) the identification of building blocks in a value chain, 2) the analysis of identified building blocks from economic, moral, ethical and fairness perspectives, 3) the extrapolation of all aspects of a value chain to connect technologies, other value chains,

management and resources, and 4) the quest to balance and optimise factors. All four of these mentioned aspects can incorporate “machine-thinking” – technological developments, such as artificial intelligence, can assist with solving issues or can even analyse and produce solutions that human beings did not consider. Technological developments will, therefore, be the “ticket to the game” in the near future. These developments will impact the traditional way in which a value chain analysis was thought about by creating opportunities for accelerated improvements and gains. Another factor that will have an impact on the traditional way in which a value chain analysis is viewed will be the increased popularity of considering and incorporating environmental impact factors. A value chain analysis is connected to other perspectives, such as green supply chain management. The idea with green supply chain management is to integrate environmental thinking into supply chain management. Green supply chain management influences the total environmental impact of companies involved in supply chain activities and can also contribute to the improvement of sustainability performance (Chin *et al.*, 2015:697). Green supply chain management aims to minimise or eliminate waste, including hazardous chemicals, emissions, energy and solid waste, along supply chains, such as product designing, material resourcing and selection, the manufacturing process, delivering final products and end-of-life management of products (Rao, 2006:202; Srivastava, 2007:71).

A value chain analysis with all of its intricacies can be illustrated by providing an example of the global crude oil exploration. Crude oil production takes place in various regions across the globe. Extracted or harvested crude oil has to be transported to refineries. Refineries produce various products from the processing of crude oil that need to be stored. From the storage facilities, refined products are logistically transported to other areas, such as retail facilities. The overall value chain for crude oil production is, therefore, important for the functioning of the world economy. All of the building blocks in the value chain of crude oil and its products can be managed by artificial intelligence systems. Efficiency can be improved by a more effective analysis and management of the value chain of commodities, such as crude oil, and will lead to an overall improvement of the production industry and also of the global economy. Concepts, such as a virtual value chain analysis, can indeed be part of our near future. In a virtual value chain analysis, a value chain analysis is explored by a system and the system will permit itself to be influenced by trends, such as incorporating environmental factors, the inequality of humanity, safety aspects concerning individuals and global governance.

5 SUSTAINABILITY

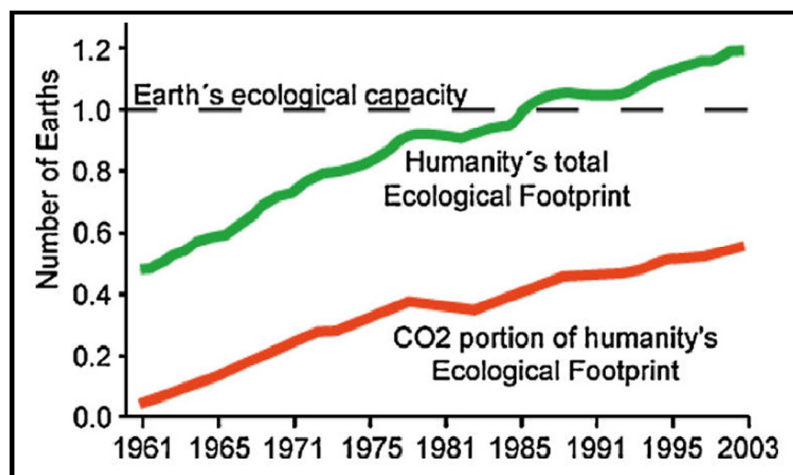
The main objectives of this research were to determine current competitive intelligence practices and to develop a competitive intelligence framework that can improve the sustainability of the metals manufacturers in South Africa. Sustainability was, therefore, a key

concept during this research study. Sustainability can be described as the continuation of businesses and long-term business survival. The overall concept of sustainability in the global community of 2017, however, has various additional meanings and interpretations. Although the interpretation of the concept of sustainability does not correlate well with the meaning of sustainability in the context of this study, it can be meaningful to explore some of the perspectives of sustainability with regard to the global community of 2017.

5.1 Definition of sustainability

No single definition exists for sustainability (Perrott, 2015:48). One useful definition of sustainability was, however, created by the United Nations Brundtland Commission in 1987: “Meeting the needs of the present generation without compromising the ability of future generations to meet their own needs” (Brundtland, 1987:12). Brundtland’s definition of sustainability is based on the growing concern by global leaders that the ecological footprint of human beings is increasingly exceeding the earth’s ecological capacity.

Figure 3.3: Earth’s ecological overshoot (1961-2003)



Source: Adapted from Jovane *et al.* (2008a).

In Figure 3.3, the increase of the total ecological footprint of human beings is projected against the threshold of what the earth can endure. Since 1985, the global resource consumption has been higher than the ecological capacity and for 2050 the required estimated bio-capacity of two Earths will be necessary to satisfy the need for renewable natural resources. The illustration in Figure 3.3 forms the basis for a number of “green” movements globally that wishes to influence the definition of and sensitivity towards sustainability. Moreover, there is a growing awareness and acceptance in societies and in business communities of the need to create sustainable companies (Unruh & Ettenson, 2010:6). According to Hopkins (2009:21), it is

generally agreed that sustainability needs to be dealt with strategically and that the following guiding principles should be embraced:

- i) Sustainability has the potential to affect all aspects of the operations of companies.
- ii) Sustainability has the potential to affect every value creation lever both in the long and short term.
- iii) There are mounting pressures from all stakeholders to deal with the emerging issues presented by sustainability.
- iv) Solutions to sustainability require collaboration from stakeholders.
- v) Solutions need to be made against a backdrop of uncertainty and in an absence of clarity.

Authors have referred to the triple bottom line of companies when viewing performance from a sustainability perspective – performance is judged in a financial, social and environmental area (Fauzi *et al.*, 2010:1355). Sustainability is a concept with a global meaning and against the backdrop of issues, such as the ecological footprint of human beings versus the earth's ecological capacity, sustainability has globally become an increasingly sensitive matter.

5.2 Sustainability: Value contribution and implementation

Enforcing sustainability in its broader meaning in companies can have a number of benefits. Hopkins (2009:23) lists the following key benefits associated with sustainability:

- i) An improved brand image of companies.
- ii) Cost savings.
- iii) A competitive advantage.
- iv) Employee satisfaction, high morale and retention of staff members.
- v) Product, service or market innovation.
- vi) A sound business model or process innovation.
- vii) New sources of revenue or cash flow.
- viii) Effective risk management.

ix) Healthy stakeholder relations.

There are good reasons why companies should embrace sustainability. However, there are also negative consequences that companies would want to avoid. In the above list by Hopkins (2009:23) of key benefits, the first advantage listed is an improved brand image. This advantage can have a negative impact when sustainability is not embraced – a brand image with negative connotations can do serious harm to the identity of companies. It can be argued that a list of advantages with regard to sustainability can, therefore, be viewed as a double-edged sword and this is already a reality in 2017. Companies receive credits and acknowledgements for their contribution in reducing humanity's carbon footprint whilst having to deal with negative consequences for not contributing sufficiently towards the reduction of a carbon footprint. Carbon taxes are levied for non-compliance in a growing number of nations (Vaughan, 2016:1).

When sustainability is fully embraced, the entropy of disorder decreases. However, human intervention is needed to stop the increase in disorder instead of allowing structure, order and sustainability to decrease. The formulation of strategies is important in building sustainable companies. Strong leadership and a company culture are among the most important drivers of establishing sustainable decision making (Epstein *et al.*, 2010:41). Companies who wish to fully embrace sustainability and to improve their sustainability rating, should embrace change. Perrott (2014:34) outlines distinguishing characteristics of the various phases for establishing sustainability in companies:

i) Phase 1: Rejection.

Companies reject sustainability and focus on their goals irrespective of the impact on employees, the ecology and fairness of business.

ii) Phase 2: Non-responsiveness.

Companies resort to “business as usual” to maintain a compliant workforce.

iii) Phase 3: Compliance.

Companies focus on reducing the risk of sanctions and to avoid litigation.

iv) Phase 4: Efficiency.

Companies realise that there are real advantages to be gained by proactively embracing sustainability, such as new technologies and brand value impacts.

v) Phase 5: Proactive strategies.

Companies realise that sustainability can be a competitive advantage and try to achieve this advantage.

vi) Phase 6: The sustaining corporation.

Companies have internalised the ideology of sustainability.

Modern global businesses will increasingly force companies to embrace sustainability. Apart from planning, forming strategies, strong leadership and a company culture (Epstein *et al.*, 2010:41), companies should also actively involve their employees to strive for sustainable decision-making as organisational knowledge or intellectual capital gains more and more acceptance as being the most valuable resource for a sustainable successful economic future (Auer, 2004:1).

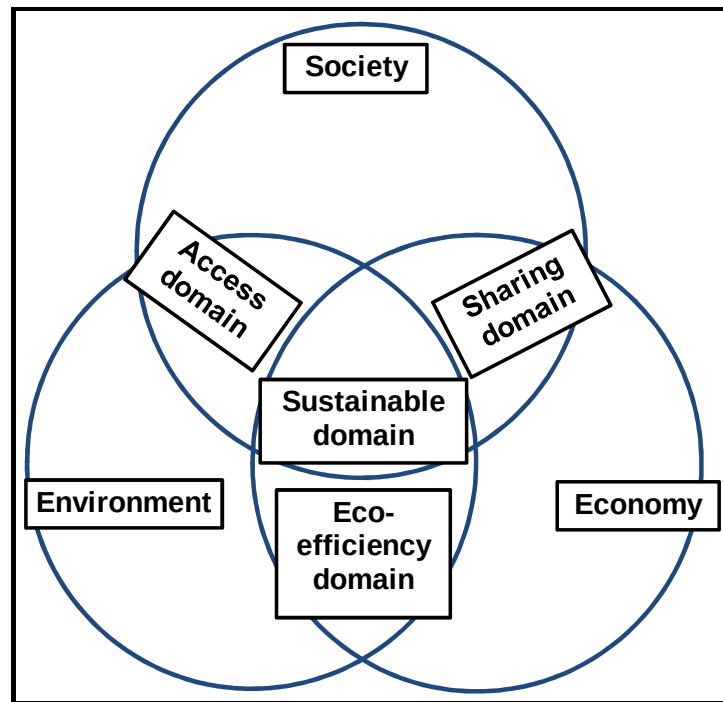
5.3 Sustainability: Development and manufacturing

The influence of contemporary sustainability has reached other domains, such as the manufacturing field. The declaration of the World Commission on Environment and Development (United Nations, 1987) is as follows:

Sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional changes are made consistent with the future as well as present needs.

This declaration makes it clear that sustainable development does not focus on changes but rather that changes should be pursued due to a shared responsibility towards future generations that will have to live with the consequences of the changes made. According to Seliger (2007:73), sustainability is directed at enhancing the living standard of human beings while improving the availability of natural resources and ecosystems for future generations. In addition, one of the main objectives of this study was to improve the sustainability of metals manufacturers in South Africa by developing a competitive intelligence framework. The advantages of sustainability to the manufacturing sector in South Africa are also topical. Manufacturing is the backbone of the growth development of countries – wealth generators and job creators (Jovane *et al.*, 2008a:652). Sustainability in the manufacturing industry is, therefore, an important factor in creating economic advantages for a country. According to Jovane *et al.* (2008a:654), sustainability in the manufacturing industry is a broad concept concerning three domains, namely the economy, a society, the environment and their interactions, as shown in Figure 3.4.

Figure 3.4: Sustainable development



Source: Adapted from Jovane *et al.* (2008a:649).

Figure 3.4 illustrates the interactions between the economy, a society and the environment:

- i) Between a society and the environment: A society has to have access to the environment and is in turn affected by the environment.
- ii) Between a society and the economy: A society is sharing in the economic wealth but the living conditions in a society are affected by the economy.
- iii) Between the environment and the economy: The environment can influence the efficiency of the economy but the economy can also suffer or benefit from the environment.
- iv) When factors i) to iii) are in balance, maximum sustainability can be achieved.

To achieve sustainability in manufacturing, a holistic view is required with regard to the products but also the manufacturing processes involved, the entire supply chain, and the manufacturing systems across multiple product life cycles. Improved models, metrics for sustainability evaluation, and optimisation techniques concerning the products, processes and system levels are, therefore, necessary (Jayal *et al.*, 2010:149). This study focused on competitiveness and competitive intelligence and how a competitive intelligence framework can improve the sustainability of South African metals manufacturers. In recent years, the consensus of

implementing sustainable development as a global strategic vision to meet the economic, social, environmental, and technological challenges we face, has been reached and competitive sustainable manufacturing is widely considered as its main enabler (Jovane *et al.*, 2008a). Competitive sustainable manufacturing can, therefore, be the answer to the key issues manufacturing in advanced countries and emerging countries are facing, such as globalisation, climate change, an ageing population, public health, poverty, social exclusion, the loss of biodiversity, increasing waste volumes, soil loss and transport congestion (Jovane *et al.*, 2008b:44). According to Jovane *et al.* (2008b:54), competitive sustainable manufacturing depends on and affects:

- i) Manufacturing – products and services, processes and business models.
- ii) Related policies – education, research and technological development together with industrial innovation.

Sustainability is the key focus during forums, such as the Global Conference on Sustainable Manufacturing that is held annually at a different venue around the world. Sustainability is, therefore, viewed as an important concept from a number of perspectives, including development and manufacturing.

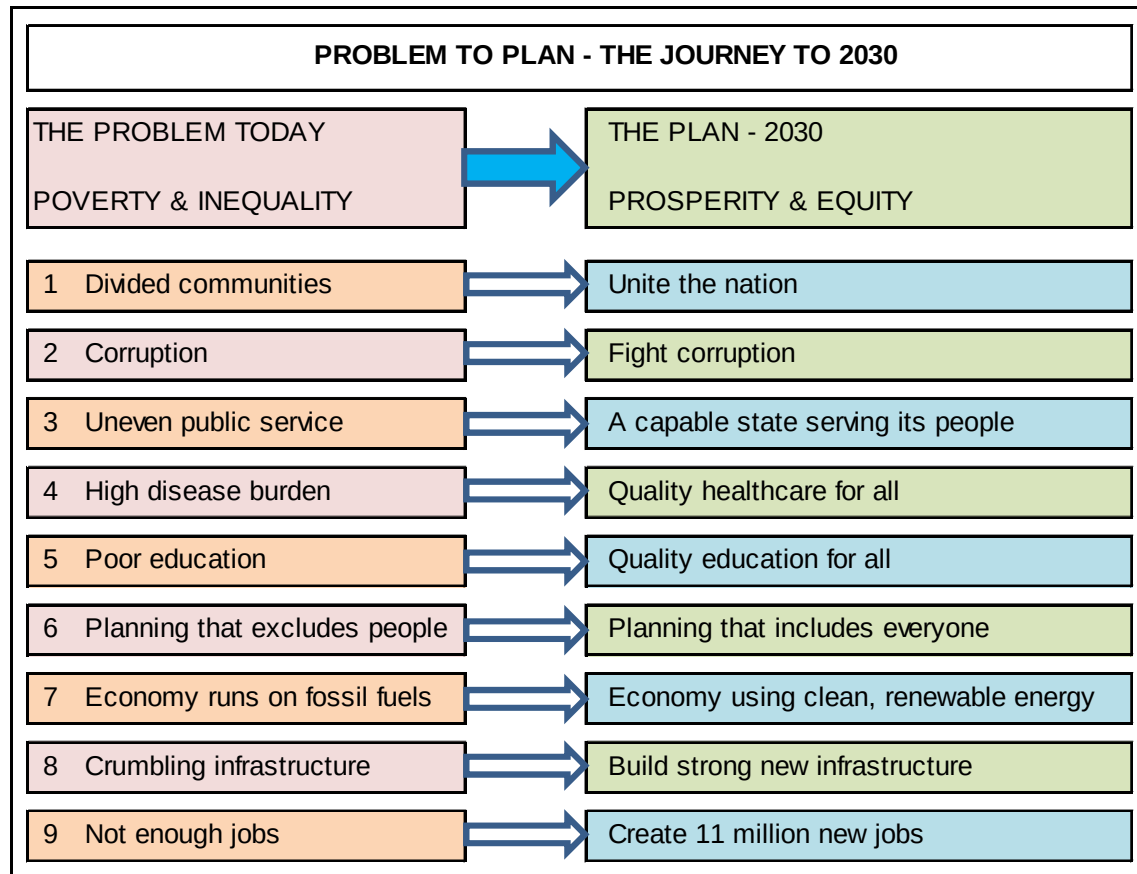
5.4 Sustainability: The future

The concept of sustainability will increasingly affect the global economy and the lives of human beings. In modern South Africa, it is widely recognised that water scarcity is a growing problem and that life as we know it will not be sustainable without new plans and solutions. Figure 3.3 shows that the earth is already overpopulated if the current ecological footprint of humanity is compared with the current ecological capacity. The recycling of water, waste management and manufacturing gasses are fast becoming an increasingly higher priority. The concept of sustainability should, however, not be viewed as a negative matter but as an issue that – when fully embraced – can enhance the quality of life positively.

6 THE SOUTH AFRICAN NATIONAL DEVELOPMENT PLAN

One of the main objectives of this study was to improve the sustainability of the metals manufacturers in South Africa. However, will the successful achievement of this goal contribute to the South African National Development Plan? The South African National Development Plan is an initiative of the South African government to take the country forward by achieving goals that will benefit the country and its people by 2030.

Figure 3.5: The South African National Development Plan



Source: Adapted from Gavaza, 2013.

The main themes and goals of the National Development Plan of South Africa are illustrated in Figure 3.5.

6.1 The National Development Plan – detail

In the National Development Plan of 2012, it was stated that “eighteen years into democracy, South Africa remains a highly unequal society where too many people live in poverty and too few work. These immense challenges can only be addressed through a step change in the country's performance” (National Planning Commission, 2012). The overarching two goals of the National Development Plan are:

- i) Eliminate income poverty – reduce the proportion of households with a monthly income of below R419 per person (in 2009 prices) from 39% to zero.
- ii) Reduce inequality – The Gini coefficient should fall from 0.69 to 0.6.

The Gini coefficient – developed by Gini (1936:77) – measures for example, inequality with regard to the levels of income where a Gini coefficient of zero expresses perfect equality (where everyone has the same income) and a Gini coefficient of 1 expresses maximal inequality (in a large number of individuals only one person receives income and all the others do not receive an income). According to the National Development Plan, one of the goals was to transform the South African economy and create a sustainable platform for job creation, which means that the rate of economic growth needs to annually exceed 5% on average. The following main goals were proposed to reach this goal:

- i) Increase exports.
- ii) Create a more efficient and competitive infrastructure.
- iii) Reduce the cost of living for low-income and working-class households.
- iv) Reduce costs of regulatory compliance.
- v) Create a larger and more effective innovation system.
- vi) Support small businesses.
- vii) Expand skills.
- viii) Strengthen financial services.
- ix) Commit to public and private procurement.
- x) Establish a higher rate of investment.
- xi) Establish a labour market that is more responsive to economic opportunities.
- xii) Enhance commercial diplomatic services.

Unfortunately, the general consensus in modern South Africa is that not sufficient progress has been achieved on the 12 mentioned goals to transform the economy and that some additional effort is required in order to achieve the overall goals for 2030.

6.2 Contributing to the National Development Plan

When the sustainability of the metals manufacturers in South Africa is improved, the manufacturing industry will economically contribute to the South African economy. A positive contribution to the South African economy should lead then to job creation and serve goal number nine of the National Development Plan – to create new jobs. The achievement of the

main research goal of this study can, therefore, contribute to the overarching goal of the South African National Development Plan. In practice, the framework that was developed in this study needs to be entrenched with metals manufacturing fraternities. It is proposed that one or more articles should be published from this research that can be made available to metals manufacturing fraternities in South Africa. The results of this study should also be communicated to leading companies in South Africa to assist in leveraging suggested changes. Companies should include SEIFSA and MEIBC in South Africa.

7 SUMMARY OF CONCEPTS

In this literature review, concepts that are core to this research were introduced and discussed. Other concepts of importance were introduced and defined earlier in the study and not reviewed during this specific literature review are highlighted again in Table 3.5.

Table 3.5: Concepts introduced in this literature review

CONCEPT	ABBREVIATION (if available)
Competitiveness	
Competitive intelligence	CI
Value chain analysis	VCA
Value streaming mapping	VSM
Life cycle analysis	LCA
Sustainable value chain analysis	SVCA
Global value chain analysis	GVCA
Shared value creation	
Supply chain management	CSM
Green supply chain management	GSCM
Sustainability	
Sustainable development	SD
Competitive sustainable manufacturing	CSM
South African National Development Plan	NDP

In Table 3.5, the main concepts that were introduced and discussed in this literature review are listed. Other concepts of importance that were introduced and defined earlier are repeated below:

i) Strategies

Strategies can be defined as the action plan of management to compete successfully and to operate a business profitably, based on an integrated array of considered choices (Thompson *et al.*, 2012:64).

ii) Intelligence

Intelligence is information content that is analysed, interpreted and infused with developed implications (Fleisher & Bensoussan, 2007:46).

iii) Strategic intelligence

Strategic intelligence is meaningful information in the hands of the right individuals at the right time so that they are able to make informed business decisions about the future of their business (Xu, 2007:49). Strategic intelligence can provide insight to understand what is influencing industries. Vast volumes of information can be accessed to help identify and develop new business opportunities and by making use of new opportunities and implementing effective strategies, business advantages are created. With the aid of internal and external business intelligence, competitive intelligence, market intelligence and knowledge management, companies can maximise their strategic goals (Marchand & Hykes, 2007:31-33).

This section summarised important concepts that are part of this research study.

8 LATEST STATUS ON LITERATURE REVIEW CONCEPTS

The purpose of this section is to summarise the latest status regarding the main themes of this literature research. For this purpose, the title of this research study should be highlighted again: “A competitive intelligence framework for the sustainability of metals manufacturers in South Africa”. The aspects specifically covered in this literature research are emphasised in the following sections.

8.1 Competitiveness and competitive intelligence

From the section on competitiveness and competitive intelligence, the following views emerged that summarise these concepts:

- i) From the 1970s to 1980s and up until 2006 many publications on competitive intelligence were published.

- ii) In this literature review, competitive intelligence-related publications were researched and cited up until 2016.
- iii) Literature about competitive intelligence coherently describes and defines the concept.
- iv) There is general agreement on the importance of competitive intelligence and the steps that should be followed by companies.
- v) Competitive intelligence is viewed as a “stigmatised practice” due to its connotation to industrial espionage.
- vi) The number of competitive intelligence practitioners is likely to increase.
- vii) Competitiveness is necessary for sustainability in businesses.
- viii) There are some issues involved concerning unfair competitive advantages.
- ix) Competitiveness is an important concept in South Africa as well.
- x) In South Africa, non-competitive behaviour by companies is legally punishable.
- xi) Globally, competitive intelligence research is in a relatively healthy state.
- xii) Research on competitive intelligence in South Africa is limited.
- xiii) Technological developments in 2017 and in the foreseeable future indicate that the practice and value of competitive intelligence will impact and enhance these developments.

8.2 A value chain analysis

- i) A value chain analysis has relationships with other concepts, such as:
 - Value stream mapping – focuses primarily on the manufacturing process while a value chain analysis focuses wider.
 - Supply chain thinking is less encompassing than a value chain analysis and value chain thinking.
 - A life cycle analysis focuses on a value chain analysis and also on the holistic environmental impact of resource utilisation and outputs.
 - A sustainable value chain analysis not only incorporates a value chain analysis and a life cycle analysis but also favours a long-term view of sustainability.

- A global value chain analysis studies labour within each of the value chains that are inter-related to produce final products.
 - Shared value creations are mutually beneficial to both value chains and societies.
- ii) The “value” of value chains still requires much needed research.

8.3 Sustainability

The meaning of sustainability and the long-term health of the environment are closely related:

- i) Global interest in sustainability is peaking.
- ii) Embracing sustainability will require change by companies.
- iii) Sustainability has close relationships with other concepts:
- Sustainable development
 - Competitive sustainable manufacturing
- iv) The total ecological footprint of humanity exceeds the ecological capacity of the earth.
- v) A popular contemporary topic is sustainable companies.

9 SUMMARY

In this chapter, competitive intelligence and a value chain analysis were reviewed as key components of the objectives of this research. Secondary concepts, such as sustainability and integrated intelligence, were also reviewed. The competitive intelligence process was reviewed and a definition for competitive intelligence for the purposes of this study was proposed. The South African National Development Plan was reviewed against the backdrop of the earlier reviewed primary and secondary concepts. The key concepts were summarised and the latest status on the concepts was reviewed. This chapter positioned this research to reach the research objectives by providing a comprehensive and solid literature review. This chapter is followed by Chapter 4 in which a detailed study of the metals manufacturing industry of South Africa is presented.

CHAPTER 4

REVIEW OF THE SOUTH AFRICAN METALS MANUFACTURERS

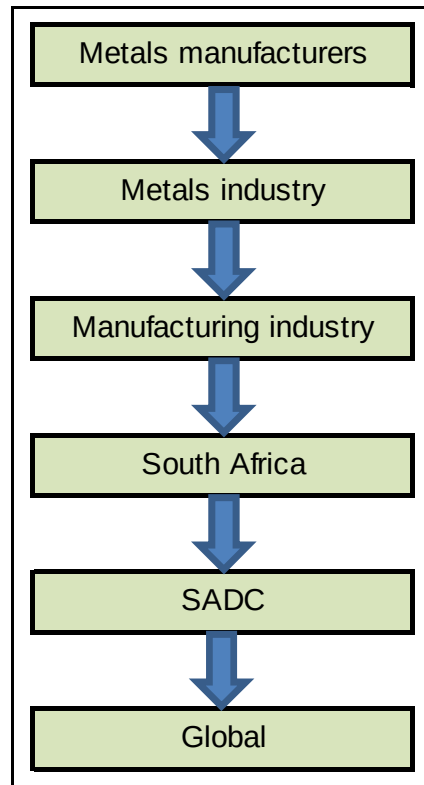
1 INTRODUCTION

In the previous chapter, literature reviews on the main concepts supporting the objectives of this research were presented: competitive intelligence and a value chain analysis followed by integrated intelligence and sustainability. In this chapter, a detailed study of the metals manufacturing industry in South Africa is presented. If this research study is correctly positioned in terms of the industry on which the study focused, the research objectives can be reached by providing a comprehensive and solid platform. This chapter is followed by the empirical research and in Chapter 5 the findings are presented.

2 POSITIONING THIS REVIEW OF SOUTH AFRICAN METALS MANUFACTURERS

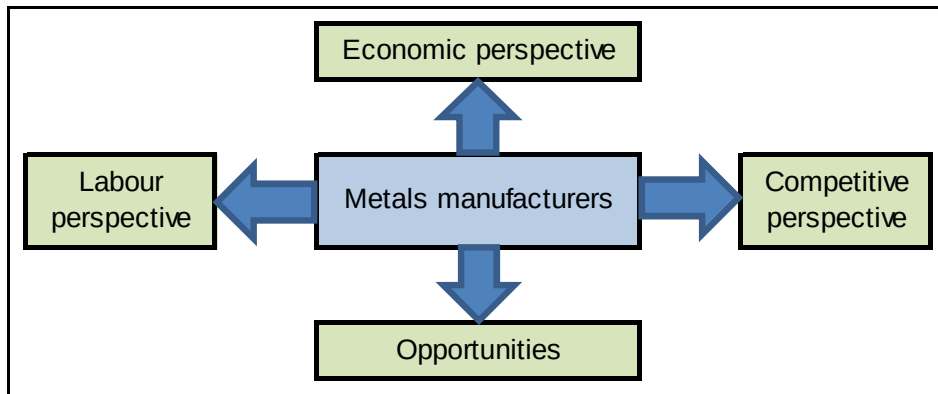
Metals are any number of chemical elements and alloys that are often lustrous, malleable and good conductors of heat and electricity (Business Dictionary, 2017a). Non-ferrous metals do not contain iron and a grouping of metals, such as aluminium, brass, bronze, copper, nickel, tin, lead and zinc (Altonmaterials, 2017). According to the definition of non-ferrous metals, precious metals are also included, such as gold and silver. However, precious metals were excluded from this research study. The metals manufacturers of South Africa are companies that focus on the manufacturing of metals, supplying upstream raw materials, such as ore, and interacting downstream with clients who use manufactured metals to produce products or to further beneficiate produced metals.

Figure 4.1: Illustration of the positioning of metals manufacturers



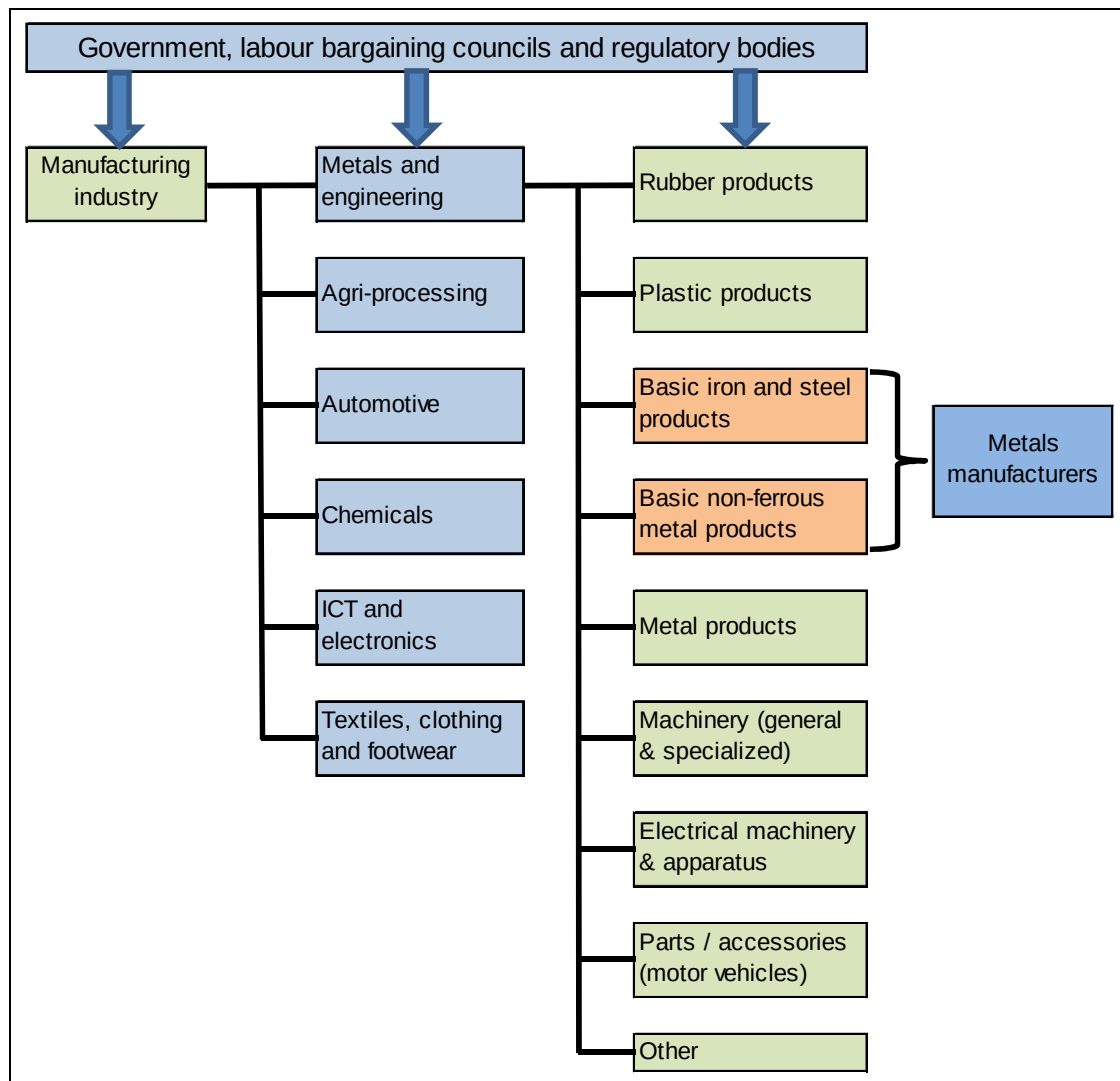
With reference to Figure 4.1, the metals manufacturers are part of the metals industry of South Africa. The metals industry includes stakeholders, such as the government, labour bargaining councils and regulatory bodies. This study focused specifically on the metals manufacturers and not the broader metals industry mainly because the competitive intelligence framework of this research focuses on improving the sustainability of metals manufacturers. The improved sustainability of the metals manufacturers will, however, directly benefit the metals industry, the manufacturing industry and the broader South African economy as well. As can be seen in Figure 4.1, the South African economy is part of the South African Development Community, which in turn is part of the global economy. This review focuses on the South African metals manufacturers but also covers the metals manufacturing industry, the South African Development Community and global metals manufacturing landscapes. The aim of the above given introductory description was to position this research in terms of the scalable industry views and the global economic view. This review is furthermore positioned in terms of a number of functional perspectives provided in Figure 4.2 below:

Figure 4.2: Perspectives of this research



This study reviews the metals manufacturers of South Africa from a functional economic, labour and competitiveness perspective. The presentation in Figure 4.1 together with the functional presentation in Figure 4.2 provides an overall contextual presentation of the South African metals manufacturers. The metals manufacturing industry in South Africa is supplied with raw products. Basic ore is the main product and the South African mining industry is, therefore, briefly reviewed in section 7 in order to add more overall context to the South African metals manufacturing industry.

Figure 4.3: Statistical grouping of sub-industries



South African statistics about the metals industry are generally available in the metals industry and the engineering industry combined, called the metals and engineering industry, as indicated in Figure 4.3 (Statistics South Africa, 2016; Quantec, 2017). The metals and engineering industry is defined as a sub-industry of the manufacturing industry. Published statistics of the metals and engineering industry often show main sub-industries and groupings of the remaining sub-industries. The main sub-industries of the metals and engineering sub-industry are:

- i) Rubber products
- ii) Plastics products
- iii) Basic iron and steel products
- iv) Basic non-ferrous metal products

- v) Metal products
- vi) Machinery (general and specialised)
- vii) Electrical machinery and apparatus
- viii) Parts/accessories (motor vehicles)
- ix) Other

Statistics for these sub-industries of the metals and engineering sub-industry are quite often shown in tabular formats (Statistics South Africa, 2016). From these tabular formats, specific mentioned sub-industries, iii) basic iron and steel products and iv) basic non-ferrous metal products, are grouped to define the metals manufacturers as focused on in this study. The researcher was, however, not directly in control of the distribution of the questionnaire during the quantitative phase of this research and perhaps adjacent metals sub-industries were involved. The composition of the sub-industries of the manufacturing industry, the sub-industries of the metals and engineering industry and the metals manufacturers is illustrated in Figure 4.3. Also note from Figure 4.3 that other influences, such as the government, labour bargain councils and regulatory bodies, are omnipresent in all industries and sub-industries in South Africa but were not included in the scope of this research as previously stated.

To summarise: The scope of metals manufacturers for this research can be defined as follows:

- i) A grouping of basic iron, steel and non-ferrous metal products, as illustrated in Figure 4.3.
- ii) Influences, such as the government, labour bargain councils and regulatory bodies, were excluded.
- iii) Precious metals, such as gold and silver, were also excluded.

The scalable economic perspectives up to and including the global economic view (in Figure 4.1) and the mentioned functional views (in Figure 4.2) are reviewed next. The above-mentioned grouping of metals manufacturers is highlighted in the statistical tables to follow.

3 ECONOMIC PERSPECTIVE

In the previous section of this review, positioning the review of the South African metals manufacturers, the inter-linked structure of the various industries and sub-industries related to metals manufacturers was illustrated and described. In this section, these inter-linked industries

and sub-industries are further reviewed on a South African and global economic level. Statistics for this section are used from Statistics South Africa and Quantec (a South African-based company that specialises in the statistical analysis of the economy of South Africa) and from a number of other information sources.

3.1 Metals manufacturers in South Africa

As previously stated, published statistics for the metals industry, the metals and engineering industry and the manufacturing industry in South Africa are often combined and statements, projections and performance retrospections are often painted with a broad brush for all three of these sectors. In this sub-section of the review, an overview is presented of the South African economy and the industries in which metals manufacturers are situated.

3.1.1 The South African economy

The South African economy experienced challenges in 2016 and was ranked as one of the toughest years after the 2008/2009 financial crisis (Chibanguza & Noise, 2017):

- The economy grew by a mere 0.4%.
- Potential GDP growth was downgraded to 1.3%.
- A negative output gap was recorded.
- Gross fixed capital formation remained negative.
- The political situation remained volatile.
- A severe drought was experienced.

The South African National Treasury (2017) also downgraded the 2016/2017 medium term GDP for South Africa to R4385 billion.

The production disruptions of 2014 were 1) a five-month long strike by workers in the platinum mines, and 2) a month-long strike by workers in the metals and engineering sector (Statistics South Africa, 2017). These strikes had a compounding negative effect on the performance of the South African economy in 2016 (Statistics South Africa, 2017). The business confidence level in quarter 1 of 2017 has slightly increased to 40 index points from the lowest level in six years of 36 index points in quarter 1 of 2016 (Statistics South Africa, 2017). While a downgrade of the South African economy by international credit rating agencies was averted in 2016, Standard & Poor's together with Fitch downgraded South Africa to so-called "junk status" during quarter 1 of 2017. The grading decision of the third of the "big three" international credit rating agencies, Moody's, is scheduled for quarter 2 of 2017 (Independent Online, 2017). The forecast

for economic growth in South Africa is 1.2% in 2017 and 1.8% in 2018 against the backdrop of expected improved commodity prices and improved global sentiment towards emerging markets (Chibanguza & Noise, 2017).

3.1.2 The manufacturing industry

South Africa has developed an established, diversified manufacturing base that has shown its resilience and potential to compete in the global economy (Department of Trade and Industry, 2016). The manufacturing sector provides a locus for stimulating the growth of other activities, such as services, and achieving specific outcomes, such as employment creation and economic empowerment. Manufacturing is dominated by agro-processing, automotive, chemicals, information and communication technology, electronics, metals, textiles, clothing and footwear industries. Underpinning this sector, is the Industrial Policy Action Plan of the Department of Trade and Industry, which aims to achieve structural development and to increase the competitiveness and sustainability in the South African manufacturing sector (Department of Trade and Industry, 2016).

Table 4.1: Manufacturing share of GDP (%)

	2004	2005	2006	2007	2008	2009	2010
United States of America	13.6	13.7	13.7	14.0	13.6	12.6	13.4
China, People's Republic	41.6	41.8	41.8	42.1	42.2	42.0	43.1
Japan	20.1	20.6	21.1	21.6	21.7	19.0	20.8
Germany	22.4	22.7	23.5	23.6	22.4	19.4	20.8
Republic of Korea	27.0	27.5	28.3	28.8	28.9	28.3	30.4
Italy	18.7	18.5	18.7	18.8	18.1	16.2	16.6
United Kingdom and Northern Ireland	13.6	13.3	13.1	12.8	12.4	11.7	11.9
France	13.2	13.2	13.0	12.9	12.5	11.4	12.3
India	15.4	15.6	16.2	16.4	16.0	16.1	15.9
Mexico	18.7	18.7	18.8	18.4	18.0	17.2	17.8
South Africa	18.3	18.5	18.7	18.6	18.4	16.7	17.1

Source: Small Enterprise Development Agency (2015).

Table 4.1 depicts the percentage of the GDP of countries in the manufacturing sector for the period 2004-2010. It shows that the manufacturing sector of South Africa is growing slower in comparison to the sectors of other countries and has shrunk from 18.3% of the GDP in 2004 to 17.1% of GDP in 2010 (Small Enterprise Development Agency, 2015). In 2016, the South African manufacturing sector contributed 15.2% to South Africa's GDP, making it the third-largest contributor to the nation's economy (businesspartners, 2017). Table 4.1 further indicates the percentage contribution of the manufacturing sector towards the South African GDP and has slightly declined from 2004 to 2010. However, the manufacturing sector still significantly contributes to the South African GDP. In addition, this sector contributes to the South African economy by employing 1.7 million workers (Industrial Development Corporation, 2016). The South African manufacturing sector has experienced two consecutive years of stagnant output growth in 2015/16 and is expected to face yet another difficult year in 2017 (Chibanguza & Noise, 2017).

3.1.3 Metals and engineering industry

The metals and engineering industry contains the metals manufacturers and is a sub-set of the manufacturing industry in South Africa and a combination of the metals industry and the engineering industry (Lundall *et al.*, 2008). According to the latest economic sector census (Statistics South Africa, 2017), the metals and engineering industry covers 29.13% of the manufacturing industry footprint. The fortunes of the metals and engineering industry correlate with the South African economy. Growth in the South African economy is, therefore, an important prerequisite for the fortunes of the metals and engineering industry (Chibanguza & Noise, 2017). The demand for output by the metals and engineering industry is fairly shared by local and international industries given that just under half of the output of the metals and engineering industry (42%) is exported from South Africa (Statistics South Africa, 2017). This trend confirms that global economic growth is just as important as the growth of the metals and engineering industry to the local economic well-being of South Africa. The metals and engineering industry has recorded trade deficits for some years. However, in 2016 this trade deficit receded with the sector exporting R216 billion worth of output and importing R339 billion worth of products, resulting in a trade deficit of R122 billion and resulting in the sector's terms of trade improving by 4.6% (Chibanguza & Noise, 2017:11). The production index of the metals and engineering industry has deteriorated during the 2008/2009 financial crisis and in quarter 1 of 2017 it was below its 18-year average of 100.8 index points. According to Chibanguza and Noise (2017:12), the metals and engineering industry is driven mainly by the following factors:

- i) The global growth cycle.
- ii) The commodity cycle.

- iii) International capital flow cycle (impacts the exchange rate).
- iv) Internal political cycle and policy direction (impacts sentiment and the exchange rate).
- v) Cost competitiveness.

The metals and engineering industry in South Africa i) significantly contributes to the South African economy and towards employment needs in South Africa, ii) is strongly dependent on both global and local support in order to grow, and iii) is strongly affected by global and local economic conjuncture cycles.

Table 4.2: Sub-industries of the metals and engineering industry

Metals & engineering sub-components	Weight: Manufacturing (%)	Weight: M&E industry (%)
Rubber products	1.35	4.6
Plastic products	2.93	10.1
Basic iron and steel products	3.27	11.2
Basic non-ferrous metal products	3.11	10.7
Structural metal products	1.83	6.3
Other fabricated metal products	3.92	13.5
General purpose machinery	2.37	8.1
Special purpose machinery	3.44	11.8
Household appliances	0.86	3.0
Electrical machinery and apparatus	1.67	5.7
Bodies for motor vehicles, trailers and semi-trailers	0.44	1.5
Parts & accessories: motor vehicles	2.78	9.5
Other transport equipment	1.16	4.0
Total	29.13	100.0

Source: Statistics South Africa (2017).

Table 4.2 depicts the sub-industries of the metals and engineering industry for 2016. The following data are shown in the two right-most columns of Table 4.2:

- i) Weight – manufacturing (%):

The data show the percentage contribution of each of the sub-industries of the metals and engineering industry towards the manufacturing sector.

ii) Weight – metals and engineering industry (%):

The data show the percentage contribution of each of the sub-industries of the metals and engineering industry towards the manufacturing sector and the engineering industry.

The scope of metals manufacturers for this study was defined as a grouping of basic iron and steel products and basic non-ferrous metal products. Metals manufacturers, with reference to Table 4.2, contribute 6.38% (3.27% + 3.11%) towards the manufacturing sector and contribute 21.9% (11.2% + 10.7%) towards the metals and engineering industry. Metals manufacturers constitute almost a quarter of the metals and engineering industry and are, therefore, of the utmost importance in the metals and engineering industry.

Table 4.3: The export/output ratios of the sub-industries of the metals and engineering industry

Metals & engineering sub-components	Export/ output ratio
Rubber products	49.1
Plastic products	12.4
Basic iron and steel products	56.0
Basic non-ferrous metal products	74.4
Metal products	32.5
Electrical machinery and apparatus	22.5
Machinery and equipment	84.9
Total	47.4

Source: Quantec (2017).

Table 4.3 shows the export/output ratios of the sub-industries of the metals and engineering industry for 2016. The export/output ratios reflect how much of the total production is exported.

The scope of metals manufacturers for this study was defined as a grouping of basic iron and steel products and basic non-ferrous metal products. With reference to Table 4.3:

- i) 56% of the output of the sub-industry (basic iron and steel products) of the metals and engineering industry is exported.
- ii) 74.4% of the sub-industry (non-ferrous metal products) of the metals and engineering industry is exported.

The companies that formed part of this study export on average more than half of their produce – earning significant foreign revenue for South Africa. Competitiveness with regard to these companies is, therefore, of global importance to South Africa.

Table 4.4: The domestic allocation of sub-industries of the metals and engineering industry

Metals & engineering sub-components	Domestic demand (70%)					Other
	Mining	Automotive Parts, accessories, transport equipment	Construction Building construction, Civil engineering	Petroleum, chemicals	Metals & engineering	
Rubber products	25.8	29.9	0.4	3.6	10.3	30.0
Plastic products	3.0	12.3	11.7	30.4	12.5	30.0
Basic iron and steel products	1.1	13.1	7.1	0.4	48.3	30.0
Basic non-ferrous metal products	0.8	6.8	0.1	2.1	60.2	30.0
Metal products	8.8	7.6	21.6	3.2	28.8	30.0
Electrical machinery and apparatus	5.4	10.8	32.5	0.2	21.2	30.0
Machinery and equipment	21.9	5.3	6.7	5.9	30.1	30.0
Total	9.6	12.2	11.4	6.5	30.2	30.0

Source: According to Quantec (2017).

Table 4.4 summarises the domestic output for 2016 of the sub-industries of the metals and engineering industry and illustrates a domestic output allocation of 70%. The following observations can be made with regard to the illustration provided in Table 4.4:

- i) Not all of the output of the sub-industries of the metals and engineering industry is consumed by the industry.
- ii) The sub-industries are grouped to define metals manufacturers, namely basic iron and steel products together with basic non-ferrous metal products – the two top sub-industries consumed by the metals and engineering industry. Relatively little of the output of the mentioned two sub-industries is consumed by any of the other listed domestic markets.

- iii) Apart from the observation made in ii), is the automotive industry leading the other local consumers with regard to the output of the basic iron and steel sub-industry of the metals and engineering industry. This correlates with the South African strategy over the past few decades to grow its automotive manufacturing industry.

In this sub-section of the review, an overview is presented of the South African economy and the industries in which metals manufacturers are situated. From the statistics presented for 2016, it is clear that metals manufacturers fulfil an important and significant role in the South African economy. The improved sustainability of metals manufacturers will have a positive impact on the South African economy. The health of the South African economy is important to the economy of the Sub-Saharan region and can also be viewed as an important stabilising factor in this region.

3.2 The South African Development Community: Regional economy

The Southern African Development Community was established in 1980 as the Southern African Development Coordination Conference (SADCC) with the main aim to integrate the economic region, excluding South Africa, and to reduce their dependence on the South African economy (Oosthuizen, 2006:7). This exclusion of South Africa from the South African Development Coordination Conference was due to South Africa's non-democratic Apartheid Regime at that time. South Africa was included and the name was changed to the South African Development Community in 1992 (Oosthuizen, 2006:7). Its newly established aims are as follows:

- i) To establish an open economy based on equality, mutual benefits and balanced developments.
- ii) To break down tariff barriers.
- iii) To promote trade exchanges and mutual investment.
- iv) To realise free movement of goods, personnel and labour services.
- v) To achieve a gradual unification of tariffs and currencies.
- vi) To establish a free trade zone amongst its members.

The South African Development Community membership 2017 is shown in Table 4.5 below:

Table 4.5: Membership countries of the South African Development Community

SADC country	GDP size (2015) (\$ bn)	Exports	Imports
1 South Africa	313.00	• Coal • Iron ore • Other mineral products • Gold • Diamonds • Platinum	• Machinery • Mineral products
2 Angola	102.00	• Crude oil • Diamonds	• Machinery & equipment
3 Tanzania	44.90	• Crude oil	• Machinery & equipment
4 DRC	35.24	• Crude oil • Diamonds	• Fuel
5 Zambia	22.06	• Copper • Sugar	• Fuel • Machinery
6 Mozambique	14.69	• Aluminium • Electric energy	• Machinery & equipment
7 Botswana	14.39	• Diamonds • Copper	• Fuel • Food
8 Zimbabwe	13.89	• Diamonds • Nickel	• Motor vehicles & machinery • Fuel
9 Namibia	11.55	• Diamonds • Uranium	• Food products • Petroleum products & fuel
10 Mauritius	11.51	• Sugar • Clothing	• Oil • Manufactured goods
11 Madagascar	9.98	• Graphite • Chromite	• Fuel • Capital equipment
12 Malawi	6.57	• Tobacco • Uranium	• Oil • Coal
13 Swaziland	4.06	• Sugar • Wood pulp	• Food • Fuels & machinery
14 Lesotho	2.18	• Clothing • Diamonds	• Food • Fuel
15 Seychelles	1.44	• Fishing products	• Petroleum products • Machinery
Total (SADC)	608.00		

Source: SEIFSA (2017).

Observations made from the content of Table 4.5:

- i) South Africa economically dominates the South African Development Community region.
- ii) This region exports basic minerals, precious metals and crude oil.
- iii) This region imports food and oil, and value-adding products, such as machinery and equipment.

South African Development Community countries are predominantly commodity exporters and a global increase in commodity prices will have a positive impact on their economy. Commodity prices are an important link between developed and developing markets and are a means of wealth distribution (Chibanguza & Noise, 2017). South Africa as the main developing economy in this region, has an important role to fulfil in the South African Development Community economy.

The rapid expansion of the Chinese economy over the past decade also has a positive impact on the South African Development Community economy (Edwards & Jenkins, 2014):

- i) The growth in Chinese demand for commodities has contributed towards rising terms of trade for these commodities.
- ii) The opening of trade channels between the South African Development Community and China has led to a reverse increase of trade of Chinese manufactured goods to this region.

The global manufacturing sector and trade between the South African Development Community and the global community are important to the health of the South African Development Community economy although South Africa – as the leading partner – is currently weakly integrated with the global economy (Sewdass & Du Toit, 2014:3).

3.3 The global economy

The South African GDP for 2017 is estimated to be US\$ 340 billion. In comparison, the 2017 estimated GDP for the United States of America is US\$19 trillion and the 2017 estimated global nominal GDP is US\$87 trillion. The South African GDP is, therefore, less than 2% of the GDP of the United States of America and less than 0.5% of the global GDP (Tradingeconomics, 2017). It is, therefore, of critical importance for the South African economy to actively take part in the international economic trading community.

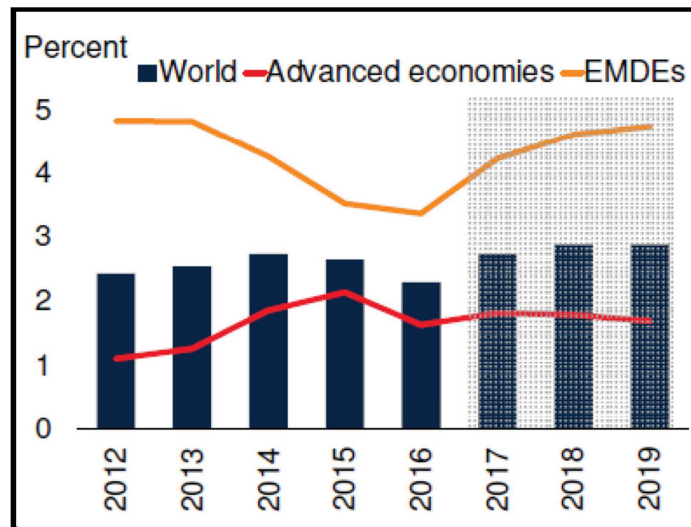
In 2017, the global economy is influenced by a number of uncertainties, such as:

- i) The new administration in the United States of America is making alarming pronouncements of economic protection, economic exclusion of neighbouring countries, such as Mexico, from trade relationships and global trade conditions to increasingly favour them (Pratley, 2017).
- ii) The exit of the United Kingdom from the European Union – known as “Brexit” – and other countries possible following their lead (Hunt & Wheeler, 2017).
- iii) The Democratic People's Republic of Korea is threatening, in particular, South Korea and the United States of America with nuclear missile attacks (Kirby, 2017).

Positive global news:

- iv) The new administration of the United States of America is increasingly looking to be less extreme and more accommodating (McGrath, 2017).
- v) The newly elected French President, Emmanuel Macron, has a more pragmatic approach to issues than previous presidents and has, for example, stated that he is not supporting France's possible exit from the European Union (Chrisafis, 2017).
- vi) China's support of the United States of America and an increase in political pressure on North Korea (Perring, 2017).
- vii) Advanced economies, such as the United States of America, the United Kingdom and the Eurozone, are sustaining their growth momentum (Allen, 2017).
- viii) India, as a developing country, is also sustaining its growth momentum (IMF, 2017).

Figure 4.4: Global economic growth forecast



Source: Adapted from Chibanguza & Noise (2017).

In Figure 4.4, the growth in advanced economies is shown to be lower than the growth in emerging market developing economies. The International Monetary Fund has lowered its projections for the world GDP to 3.2% for 2017 as lacklustre global economic growth and fundamental imbalances continue to weigh on the outlook for industrial commodity prices over the short-to-medium term (Industrial Development Corporation, 2016).

4 A COMPETITIVE PERSPECTIVE

The aims of this research were to contribute towards the competitiveness and the sustainability of metals manufacturers in South Africa. Theoretical perspectives concerning competitiveness were presented in the previous chapter and more practical perspectives about competitiveness are presented in this section. New investments in the metals and engineering industry in South Africa have been poor with a resultant drop in the production efficiency of fixed capital and subsequently, rendered the competitive capability of the sector in jeopardy (Chibanguza & Noise, 2017) and mainly due to:

- i) Low production levels.
- ii) A weak demand.
- iii) Under-utilised capacity.
- iv) The prevailing uncertainty with regard to the South African economy and politics.

Metal prices critically depend on Chinese demand – the Chinese economy accounts for more than half of the global metals consumption. South African metals manufacturers have to improve quite drastically to live up to global demand even though the South African manufacturing sector is well developed compared to most developing countries (Fedderke, 2008). It is widely accepted (Du Plessis *et al.*, 2015; Nickell, 1996:724-725) that competitiveness brings:

- i) The benefits of increasing innovation and productive growth.
- ii) Incentives for efficient production and innovation that will exert downward pressure on both costs and prices.
- iii) Increased efficiency.
- iv) A limitation of a monopoly of power.

Recent empirical studies (Nickell, 1996; Blundell *et al.*, 1999; Aghion *et al.*, 2008), point to a positive effect of product market competition on productivity growth – even at low levels of competition. Aghion *et al.* (2008) found that higher pricing power and lower competition in the South African industry are associated with lower productivity growth in the South African manufacturing industry. A healthy state of competitiveness is, therefore, of critical importance to the good health of South African metals manufacturers and to the South African economy.

4.1 Market concentration and competition in South Africa

Market concentration can be defined as the extent or degree to which a relatively small number of companies account for a relatively large percentage of the market (Business Dictionary, 2017b). In a similar definition, an industry/market concentration is defined as the extent to which a small number of companies or enterprises account for a large proportion of economic activities, such as total sales, assets or employment (OECD, 1993). An industry concentration is an important concept in competition policy debates (Fedderke, 2008), because it is often argued that an industry concentration is a proxy for the market power of companies and that a high concentration implies that leading companies have large market shares and, therefore, greater scope for exercising market power. Fedderke (2008) adds that from a competition policy perspective, an industry concentration and associated market power are issues of concern, primarily because inefficiencies and price gouging lower consumer welfare. Also, according to Tirole (1988), collusion is easier to sustain with only a small number of companies. According to Fedderke *et al.* (2016), market concentration and competition are important topics in economics while market concentration is often viewed as one of the better ways to measure the extent of oligopoly in industries.

Although an index of oligopoly or market power is viewed as changes in concentration measures, these changes can occur due to a change in the structure of industries. According to Baumol *et al.* (1982), there is no obvious relationship between an industry concentration and competitive conduct, because the huge difference in the manufacturing industry in South Africa makes it virtually impossible to define with any degree of precision what competitive conduct should entail given the heterogeneity of the sectors. Fedderke (2008) found that concentration levels in the South African manufacturing sector are high and were increasing up to 1996 but, according to recent data (Fedderke & Naumann, 2005), the trend in concentration appears to be decreasing. Fedderke (2008) is of the opinion this suggests that the liberalisation of the South African economy in the 1990s (Edwards & Van De Winkel, 2005; Edwards, 2006) was paying off. The Competition Commission of South Africa (Competition Act, 2017) acts as a watchdog for cases of collusion and uncompetitive behaviour by companies and has an extensive record of cases available. In a case during 2017, the two main cinema groups in South Africa who own the movie market, Ster Kinekor and Nu Metro, were charged with collusion, because the two companies apparently agreed that only Ster Kinekor would screen movies intended purely for artists. If the two companies are found guilty, then each would be fined 10% of their annual revenue. In this specific case, there is a high degree of market concentration and, according to Tirole (1988), this situation invites collusion.

4.2 South African mark-ups in the manufacturing industry

When a market concentration and market competition are healthy, then one can expect that the mark-ups by companies should be competitive as well. However, there have been a number of studies about the mark-ups in the manufacturing industry in South Africa suggesting that South African manufacturing companies enjoy disproportionately higher mark-ups than they should. More specifically, Aghion *et al.* (2008) claim that South African manufacturing companies have been consistently more profitable on a comparable basis over a period extending from the 1960s through to 2006. By making use of various estimates of mark-ups and profitability, they suggest that South African companies have been between 50% and 100% more profitable than their international peers – hinting strongly at the need for stricter competition policies to protect South African consumers (cited by Du Plessis *et al.*, 2015). Some of the researchers, who concluded that these higher mark-ups existed, are:

- i) Fedderke (1992)
- ii) Leach (1992)
- iii) Fedderke *et al.* (2007)

- iv) Aghion *et al.* (2008)
- v) Fedderke & Szalontai (2009)
- vi) Fedderke (2013)

During their research, various sets of data from South African companies were compared with sets of data from abroad by making use of a number of comparison techniques. Du Plessis *et al.* (2015) challenged these results and questioned the conclusion drawn specifically by Aghion *et al.* (2008) and Fedderke *et al.* (2007) who found that South African companies enjoyed profitability margins more than double of those in other counties for a sample from 1980 to 2004. Du Plessis *et al.* (2015) substantiated and contextualised their view by stating that in a South African context, where economic growth is slow and levels of poverty and inequality remain chronically high, ensuring that markets are as competitive and efficient as possible is of unquestionable importance in a policy framework. They continued by highlighting that while it may at times be infeasible to dramatically adjust the structure of a certain industry, the legislation can adjust conduct through the prohibition of activities or impose fines for conduct, which substantially prevent or lessen competition. The research done by Du Plessis *et al.* (2015) can be summarised as follows:

- i) It has long been recognised that empirical studies based on data of listed companies can be subject to the effects of survivorship bias, which occurs when a sample is drawn only from companies that are currently listed for which a historical series are then constructed in a backward-looking manner.
- ii) This type of selection leads to biased historical estimates as it systematically ignores the results or data from companies that used to be listed but no longer form part of the relevant index. By excluding the companies that are no longer listed, data are collected only from companies that survived.
- iii) In the context of these studies, biased samples of companies and their returns would probably lead to exaggerated estimates of mark-ups and profitability, because it is usually the most profitable companies that survive.
- iv) In response to this, the researchers examined the empirical validity of this claim by making use of a smaller, but more detailed data set based on the annual financial statements of the largest listed industrial companies based in South Africa and the United States of America for the period 1980 to 2013.

The results of the study done by Du Plessis *et al.* (2015) casted doubts on the findings of the research by Aghion *et al.* (2008) and Fedderke *et al.* (2007) and others who suggested that South African companies enjoyed significantly higher profitability ratios than their foreign counterparts. Although their results were only for the largest companies in each country, they expected the results to be reflective of other companies as well. In a follow-up publication, Fedderke and Simbanegani (2015) concluded that the evidence of previous research regarding excessive mark-ups by South African manufacturers were not irrefutable and noted the methods used during previous studies can be viewed as measures of an industry concentration.

In the case of AMSA, the largest steel producer in South Africa, the company has been experiencing severe losses for some years, since the global steel market collapsed in 2008. Various interactions with the South African government took place before 2017 to save this industry. The South African steel consumer has been subjected to a 10% import customs duty since 2017. Since May 2017, an additional 12% safeguard import duty on hot rolled coils was imposed (Faku, 2017), resulting in a total of 22% import cost barrier in relation to locally produced steel products to consumers. Furthermore, in the case of aluminium smelters in the Richards Bay area in South Africa, the cost of electricity to the smelters is subsidised by the South African government. Are the mark-ups of metals manufacturers excessively high in comparison to global benchmarks when the realities of ageing factories, the cost of labour in South Africa, the cost of labour unrest and demand in South Africa, and other local pertinent factors are taken into consideration? This question invites additional research to be done before these burning issues can be answered.

4.3 The China-effect on the South African industry

The Chinese economy accounts for more than half of the global metals consumption. South Africa is a mineral-rich country and China is one of the fastest developing countries of this era that requires South African minerals as part of its growth strategy. There is, however, a common perception in South Africa that the growth in Chinese trade has had a negative direct competitive effect on domestic manufacturing output and employment, including metal products. Increased protection from Chinese imports was, therefore, demanded (Morris & Einhorn, 2008; Alfonso, 2016; Pimstein, 2017). Concerns have also been raised that South African exports of manufactured goods to neighbouring countries have been indirectly crowded by Chinese exports to these countries – although there is recognition that South African exporters of resource-based products have indirectly benefited from higher commodity prices (Edwards & Jenkins, 2014). The South African exports of manufactured goods to China has, however, more than doubled from 2000 to 2010, but remains extremely low at 2% in 2010. Consequently, the share of exports to China in total domestic production is generally low across industries,

although it has risen relatively quickly in resource-based industries, such as basic iron and steel, non-ferrous metals and basic chemicals (Edwards & Jenkins, 2014). Since China joined the World Trade Organisation in 2001, bilateral trade with South Africa has grown rapidly and imports to South Africa from China increased from less than \$1.1 billion in 2001 to \$14.2 billion in 2011 while exports to China increased from less than \$0.5 billion to \$12.4 billion over the same period (United Nations, 2017). China is now South Africa's largest trading partner, both in terms of exports and imports. Trade between South Africa and China is mainly in manufactured goods (broadly defined) but there are important differences in the composition of exports and imports. South African exports are largely processed raw materials whereas imports from China are mainly consumer products and increasingly, capital goods.

Table 4.6: Iron ore – Chinese imports versus South African exports

Iron ore trading	Value (billion US\$)		
	2013	2014	2015
Import by China	106.2	93.5	57.9
Export by South Africa	8.5	6.7	2.7
S.A. export / China import (%)	8.0	7.2	4.5

Source: Adapted from United Nations (2017).

In Table 4.6, an example of total iron ore exports from South Africa and total iron ore imports by China from 2013 to 2015 is provided in US\$ (billions). The South African iron ore exports in Table 4.6 is the total to any destination and the Chinese iron ore import are the total imports from any destination. Although China consumes more than half of the metals produced globally, the total iron ore exports from South African are less than 10% of the total iron ore imported by China. This example provides a perspective of the magnitudes of the South African and Chinese economy. Growth in the South African economy will continue to be dependent on a healthy Chinese economy and the Chinese economy will continue to be a dominant global economy.

4.4 Competitiveness in reality: Remarks

It seems that competitiveness and the need for competitiveness for reasons, such as protecting the consumers of countries against exploitation, is globally accepted. There are, therefore, global competitiveness watchdog companies responsible for safeguarding the state of competitiveness in many countries. Although these “intra-country” competitiveness watchdogs are functioning well, there is reason for concern about the global “inter-country” competitiveness watchdog function. Kaplinsky (2000) is one of the researchers who have done valuable

research concerning unequal global differences amongst countries participating in global value chains, which are channels through which countries and companies trade globally. According to Bernhardt and Pollak (2016), the growing participation in global production sharing has raised hopes for economic and social upgrading within value chains although globalisation has intensified international competition and achieving both economic and social upgrading is not an easy task. Economic upgrading is defined as improving competitiveness through innovation, and increase in productivity and quality enhancement (Milberg & Houston, 2005). Barrientos *et al.* (2011) describe social upgrading as improvements in the well-being of workers and encompasses both measurable standards (e.g., wages, types of employment, working hours, and social protection) and non-quantifiable aspects (e.g., enabling rights, such as non-discrimination and non-harassment, freedom of association and empowerment). Research by Bernhardt and Pollak (2016) indicated that the consequences of participating in global value chains are not always positive and that economic upgrading is conducive to, but not sufficient for social upgrading to occur.

We live in a “digital age of communication” and we are entering a fourth industrial revolution characterised by a fusion of technologies that is blurring the lines between the physical, digital and biological spheres. A fourth industrial revolution is expected to disrupt almost every industry in every country and change the way individuals think about entire systems of production, management and governance (World Economic Forum, 2017). Globally, not all countries will eagerly embrace new technologies and developments and some countries will, therefore, be vulnerable to exploitation as these developments can create new measures of segregation. Although competitiveness is often viewed positively by consumers, the segregation of global companies and nations due to technological developments can lead to global exploitation by multi-national companies and countries. In 2017 on an international level, there are calls by country leaders to deal with inequalities:

- i) The 2017 United States of America dispensation calling for market protection to favour local producers (Pratley, 2017).
- ii) The United Kingdom who “Brexit” from the European Union in order to gain more independence (Hunt & Wheeler, 2017).
- iii) Global calls for the termination of practices that lead to unfair advantages, such as child labour, exploitation by rural farmers and unfair working conditions (Starbucks, 2017).

The International Criminal Court seated in Den Hague is responsible to mostly reactively follow up on cases where injustices on a government level occurred (ICC, 2017). It is the opinion of this researcher that international competitiveness should have watchdog

companies in place to ensure that – similarly to the intent with the United Nations and the International Criminal Court – global competition practices are kept in balance by taking more than only economic factors into account.

5 LABOUR MARKET PERSPECTIVES

In 2016, the metals and engineering industry experienced a lethargic year and unemployment in general is still unacceptably high (Chibanguza & Noise, 2017). Moreover, more than two decades after South Africa's first democratic election, inequalities in South Africa are still rife. A labour market perspective for the manufacturing sector and the metals and engineering industry in South Africa is an emotive and a complex topic. There are many complexities and dynamic factors influencing the labour market in South Africa. The purpose with this section of the review is to provide labour market perspectives for metals manufacturers in South Africa.

5.1 South African employment

Table 4.7: South African employment

South Africa employment	2016
Unemployment rate	27%
Youth unemployment	54%
Employed people	9.2 million
Unemployed people	5.8 million

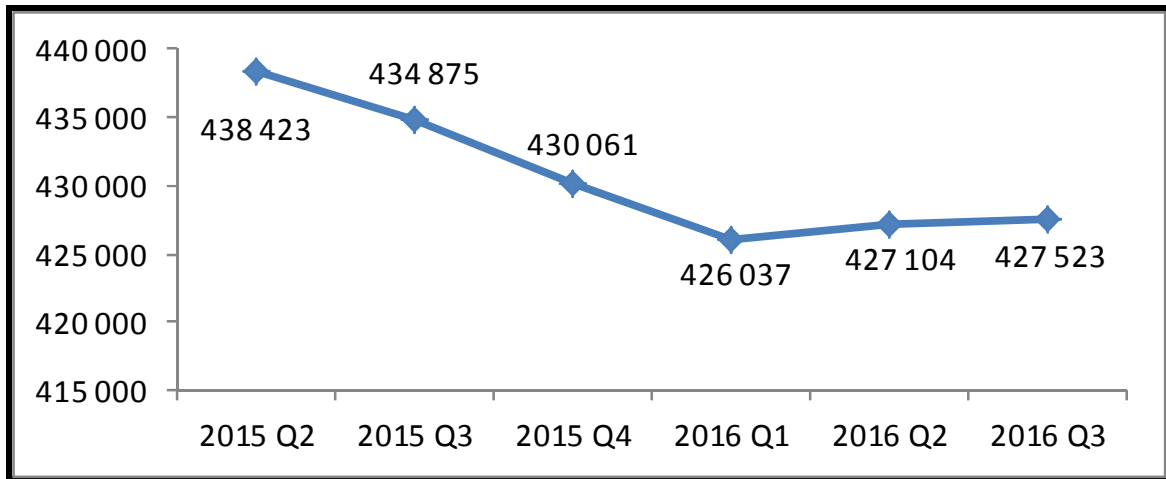
Source: Statistics South Africa (2017).

Table 4.7 summarises the overall South African employment statistics for 2016. Of the total employable population of South Africa 27% is employed. The official definition of unemployment refers to the percentage of the workforce that is unemployed but that is willing and able to work and actively seeks employment (Statistics South Africa, 2017). It is in particular worrying that more than half of the youth of South Africa is unemployed. According to the Industrial Development Corporation (2016), a quarter to quarter comparison between quarter 1 of 2015 and quarter 1 of 2016 for an overall South African view shows the following:

- i) A rise in unemployment from 2015Q1 to 2016Q1 by 2.2%.
- ii) 355,000 jobs were lost due to this rise in unemployment.
- iii) 100,000 jobs were lost in the manufacturing sector alone.
- iv) At the end of 2016Q1, the number of unemployed individuals increased to 5.71 million.

The quarter to quarter (2015Q1 to 2016Q1) comparison done by the Industrial Development Corporation (2016) and the full year statistics provided by Statistics South Africa (2017) indicate a negative employment trend.

Figure 4.5: Metals and engineering industry employment



Source: Statistics South Africa (2017)

Figure 4.5 shows the employment for the metals and engineering industry for six consecutive quarters from quarter 1 in 2015. The metals and engineering industry employment trend reflects the overall South African industry trend.

5.2 Capacity utilisation

Some of the most common measures used to determine the status of economic performance are productivity growth and capacity utilisation indexes as these measures reflect information that can provide a basis for economic performance indicators, such as growth in GNP (gross national product), investments and how efficiently production is accomplished (Morrison, 1993).

Table 4.8: Capacity utilisation of the metals and engineering sub-industries

Metals & engineering sub-industries	2015	2016
Rubber products	80.8	83.5
Plastic products	83.3	83.8
Basic iron and steel products	74.9	74.9
Basic non-ferrous metal products	77.3	76.9
Metal products	73.7	73.2
Machinery (general & specialized)	82.8	81.5
Electrical machinery and apparatus	80.1	80.5
Parts/ accessories (motor vehicles)	82.9	83.5
Other	86.3	87.3
Total (average)	80.2	80.6

Source: Adapted from data by Chibanguza and Noise (2017).

With reference to Table 4.8, the capacity utilisation of the overall manufacturing sector in South Africa in 2016 was 80.6%, which is below the accepted full capacity norm of 85% (Chibanguza & Noise, 2017). Metals manufacturers, a grouping of basic iron and steel products and basic non-ferrous metal products, show some of the poorest capacity utilisation indices in the metals and engineering industry. The average index rating for 2015 and 2016 for the iron and steel products sub-sector was 11.9% – below the full capacity target. The average index rating for the same period for the basic non-ferrous metals products sub-sector was 9.3% – also below the full capacity target. An under-utilised capacity has a direct impact on lower competitiveness, lower efficiency and lower productivity (Chibanguza & Noise, 2017).

5.3 Labour in the metals and engineering industry: Remarks

Labour productivity in the metals and engineering industry in South Africa increased by 12% between 2005 and 2015 whilst the unit labour cost increased 81% over the same period (Statistics South Africa, 2017) – a competitively unsustainable situation is, thereby, created. The cost of labour is one of the factors that companies have control over, which is confirmed by the strong correlation between production and employment. The labour laws of a country and the effects of labour union actions can influence the degree to which employment is prolonged when production decreases. However, when an imbalance between production and employment is indefinitely maintained, the sustainability of businesses is severely impacted on. According to Edwards and Jenkins (2014:2):

- i) Employment in the manufacturing sector in South Africa is further influenced by global factors, such as trade with China.

- ii) China dominated – as a source of imports – the traditional labour-intensive industries, such as clothing, footwear and toys in the mid-1990s, but by 2010 its dominance had also shifted to high-technology and machinery industries. In 2010, China accounted for more than 50% of imports of knitted and crocheted fabrics, clothing, footwear, household appliances and electrical lamps with a direct effect on employment in South Africa.

Import penetration from China, therefore, diminishes South African manufacturing output and employment. The effect on employment in the manufacturing sector is larger, because the declines in output are concentrated on labour-intensive industries. On the local front in South Africa, the influences of labour unions are also important. A new round of negotiations between employers and the representatives of employees regarding remuneration packages in the metals and engineering industry is scheduled for later in 2017. The outcomes from negotiations can either further fatigue the industry or can cause a turn-around of the lethargic behaviour of the industry (Chibanguza & Noise, 2017).

6 OPPORTUNITIES

On a global front, there are opportunities to increasingly participate in global value chains. However, Bernhardt and Pollak (2016:1233) found that in just over a quarter of the cases in the sample of their research economic upgrading was experienced and that the occurrence of overall upgrading – the concurrence of both economic upgrading and social upgrading – has been scarce. Globally, export markets present significant expansion potential with regard to the South African economy (Industrial Development Corporation, 2016:9):

- i) The export-to-GDP ratio increased to 30.9% by 2015 after an all-time low of 20.7% in 1992.
- ii) Merchandise export totalled R1.0 trillion in 2016 with R610 billion pertaining to manufactured exports.
- iii) The impact of exports on the South African economy is substantial. In 2015, the GDP value-adding due to manufacturing amounted to R140 billion and overall to R580 billion due to connections with other sectors.
- iv) More than 816000 direct jobs are estimated to be linked to merchandise exports with the number rising to 2.66 million if all indirect effects are included.
- v) It is estimated that 24% of all formal sector employment and 26.5% of GDP in 2015 were associated with merchandise exports.

Participation in global value chains is often viewed as bearing potential for propelling economic development. In addition to generating income, it can facilitate access to external and diversified markets, technology and knowledge transfer and capacity-building through learning (Bernhardt & Pollak, 2016:1238). This is also true for the South African Development Community but in the absence of strong trading agreements or stable moral/political relationships amongst its partners, competition for contracts will be fierce (particularly from Asia) and prices will be a key determinant for success (Chibanguza & Noise, 2017). Competitiveness is a key factor for surviving in the global economy of 2017. Two broad trajectories can be distinguished regarding the competitiveness of companies (Bernhardt & Pollak, 2016:1237):

- i) The “low road” is the trajectory of companies that are locked in low value-adding activities and fight to stay competitive on the basis of their low costs, mainly achieved through squeezing wage rates and profit margins.
- ii) The “high road” of improved competitiveness is the second trajectory of companies. In global value chain literature, this is typically referred to as economic upgrading.

According to Milberg and Houston (2005:149), the “high road” of improved competitiveness can be achieved through innovation, increasing productivity and enhancing quality.

Competitiveness is especially a key factor when the influence of the Chinese import/export market is considered and there are threats and opportunities to be considered (Edwards & Jenkins, 2014:6):

- i) Cheaper access to capital and intermediate inputs imported from China can boost the profitability of domestic production.
- ii) The productivity responses by domestic companies to increase competition together with the elimination of inefficient companies may have left the South African manufacturing industry in a better position for expansion in future.
- iii) While losses in employment within manufacturing associated with Chinese competition have received much attention, some of these losses have been offset by increases in employment in other areas.
- iv) Lower priced imports raise consumer welfare, particularly in relatively poor households who spend a disproportionate share of their income on traded goods. By reducing inflation, Chinese imports may have helped to keep interest rates low.
- v) While Chinese competition has crowded out South African manufactured exports, the total exports have nevertheless increased. Exporters of primary products and resource-

based manufactures have also benefited from higher international prices driven by Chinese growth.

According to Morris and Einhorn (2008:369), increased trading between South Africa and China has resulted in an increase in employment in the South African services industry and apparent in the clothing retail sector.

On the local front in South Africa, the South African government committed to an infrastructure investment programme that can result in a large number of jobs being created and/or sustained in various sectors of the South African economy (Industrial Development Corporation, 2016:8):

- i) For the period 2016/2017 to 2018/2019, the overall infrastructure investment spending by the public sector is projected to average R288.5 billion per annum.
- ii) Considering that a large portion of the goods and services required in this programme is sourced from local companies, it is without any doubt that the economy-wide benefits associated with the infrastructure roll-out will indeed be fairly substantial.

South Africans can be optimistic about the future of rising employment given the growth of global and local economies, but they have to heed warning signs – the absence of competitiveness, excessive labour union demands, unrealistic expectations of productivity and other means of ineffective utilisation of labour capacity will have serious repercussions.

7 MINING INDUSTRY: UPSTREAM FROM METALS MANUFACTURING

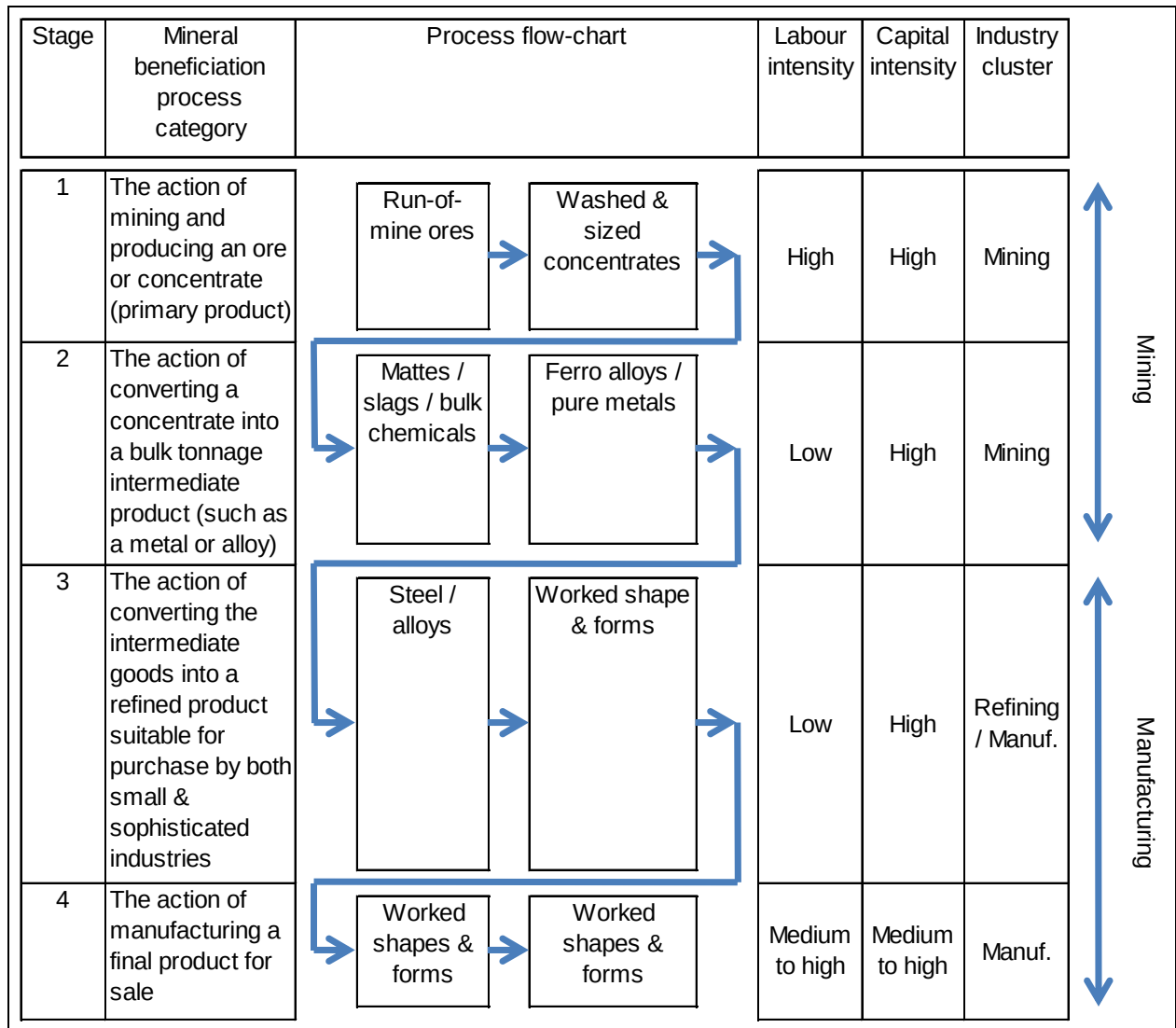
The metals manufacturers in South Africa rely on upstream inputs, such as metal ore. South Africa is remarkably affluent concerning metals (Lundall *et al.*, 2008:11; DTI, 2005:13-14). South Africa:

- i) Owns more than 80% of the known world reserves in the platinum group metals and manganese.
- ii) Owns more than 70% of chrome worldwide.
- iii) Owns about 40% of gold and vanadium worldwide.
- iv) Holds considerable reserves in titanium and zirconium.
- v) Produces considerable iron ore and nickel.

Combined with an abundant supply of coal and relatively affordable electricity, South Africa has a considerable comparative advantage in metals beneficiation. Beneficiation can be defined as

the process of adding value from mining right through to the final fabrication of consumer branded products (Baxter, 2005:26). South African mining also has a rich history (Lundall *et al.*, 2008:6). Initially, large mining companies were the nodes around which networks of suppliers of infrastructure and services were established. The enterprises that emerged to provide specialised services to the core operations of these mining companies, including metal and engineering companies, found markets in the agricultural, transport and manufacturing sectors that created opportunities for these enterprises to expand their operations beyond maintenance and repair. The activities of large-scale mining with very specific technical demands created a supporting industrial infrastructure to meet engineering challenges, which in turn provided a catalyst for a much wider range of operations (Feinstein, 2005:115). In 2008, the South African iron ore mining industry produced approximately 48 million ton of iron ore and was the fourth largest exporter of seaborne iron ore after Australia, Brazil and India (KUMBA, 2011:16). In addition, the upstream basic metals industries (basic iron and steel and non-ferrous metals) are highly capital intensive and have registered very high rates of growth while reducing their labour force at the same time. Basic metals industries are also characterised by very large economies of scale and a very small number of producers with a monopoly of power to set prices (Lundall *et al.*, 2008:7). In contrast, the downstream labour-intensive metal products industries have grown very slowly (Department of Trade and Industry, 2005:18). Globally, developing countries are increasingly playing a bigger role in economic growth. During the global economic and financial crisis in 2008, the growth in developing countries confirmed assertions that the world has entered a new growth phase that will precipitate a long-term high demand for natural resources, goods and services (Department of Mineral Resources, 2011:17). Despite the comparative advantage in high mineral resources, and more than a century of mining in South Africa, the levels of mineral beneficiation have been low and mostly concentrated in the high capital sectors of the mineral value chain. This demonstrates that having natural resources does not automatically translate to downstream beneficiation, but requires dedicated interventions to address possible constraints to realise a competitive advantage for the mineral beneficiation industries.

Figure 4.6: The four stage metals beneficiation process



Source: Adapted from Baxter (2005:24).

There are generally four stages involved in metals beneficiation (Lundall *et al.*, 2008:7; KUMBA, 2011:11), which spans multiple industries, as illustrated in Figure 4.6:

- i) Exploration and extraction.
 - The process of exploring for and then extracting iron ore. Drilling, blasting, loading and hauling are typically open pit mining performed by mining companies.
 - This is the primary stage of mining where an ore or concentrate is produced.
- ii) Mining beneficiation.
 - Although some iron ore miners sell their iron ore directly to steel producers, referred to as directly shipped ore, most of the iron ore in South Africa is beneficiated

through capital-intensive, dense-medium separation or jigging by miners at a mine site in order to convert the mined ore into saleable products and/or to increase its value in use to local and international steel producers.

- During this stage, ore or a concentrate is converted into an intermediate product, such as a metal or alloy. The production of intermediate products usually takes place in capital-intensive and energy-intensive smelters and refineries. This stage is referred to as the milling stage. Milling companies in South Africa are chiefly involved in the production of pig iron and the conversion of pig iron into a range of wrought iron and steel materials. These materials are produced to be available in different forms, such as ingots, plate, sheet and coil.

iii) Metallurgical beneficiation and shaping.

- This process is performed by the steel manufacturing industry and typically involves smelting to convert iron ore into pig-iron. In South Africa, primarily via the blast furnace route. Pig-iron is then refined by making use of a basic oxygen furnace and shaping it in rolling mills into steel products, such as hot rolled coils. Other input materials in steel manufacturing are scrap, manganese and coking coal. The most expensive component in this process is coking coal (mainly imported into South Africa), which is used to produce coke, needed as a chemical reductant and is the source of energy in the process.
- An alternative steelmaking technology also used in South Africa is the electric arc furnace route. Although this process uses small quantities of iron ore, most of the iron is obtained from smelting scrap metal using significant quantities of electricity as the energy source.
- Employment levels are high and the degree of value-add increases substantially due to the inclusion of other resources and inputs, such as skills and technology. These activities take place in South Africa in engineering or machine shops that are responsible for the manufacture of products, parts, components, tools, forgings, moulds and the fabrication of products and structures.

iv) Conversion/fabrication and manufacturing/end user industries.

- This final step in the value chain encompasses two groups of role-players:
- Converters/fabricators that convert standard steel products into intermediate products (e.g., wire and tube).
- Manufacturers/end users that consume both standard steel products and intermediate products from converters.

- During this phase, processed metal is further transformed into a variety of finished products.
- The range of employment opportunities is significantly larger at this stage and companies in this stage of production include small, medium and large manufacturers. Of particular importance are the machine builders, which generally tend to source parts and components from engineering or machine shops and control systems from electrical and electronics companies. These companies assemble components in conjunction with the core features of the machines designed and produced.

This research study mainly focused on a combination of stage 2 and stage 3 as shown in Figure 4.5. The mining industry is a key input for metals manufacturers and the stability and growth thereof are of key importance. According to the Industrial Development Corporation (2016:23), realities in the coal mining industry include:

- i) The mining sector still faces difficult conditions, at least in the short term, despite the recent recovery in commodity prices.
- ii) A continued growth moderation in the Chinese economy is likely to affect its demand for South African mineral commodities and there is no certainty that commodity prices are on a sustained rebound.
- iii) The strong up-tick in growth in mining output experienced in 2015 was reversed in 2016, as the 2015 growth rebound was mainly due to technical factors and not reflective of demand conditions.
- iv) The coal mining sector benefits from the country's expanding electricity generation capacity as various units of the Medupi and Kusile coal-fired power stations in South Africa are scheduled to come on stream in the 2017-2018 timeframe.
- v) Eskom (the South African government supplier of electricity to South Africa) recently announced that it is undertaking continued maintenance on its older generation power plants instead of moth-balling them, and Eskom has entered into five year contracts with coal mining companies to accommodate its future input requirements.
- vi) On the export front, the growth potential is quite limited outside of the Indian and a few African markets, considering the current over-supply situation in China.

The overall mining industry is, however, continuing to be a significant contributor to the South African economy and in particular, to metals manufacturers in South Africa.

8 SUMMARY

In this chapter, a detailed study of the metals manufacturing industry in South Africa was reviewed. This review focused on two main perspectives, namely 1) scalable economic perspectives, and 2) functional perspectives. During the discussion of scalable economic perspectives, the economies of the metals manufacturers in South Africa, metals manufacturers worldwide and the Southern African Development Community were reviewed. During the discussion of functional perspectives, the metals manufacturers were reviewed from 1) a labour, 2) competitive, and 3) an opportunity perspective. The mining industry in South Africa is upstream from the metals manufacturers and this was also reviewed. The mentioned two main perspectives of the metals manufacturers as well as the mining industry provided a solid overall view of metals manufacturers in South Africa. This chapter is followed by the empirical research and the findings of the study.

CHAPTER 5

EMPIRICAL RESEARCH AND FINDINGS

1 INTRODUCTION

In the previous chapter, a detailed study of the metals manufacturing industry in South Africa was presented. This chapter is devoted to the empirical study of this research and the findings. By correctly positioning and concluding this chapter, the research objectives of this study were reached. This phase of the research focused on element 5 (data collection) and element 6 (data analysis techniques) of the honeycomb model of research methodology shown in Figure 2.3 in Chapter 2. During this research and as illustrated in Figure 2.6 in Chapter 2, a quantitative research phase was followed by a qualitative research phase, which is referred to as an explanatory sequential mixed methods design (Creswell *et al.*, 2014:312). Theories were tested and conclusions developed as part of this research phase. Theory testing is usually associated with quantitative research and deductive reasoning whilst theory development is associated with qualitative research and inductive reasoning (Creswell, 2014:103; Oberholzer, 2017). This phase of the research was well planned and structured as multiple parties/entities were involved with various elements of data collection and the data analysis. This chapter consists of a number of building blocks that represent the empirical phase. The layout of this chapter was considered with the aim to group the sections of this chapter as sensibly as possible. An initial option was to group both phases of the empirical study under the headings of the design, the analysis and the interpretation of the data. The empirical research, however, followed a chronological sequence where, for example, the qualitative phase of the study only started once the quantitative phase was completed and the success of the quantitative phase was evaluated. As a result, it was decided that the most effective presentation of the layout of this chapter would be to adhere to the chronological progress during the empirical phase of this study. This chapter is followed by Chapter 6 in which the conclusions and recommendations are discussed.

2 DESIGN OF THE QUESTIONNAIRE

Various aspects are covered during the design of the questionnaire:

Figure 5.1: Questionnaire design overview

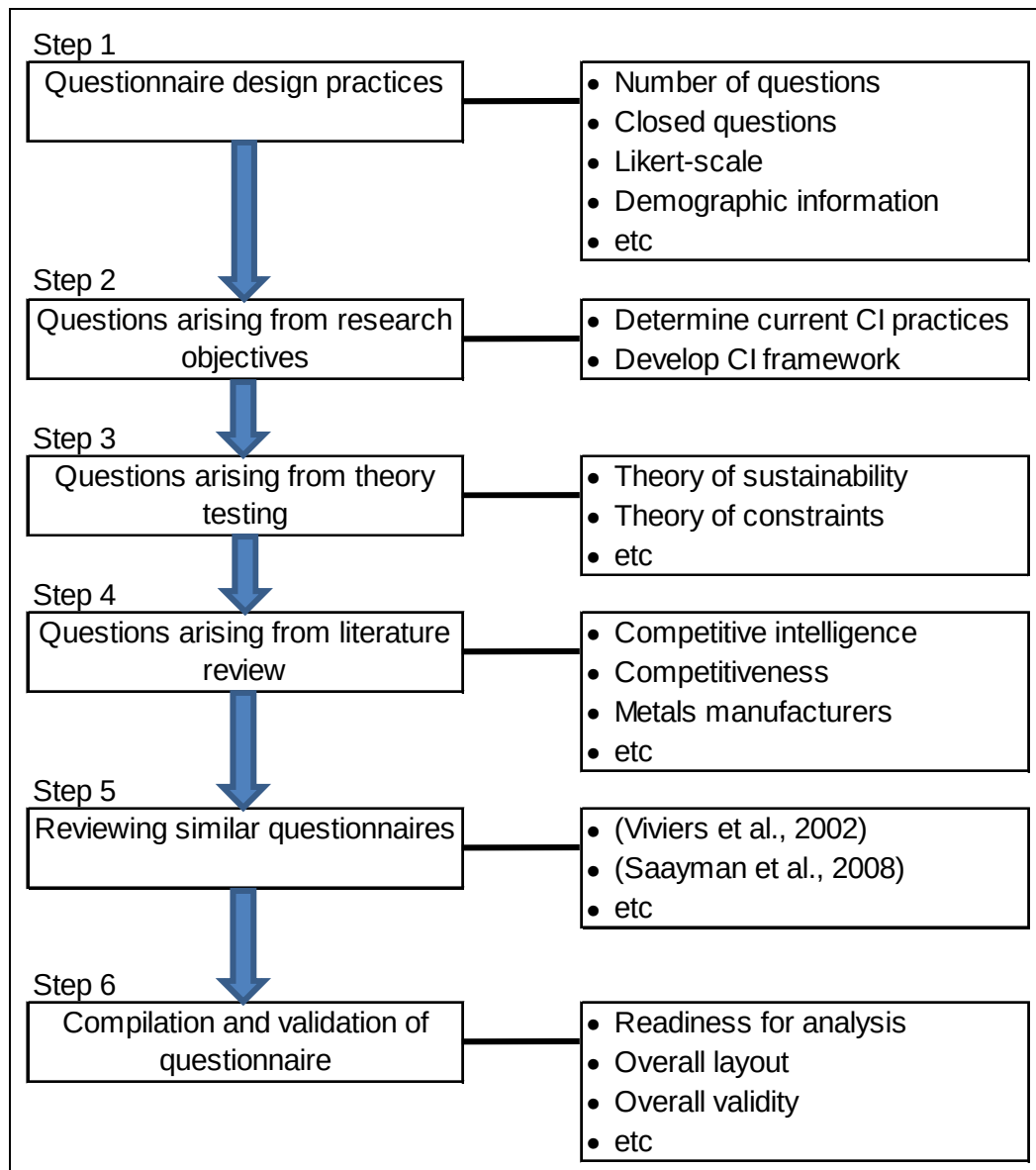


Figure 5.1 provides a process view of the design of the questionnaire and covers the various inputs reflected in the final questionnaire that was used during the quantitative phase. According to Frary (2003), researchers must precisely determine which information is needed and should, therefore, endeavour to limit the questions asked to obtain the information. Burgess (2011:2-27) emphasises that:

- i) It is crucial of a good research design that the questionnaire addresses the main aims of a study.
- ii) The questions focus on the information needed.
- iii) Not too many questions are asked.

- iv) A proper analysis should be done to determine if the questionnaire meets the aims of a study.

The objectives of this study (as indicated in Chapter 1 on page 8) were to determine current competitive intelligence practices and to develop a competitive intelligence framework to improve the sustainability of the South African metals manufacturers. These two objectives should, therefore, be interwoven in the questions asked in the questionnaire – the questions should contribute to the development of a competitive intelligence framework and to determine current competitive intelligence practices. The testing of theories should also be highlighted in the list of questions contained in the questionnaire. According to Colquitt and Zapata-Phelan (2007:1291), the order of the testing of existing theories should increment from a rudimentary level of 1 to 5:

- i) Level 1: The testing is inductive or grounds predictions with logical speculations.
- ii) Level 2: The testing grounds predictions with a reference to past findings.
- iii) Level 3: The testing grounds predictions with existing conceptual arguments.
- iv) Level 4: The testing grounds predictions with existing models, diagrams or figures.
- v) Level 5: The testing grounds predictions with existing theory.

From the literature review of competitive intelligence, related fields and the metals manufacturers in South Africa, the information presented was tested within the questionnaire. Moreover, the questionnaire formed part of the process that addressed the research questions as posed in Chapter 1.

3 COMPILATION OF THE QUESTIONNAIRE

The final questionnaire has the aim to:

- i) Determine current competitive intelligence practices of the metals manufacturers in South Africa.
- ii) Develop a competitive intelligence framework for metals manufacturers in South Africa.
- iii) Test existing theories.
- iv) Test views on specific matters from the literature reviews regarding competitive intelligence, related fields and the metals manufacturers of South Africa.

- v) Select questions aimed at also answering the research questions listed in Chapter 1.

Except for one question, all of the questions posed in the questionnaire are presented with answering options conforming to a 5-point Likert-scale (Appendix A). The answer to one of the questions is in the form of a ranked response (Question C1). The questionnaire was compiled with five sections and is explained in the following section.

3.1 Section A – demographic information

In Section A of the questionnaire, demographical questions are asked. The order of the questions was carefully selected in order to build a trust relationship with each of the participants. Intervals and option lists are used in order to direct the participants in answering the questions.

The following questions with each question's specific question structure (between brackets) used in Section A of the questionnaire:

- i) The specific metals that are manufactured (option list).
- ii) The number of employees in the company (intervals).
- iii) The job position in the company (option list).
- iv) The level of the job position in the company (option-list).
- v) Gender (option list).
- vi) Years of service in current position (intervals).
- vii) The province in South Africa where the company's head office is situated (option-list).
- viii) The department in the company to which the participant reports to (option-list).
- ix) Age (intervals).
- x) Highest qualification (option list).
- xi) The metals sub-industry (option list).
- xii) If in the ferrous metals sub-industry, then a further selection is provided (option list).

3.2 Section B – competitive intelligence building blocks

The competitive intelligence process includes six building blocks (Dishman & Calof: 2008:771). The researcher developed a number of questions for each of the six building blocks included in the competitive intelligence process. The following questions per building block were short-listed:

3.2.1 Building block 1: Planning and focusing

- i) My company plans what competitive intelligence information is needed.**
- ii) My company engages with specific sources, such as competitors, suppliers, clients and partners, for information that can strategically assist us.**
- iii) The results of the competitive intelligence efforts influence my company's strategic direction and decision-making.
- iv) In my company, we focus on competitive intelligence information gathering that will benefit us.**
- v) In my company, we only gather specific information on which we base our competitive intelligence.**

Questions i), iii), iv) and v), as highlighted in the above list, were selected for this section of the questionnaire.

3.2.2 Building block 2: Collecting

- i) My company uses the results from job interviews/job exits for our intelligence systems.**
- ii) My company uses the feedback from employees who wish to contribute to our competitive intelligence efforts.**
- iii) In my company, we collect information to contribute to our competitive intelligence efforts.**
- iv) My company uses the feedback obtained after communication interactions with management.
- v) My company collects competitive intelligence information from external sources.**

Questions i), ii), iii) and v), as highlighted in the above list, were selected for this section of the questionnaire.

3.2.3 Building block 3: Analysing

- i) In my company, competitive intelligence information is analysed in order to achieve competitive intelligence results.**
- ii) My company routinely assesses influences.
- iii) Collected information in my company is checked for accuracy and validity before being processed into our system.**
- iv) My company analyses competitive intelligence information.
- v) In my company, analysed information can be obtained from a variety of information management systems.**
- vi) My company continually analyses information to provide competitive advantages.**

Questions i), iii), v) and vi), as highlighted in the above list, were selected for this section of the questionnaire.

3.2.4 Building block 4: Communicating

- i) In my company, reported competitive intelligence information is passed on to decision-makers.**
- ii) My company often receives progress feedback about competitive intelligence practices.
- iii) In my company, we generally receive feedback of competitive intelligence information.**
- iv) In my company, valuable information is frequently communicated upwards and downwards.**
- v) Non-sensitive competitive intelligence findings are available to employees.**

Questions i), iii), iv) and v), as highlighted in the above list, were selected for this section of the questionnaire.

3.2.5 Building block 5: Processing/structuring

- i) My company has information systems that can analyse competitive information.

- ii) **My company has structures in place to report competitive intelligence information.**
- iii) **My company maintains competitive intelligence information in formal ICT (information and communication technology) systems.**
- iv) **My company knows how to collect information that can be of competitive value.**
- v) **My company maintains profiles of our customers and competitors.**

Questions ii), iii), iv) and v), as highlighted in the above list, were selected for this section of the questionnaire.

3.2.6 Building block 6: Establishing a company awareness/culture

- i) **My company has competitive intelligence training available for our employees.**
- ii) My company knows the strategic business direction we strive for.
- iii) My company knows what our competitive intelligence needs are.
- iv) Our employees receive training on how to collect information that can be of competitive value to our company.
- v) My company sensitises our employees about the collection of competitive information before they go on trade shows and meet clients.
- vi) **My company encourages us to report information that can contribute towards a competitive position.**
- vii) Competitive intelligence is a known activity in our company.
- viii) **My company encourages the sharing of information that can be viewed as an advantage.**
- ix) In my company, we believe that competitive intelligence can be used as an advantage.
- x) **Our office-bound employees understand what competitive intelligence is.**

Questions i), vi), viii) and x), as highlighted in the above list, were selected for this section of the questionnaire.

The 24 questions were ordered by selecting the first questions from each of the six building blocks followed progressively by the other highlighted questions in order to keep the interest of the participant.

3.3 Section C – competitive intelligence framework

In Section C, questions were asked to obtain feedback to contribute to the development of a competitive intelligence framework for the metal manufacturers of South Africa. One question is asked to obtain a ranked response followed by five questions conforming to a five-point Likert-scale. The single ranked response question is deliberately positioned at this point in the questionnaire to deviate from the monotony of answering questions and to help participants focus again.

The ranked response question firstly states that a competitive intelligence framework needs to take into consideration a number of stakeholders, such as:

- i) Clients
- ii) Suppliers
- iii) Own internal departments
- iv) Business partners
- v) Government frameworks

Secondly, the participant is then requested to place the listed stakeholders in order of importance with a competitive intelligence framework in mind.

The five-point Likert-scale questions following the above-mentioned ranked response question are:

- i) Competitive intelligence activities should be led by a core or a dedicated function (individual or individuals) in companies.
- ii) An introduction to competitive intelligence should occur when new employees enter companies.
- iii) Progress reporting on competitive intelligence activities and results should be made available to all the employees of companies.
- iv) Any employee should be able to propose information to be investigated for competitive intelligence purposes.
- v) There should be a rewards system in place for employees who propose valuable information that leads to a competitive intelligence advantage.

3.4 Section D – theory testing questions

The following four theories were selected to be tested:

- i) Theory 1: The resource-based theory of companies.
- ii) Theory 2: The knowledge-based theory of companies.
- iii) Theory 3: The theory of constraints.
- iv) Theory 4: The theory of sustainable development.

The four theories each led to two hypotheses. The eight hypotheses were each tested with one question as summarised below:

- i) Theory 1, H1: The effective application of human resources leads to competitive advantages for my company.
- ii) Theory 1, H2: My company applies human resources effectively and lead to competitive advantages for my company.
- iii) Theory 2, H1: My company knows about certain competitive aspects better than our competitors.
- iv) Theory 2, H2: My company knows certain competitive aspects sooner than our competitors.
- v) Theory 3, H1: My company regularly identifies our most inhibiting constraints.
- vi) Theory 3, H2: Once my company has identified our most inhibiting factors, we address these factors until they do not inhibit the company any longer.
- vii) Theory 4, H1: My company is sensitive to matters concerning sustainable development.
- viii) Theory 4, H2: My company incorporates the principle of sustainable development in our operations.

These eight questions for the final questionnaire were ordered by selecting the first question from each of the four theories followed by the second question in order to keep the participant interested.

3.5 Section E – competitiveness in practice

A number of questions were developed from themes identified during the literature reviews. The following seven statements were selected to test chosen themes concerning competitiveness:

- i) The human resources capacity of my company can be significantly improved.
- ii) My company will have a better competitive position in relation to China if the level of competitive intelligence in my company is increased.
- iii) The efficiency of my company can be significantly improved.
- iv) South Africa's trading with China is benefitting my company.
- v) The competitiveness of my company can be significantly improved.
- vi) The global trading market is benefitting my company.
- vii) My company is cognisant of the competition laws of the countries of our clients.

The above listed seven questions are tested in the questionnaire in the form of a five-point Likert scale.

4 QUESTIONNAIRE-TESTING AND DATA COLLECTION

The questionnaire was tested multiple times and the data were collected with the assistance of multiple industry associations.

4.1 Testing of the questionnaire

The testing of the reliability and validity of the questionnaire, as discussed in section 10 of Chapter 2 (Data analysis) was addressed in three phases:

- i) A session with Prof. Suria Ellis from the Statistical Consultation Services Department of the North-West University, Potchefstroom Campus, to investigate the various questions, the structure and sub-structure of the questionnaire, the length and layout of the questionnaire, and the overall structure of each question.
- ii) The questionnaire was completed by a group of academic personnel members from the Potchefstroom Campus of the North-West University to test the practical and coherent interpretation of each question.

- iii) A pilot test was done by making use of a selected group of experienced specialists in the metals industry in South Africa, including professional consultants and senior management representatives during which the overall questionnaire was tested for practical aspects.

After the questionnaire was tested, the correctness of the coding of the questionnaire via the hyperlink supplied by the Statistical Consultation Services Department was tested and minor improvements were made. Potential participants were supplied with the hyperlink and they completed and submitted the questionnaire on-line. The data were captured directly on the database of the Department. The evaluation of the questionnaire during this phase of testing showed that it was valid and reliable.

4.2 Data collection

Two industry associations committed their support at the beginning of the research: 1) SEIFSA, and 2) MEIBC. A third industry association also committed their support (SAISI) due to practical constraints with MEIBC in the industry at the time of administering the questionnaire. An initial formal request to the industry associations was followed a week later with a reminder that was written in a style that supported the direct electronic forwarding of the reminder to members of the industry associations. The researcher also contacted the companies and employees in the metals manufacturing industry directly to further promote participation in the quantitative phase of the study. The lists of members of the industry associations are confidential and, therefore, the researcher did not have direct control over the distribution of the questionnaire. However, it seemed as if the questionnaire was indeed distributed to members of SEIFSA and SAISI and a total of 63 responses from various companies were captured. The researcher's reminder to the industry associations was succinctly written and specifically requested for two levels of distribution: 1) for the industry associations to distribute the request to their members, and 2) for the members to forward the request inside their own company to employees of a particular profile to also complete the questionnaire. However, it seemed that part 2 of the above-mentioned request was not conveyed and the 63 responses mostly consisted of single responses belonging to an industry association. This assumption was tested during the analysis of the statistical data. The overall analysis of the completed questionnaires showed good Kaiser-Meyer-Olkin values and Cronbach's alpha coefficients. Prof. Suria Ellis recommended that additional data collection was not necessary due to the good Kaiser-Meyer-Olkin values received from the statistical consultant from the North-West University's Statistical Consultation Services. The data collected for the quantitative phase of this study were sufficient.

5 DESCRIPTIVE STATISTICS OF THE QUANTITATIVE RESULTS

The captured data were analysed by the Statistical Consultation Services of the North-West University by making use of SPSS. In this section, the processed data are presented and interpreted. Frequency distributions, arithmetic means and standard deviations were used. A subsequent section focuses on a factor analysis, a correlation analysis and an analysis of means. The questionnaire is discussed, according to its five sections:

- i) Section A: Demographic information
- ii) Section B: Testing for competitive intelligence building blocks
- iii) Section C: Testing towards a competitive intelligence framework
- iv) Section D: Testing of four theories
- v) Section E: Testing for competitive intelligence in practice

5.1 Demographic information

In this section the descriptive statistics for Section A of the questionnaire (demographic information) is presented and discussed in the same order as the questions were asked in the questionnaire.

i) Question A1

“I am working in the metals manufacturing sector and mainly with the following metals”

Table 5.1: The metals sub-industries of the participants

<u>Metal</u>	<u>%</u>
Iron	3.2
Iron, Steel	9.5
Iron, Steel, Stainless steel, Aluminium, Copper	3.2
Steel	28.6
Steel, Copper	3.2
Steel, Stainless steel, Aluminium	6.3
	54.0
<u>Permutations of:</u> Aluminium, Brass, Bronze, Copper, Iron, Lead, Nickel, Stainless steel, Steel, Tin, Zinc	46.0
	100.0

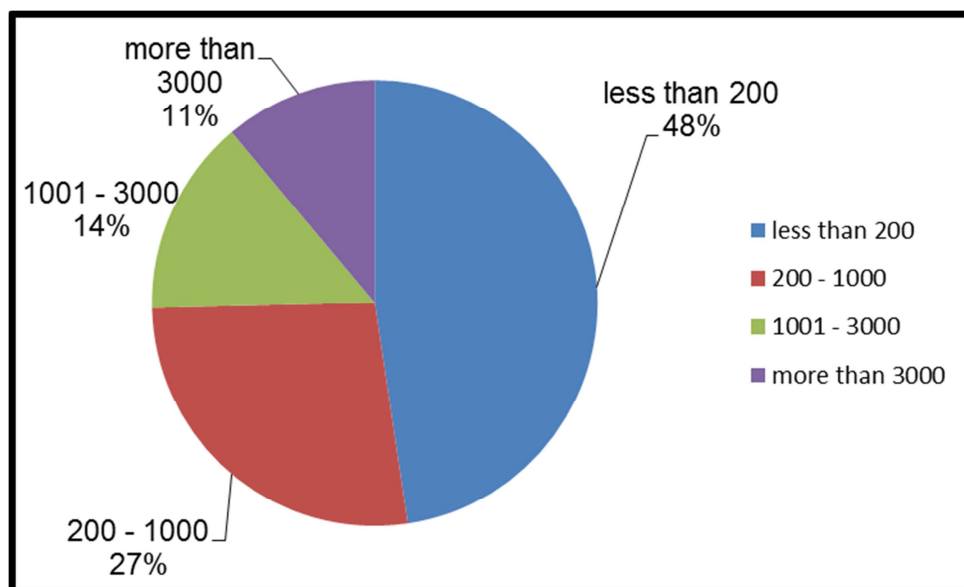
The main observations concerning these responses are:

- The highest number of participants from any of the listed options in the questionnaire is from the steel industry.
- The second highest number of participants from any of the listed options in the questionnaire is from the iron and steel industry.
- The majority of participants are from permutations from the listed options in the questionnaire.

ii) **Question A2**

“The number of employees in my company”

Figure 5.2: The company sizes of the participants



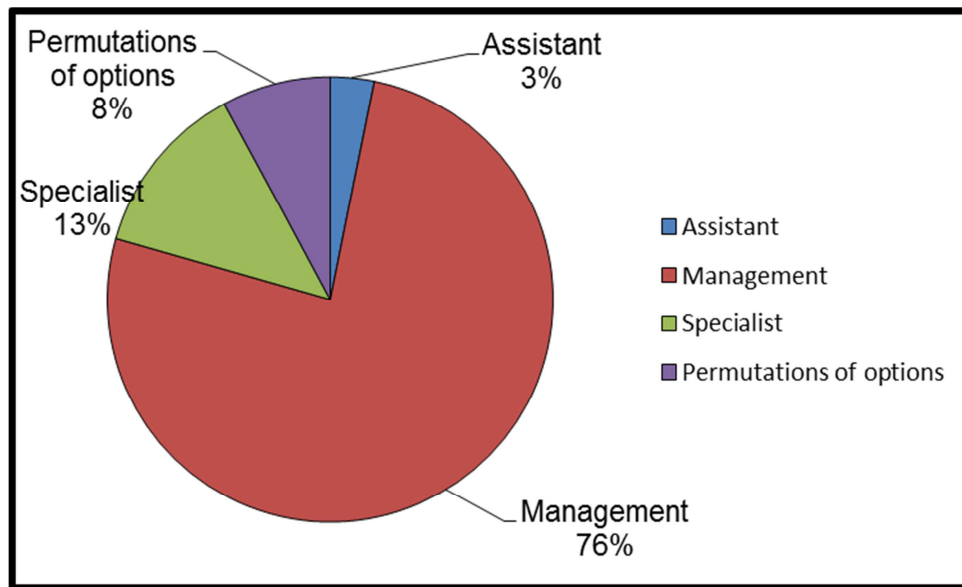
The main observations concerning these responses are:

- The highest number of participants from any of the listed options in the questionnaire is from companies with less than 200 employees.
- The higher the number of employees in a company, the fewer employees participated. This pattern supports the assumption made in section 4.2 (Data collection) in this chapter that the responses received were mostly single responses per company belonging to an industry association.

iii) **Question A3**

“My job position in the company”

Figure 5.3: The job positions of the participants in their company



The permutations of job positions in Figure 5.3 include debtor's clerks, owners, management and payroll.

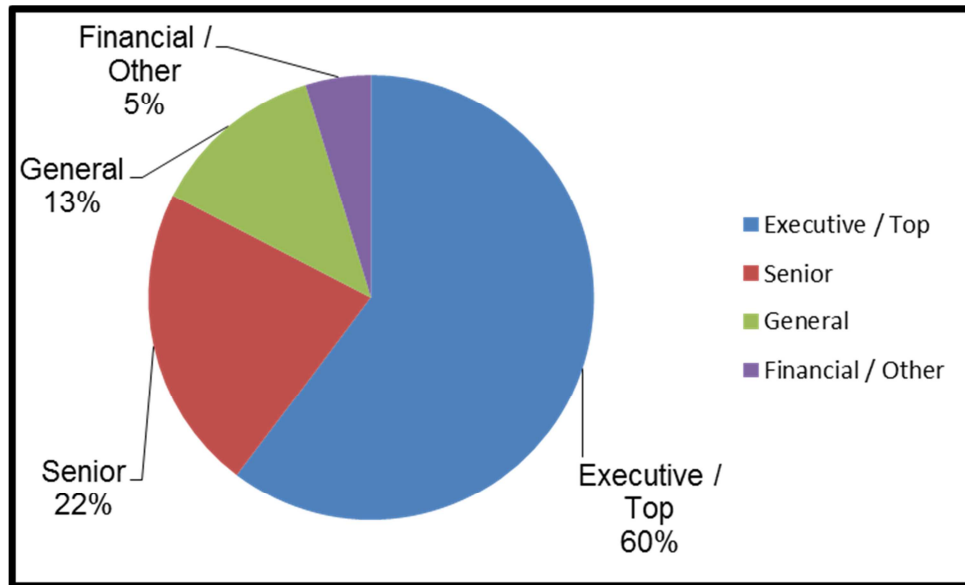
The main observations concerning these responses are:

- The highest number of participants from any of the listed options in the questionnaire is from management.
- Only the options of management, assistant or specialist were selected and the option of "Other" was never selected. This also supports the assumption made in section 4.2 (Data collection) in this chapter that the responses received were mostly single responses per company belonging to an industry association.
- It can be an indication that small companies where multi-tasking is used also participated if the responses of debtor's clerk, owner, management and payroll are considered.

iv) Question A4

"The level of my job position in the company"

Figure 5.4: The job level of the participants in their company



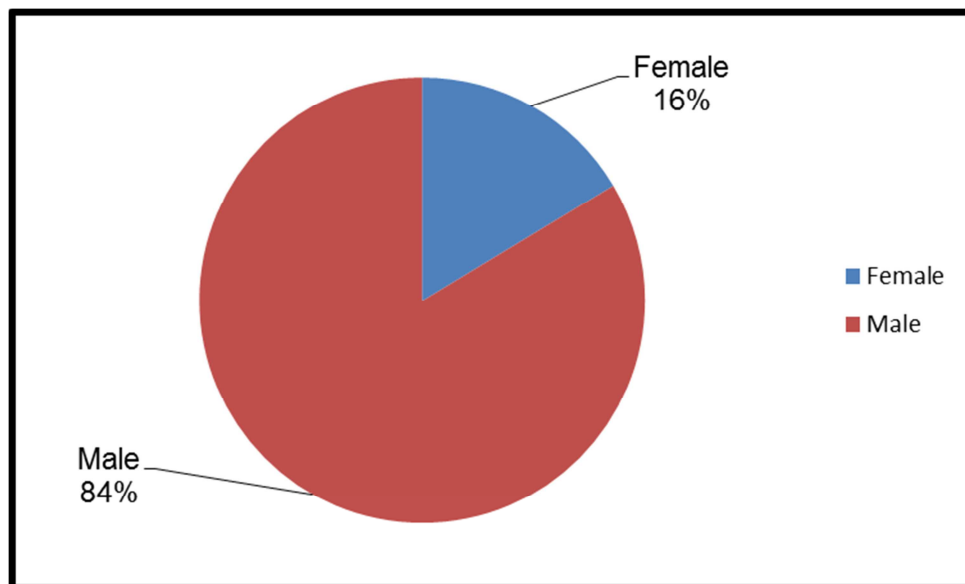
The main observations concerning these responses are:

- It was mostly participants in senior roles who completed this questionnaire.
- Single participants or a few participants per company completed this questionnaire.

v) Question A5

"My gender"

Figure 5.5: The gender of the participants

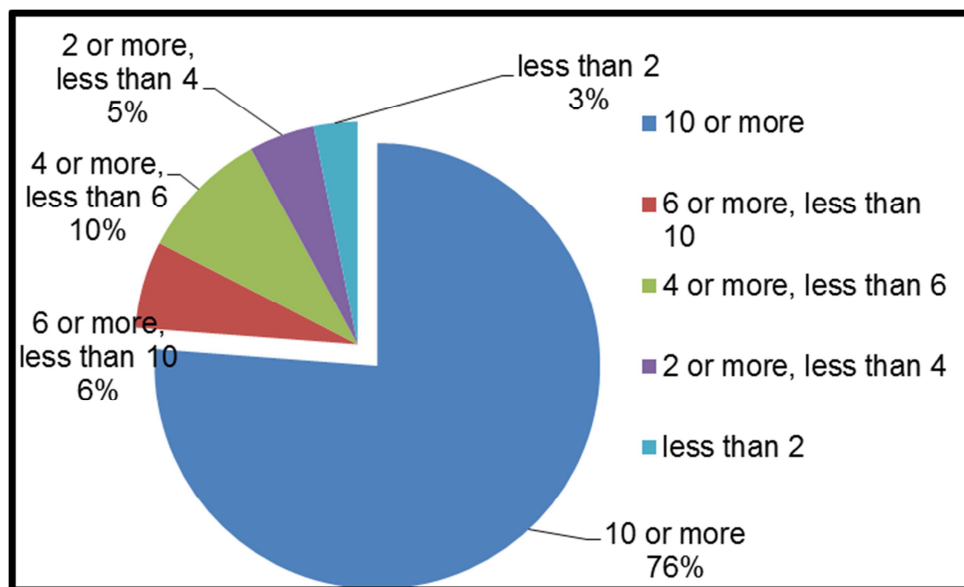


The main observation from the responses is that the vast majority of participants are male, which reflects the reality of the metals manufacturing industry in South Africa.

vi) **Question A6**

“Years of service in my current industry”

Figure 5.6: The years of service of the participants in their current industry

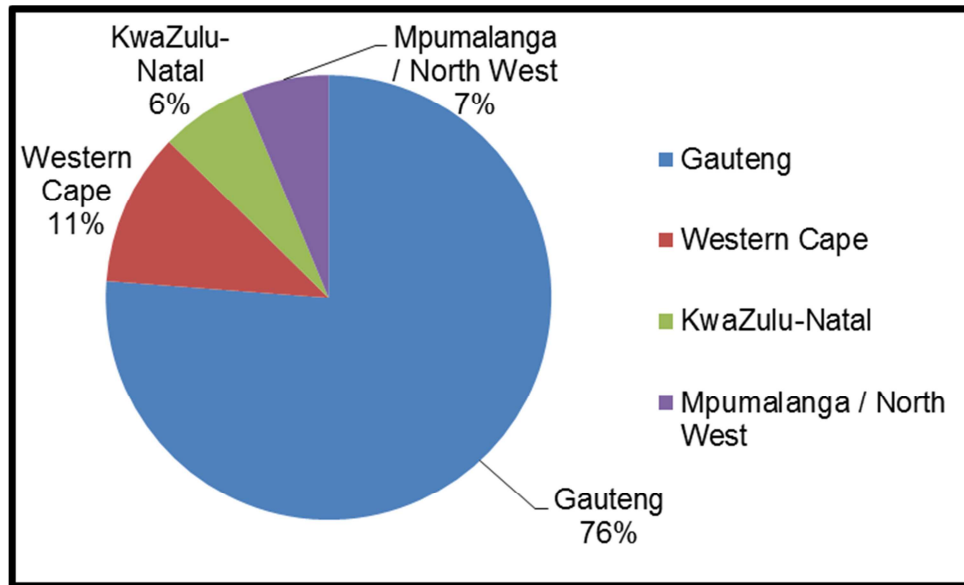


The main observation from the responses is that the vast majority of participants are well-embedded in their roles, which coincides with the outcome of Question A4 (“The level of my job position in the company”).

vii) **Question A7**

“The province in South Africa where the company's head office is situated or where the main decisions are made”

Figure 5.7: The head offices of the participants

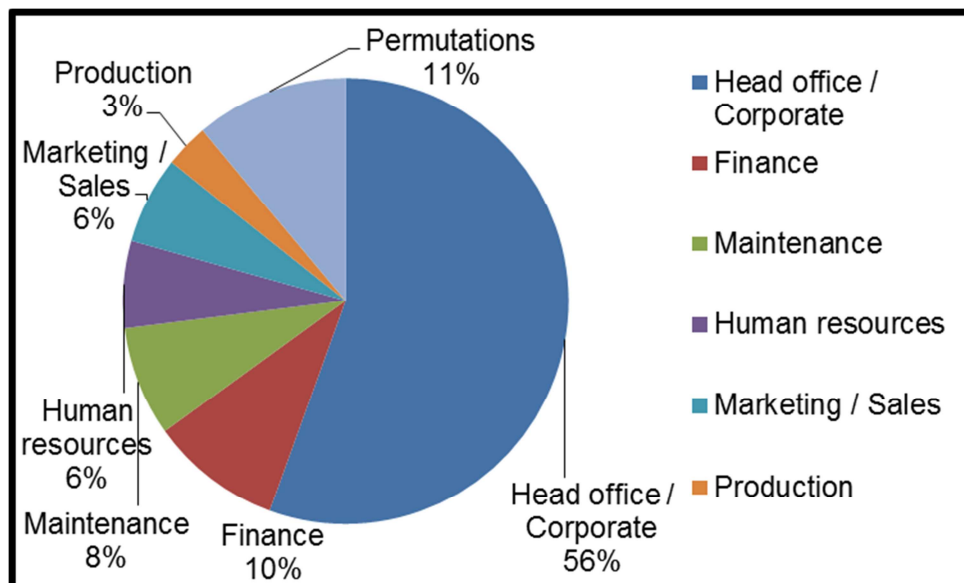


The main observation from the responses is that the head offices of the participants' companies are mostly located in Gauteng. This can be due to factors, such as Gauteng being viewed as the economic hub of South Africa and both the participating head offices of SEIFSA and SAISI are situated in Gauteng.

viii) Question A8

"The department in the company where I report"

Figure 5.8: The reporting departments of the participants



The permutations of the reporting departments of the participants in Figure 5.3 include engineering, technical and a collective of all departments.

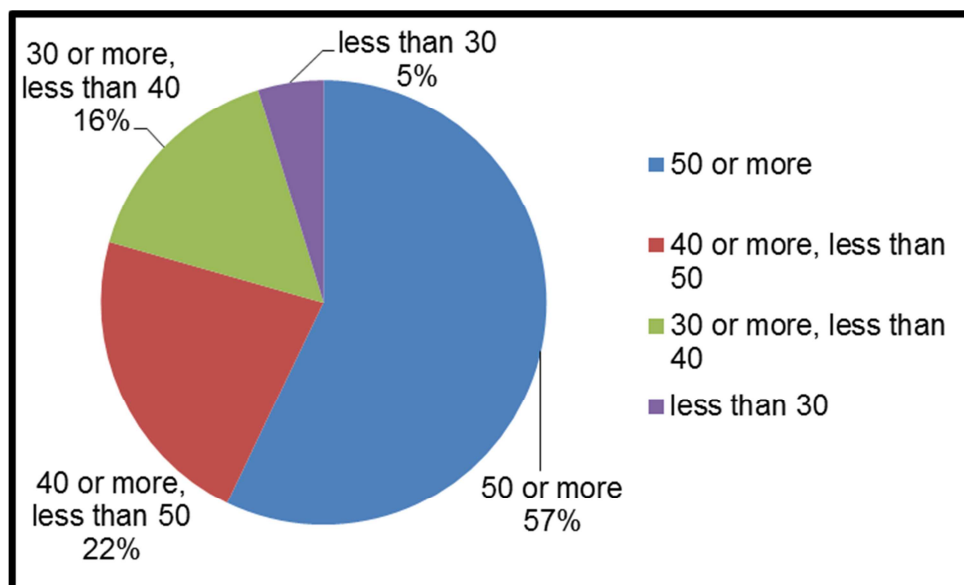
The main observations concerning these responses are:

- It was mostly participants in senior roles who completed this questionnaire.
- Single participants or a few participants per company completed this questionnaire, which coincides with previous observations.

ix) **Question A9**

“My age”

Figure 5.9: The age of the participants

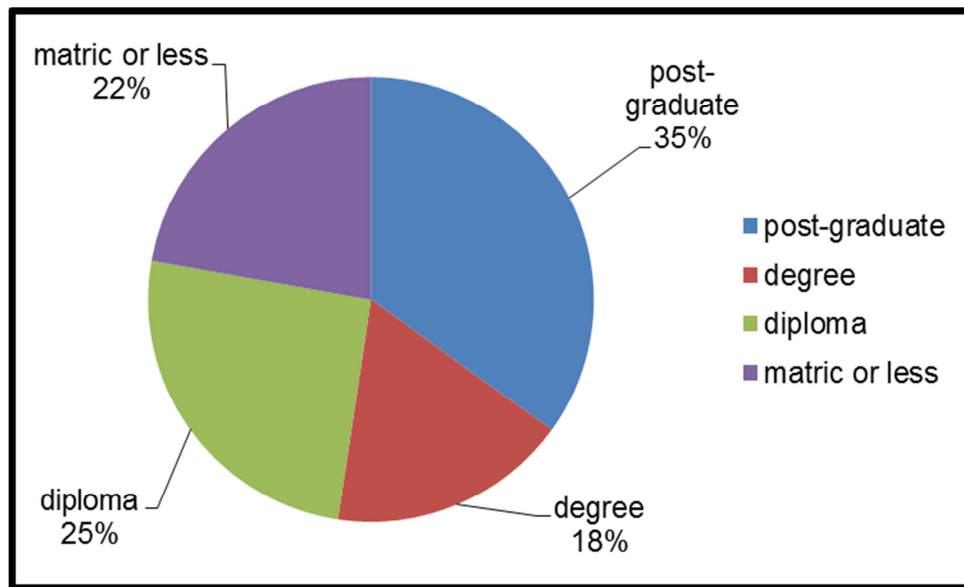


The main observation from the responses is that it was mostly senior candidates who completed this questionnaire.

x) **Question A10**

“My highest qualification”

Figure 5.10: The highest qualification of the participants



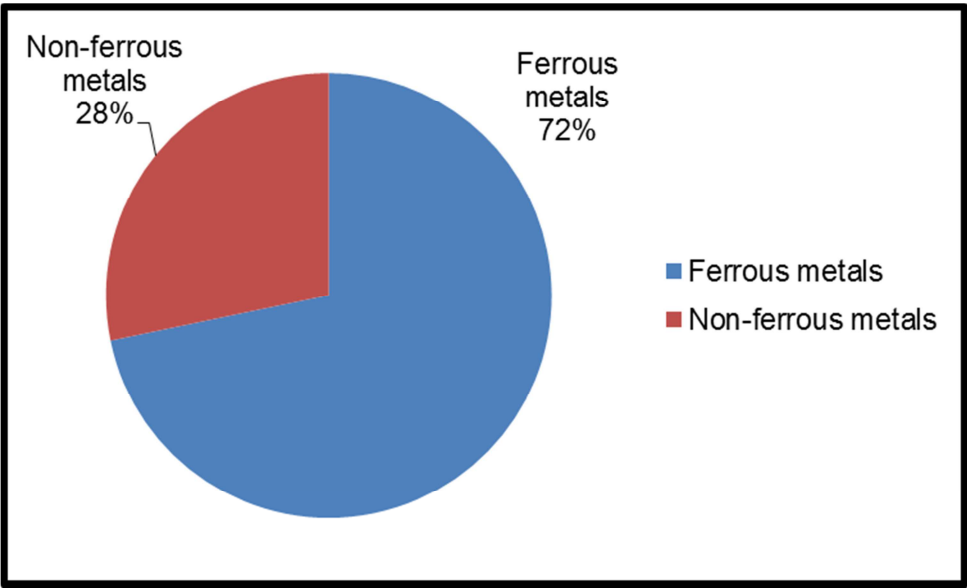
The main observations concerning these responses are:

- It was mostly participants in senior roles who completed this questionnaire.
- It was largely participants from smaller companies who completed this questionnaire as there are a significant number of participants with a degree or diploma as qualification. It can be expected that a relatively small number of the participants with only a diploma as qualification will be part of top management in large companies.

xi) Question A11

“My company operates in the following sub-industries”

Figure 5.11: The metals sub-industries of the participants



The main observation from the responses is that the participants are mostly from the ferrous metals industry, because of the strong support of SAISI for this research study. SAISI specifically focuses on the ferrous metals manufacturers whilst the focus of SEIFSA includes both the ferrous and non-ferrous industries.

xii) Question A12

“If you have chosen ferrous metals at A11, please specify the downstream industries”

Table 5.2: The ferrous downstream industries of the participants

<u>Downstream ferrous metals industry</u>	<u>%</u>
Plate & Sheet metal works	7.9
Building & construction	4.8
Automotive	3.2
Cables, wire products & gates	3.2
Permutations of: • Hardware, furniture, railroad, • Fasteners, •	81.0
Electrical appliance White goods, • Agricultural, • Roofing & Cold	
forming, • Tube & Pipe, • Packaging, • Mining, • Unallocated /	
other	
	100.0

The main observation from the responses is that the participants are mostly from a permutation of the listed sub-industries. This coincides with a previous observation that mostly participants of smaller companies completed this questionnaire.

This observation coincides with the researcher's experience when he engaged with two of the largest steel manufacturers in South Africa and experienced corporate reluctance to participate. The researcher partially assign the reluctance of the largest steel manufacturing companies in South Africa to receiving multi-billion Rand fines during the past years by the Competition Tribunal of South Africa for collusive behaviour, and that this can explain their reluctance in freely sharing their views.

5.2 Competitive intelligence building blocks

This section presents the descriptive statistics for Section B of the questionnaire (Testing for competitive intelligence practices) and also provides observations made with regard to the statistics presented. The 24 questions (and statements) in this section represent testing for the six building blocks of the competitive intelligence-process. The four questions per each of the six building blocks were scrambled, as described in section 3.2 (Section B – competitive intelligence practices), and were unscrambled and regrouped per building block for the purposes of this reporting.

Table 5.3: Response summary on the competitive intelligence building blocks

CI building block	Question nr.	Statement	Strongly disagree %	Disagree %	Not sure %	Agree %	Strongly agree %	Mean	Standard deviation
			1	2	3	4	5		
1	1	Our company plans what CI information we need.	3.2	11.1	12.7	57.1	12.7	3.67	0.96
1	7	The results of our CI efforts are such that it influences our company's strategic direction and decision-making.	3.2	14.3	19.0	47.6	12.7	3.54	1.01
1	13	In our company we focus on CI information gathering that will benefit us.	1.6	17.5	19.0	42.9	14.3	3.53	1.02
1	19	In our company we only gather specific information on which we base our CI.	3.2	25.4	19.0	42.9	6.3	3.25	1.03
2	2	Our company uses the results from job interviews / job exits for our intelligence systems.	4.8	28.6	22.2	34.9	6.3	3.10	1.06
2	8	Our company uses the feedback from employees who wish to contribute to our CI efforts.	3.2	17.5	23.8	47.6	6.3	3.37	0.96
2	14	In our company we collect information to contribute to our CI efforts.	3.2	11.1	17.5	54.0	11.1	3.61	0.95
2	20	Our company collects CI information from external sources.	1.6	20.6	17.5	47.6	9.5	3.44	0.99
3	3	In our company CI information is analysed in order to achieve CI results.	3.2	11.1	20.6	50.8	11.1	3.57	0.96
3	9	Collected information in our company is checked for accuracy and validity before being forwarded in our system.	4.8	19.0	23.8	34.9	14.3	3.36	1.11
3	15	In our company analysed information can be obtained from a variety of information management systems.	4.8	25.4	15.9	41.3	9.5	3.26	1.11
3	21	Our company continually analyses information to provide competitive advantages.	3.2	19.0	14.3	46.0	14.3	3.51	1.07
4	4	In our company reported CI information is passed on to decision-makers.	1.6	7.9	17.5	52.4	17.5	3.79	0.90
4	10	In our company we generally receive feedback of CI information.	6.3	27.0	20.6	39.7	3.2	3.07	1.05
4	16	In our company helpful information is frequently communicated upwards and downwards.	1.6	20.6	7.9	55.6	12.7	3.58	1.02
4	22	Non-sensitive CI findings are available to employees.	4.8	25.4	30.2	33.3	3.2	3.05	0.97
5	5	Our company has structures whereby CI information can be reported.	4.8	15.9	22.2	42.9	12.7	3.44	1.07
5	11	Our company maintains CI information in formal ICT systems.	12.7	27.0	25.4	30.2	1.6	2.80	1.08
5	17	We know how to collect information that could be of competitive value to our company.	4.8	15.9	22.2	46.0	7.9	3.38	1.02
5	23	We maintain profiles of our customers and competitors.	6.3	9.5	17.5	50.8	12.7	3.56	1.06
6	6	Our company has CI training available for our employees.	15.9	36.5	19.0	22.2	1.6	2.55	1.08
6	12	In our company we are encouraged to report information that can contribute towards our company's competitive position.	1.6	7.9	15.9	55.6	15.9	3.79	0.88
6	18	Our company encourages the sharing of information that could be to the advantage of our company.	0.0	15.9	7.9	61.9	12.7	3.73	0.89
6	24	Our office-bound employees understand what CI is.	11.1	19.0	28.6	34.9	3.2	3.00	1.08

In Table 5.3, the responses of the participants to the questions that tested for the building blocks of competitive intelligence are grouped per building block. The average percentage of the responses per each of the five outcomes per question is shown together with the arithmetic means and standard deviations per question. For example: Question 14 (competitive intelligence building block 2), the percentage of the total participants who chose the following options:

- Option 1 (Strongly disagree) – 3.2%
- Option 2 (Disagree) – 11.1%
- Option 3 (Not sure) – 17.5%
- Option 4 (Agree) – 54.0%
- Option 5 (Strongly agree) – 11.1%

The majority of participants (54.0%), therefore, agree with the statement: “In our company we collect information to contribute to our CI efforts”.

The least popular answer was Option 1 (“Strongly disagree”) to Question 18 (Building block 6): “Our company encourages the sharing of information that could be to the advantage of our company”. This specific option was not chosen by the participants – not one of the participants agreed with the option “Strongly disagree”.

Coincidentally, the most popular option for Question 18 (61.9%) chosen by the participants was the “Agree” option.

The lowest mean value (2.55) was obtained from Question 6 (Building block 6): “Our company has CI training available for our employees”. This means that the average participant was slightly more negative than neutral with regard to this statement.

The highest mean value (3.79) was shared by the following two questions:

- i) Statement B4 (Building block 4): “In our company reported CI information is passed on to decision-makers”.
- ii) Statement B12 (Building block 6): “In our company we are encouraged to report information that can contribute towards our company's competitive position”.

It was noted that Building block 4 and Building block 6 are two building blocks that occur towards the end of the competitive intelligence process:

- i) Building block 4: Communicating
- ii) Building block 6: Establishing a company awareness/culture

The lowest standard deviation (0.88) was obtained from Question 12 (Building block 6): “In our company we are encouraged to report information that can contribute towards our company's competitive position”. This means that the viewpoints of the participants varied the least with regard to this particular question compared to the variance in the other questions.

5.3 Competitive intelligence framework

This section presents the descriptive statistics for Section C of the questionnaire (Developing a competitive intelligence framework) and also comments on the statistics provided. The first of the six questions was designed to obtain a ranked response and the remaining five were asked according to a 5-point Likert-scale rating.

The ranked response question (Question C1) states that a competitive intelligence framework needs to take into consideration a number of stakeholders, such as:

- i) Clients
- ii) Suppliers
- iii) Own internal departments
- iv) Business partners
- v) Government frameworks

The participant was then requested to place the list of stakeholders in order of importance with regard to whom a competitive intelligence framework should address. The respondent was requested to indicate a ranking of importance where 1 is the most important.

Table 5.4: The stakeholders' ranking

Stakeholder importance	Most important				Least important	Mean	Standard deviation
	1	2	3	4	5		
Clients	67.3	16.4	9.1	0.0	7.3	1.64	1.14
Suppliers	8.9	26.8	17.9	30.4	16.1	3.18	1.25
Own internal departments	14.3	21.4	26.8	21.4	16.1	3.04	1.29
Business partners	21.4	25.0	25.0	21.4	7.1	2.68	1.24
Government	5.4	10.7	10.7	10.7	62.5	4.14	1.29

In the case of all questions except for Question C1 in the questionnaire, a 5-point Likert-scale rating was used where an outcome of 1 would mean “strongly disagree” and an outcome of 5 would mean “strongly agree”. In only the case of Question C1 where ranking was requested, the highest rank would be 1 and the lowest rank would be 5. The lowest mean in Table 5.4 would thus correlate with the highest rank and the highest mean would correlate with the lowest rank. The response to Question C1 shows “Government” (mean = 4.14) is deemed the least important for a CI framework with “Clients” (mean = 1.64) deemed the most important. It is well accepted that a country’s government should create and maintain a viable economic structure for businesses to survive. In the case of South Africa this study showed a high degree of frustration with the lack of protection by the South African government and as such this response is expected. The response to Question C1 where “Clients” was deemed most important for a CI framework is expected as in a business climate where bigger role-players such as the government is seen to not be stepping up to its anticipated role, the loyalty of clients and relationships with clients will be a deciding survival factor.

The responses to questions C2 – C6 are shown in Table 5.5 below.

Table 5.5: General questions related to a CI framework

Question nr.	Statement	Strongly disagree %	Disagree %	Not sure %	Agree %	Strongly agree %	Mean	Standard deviation
		1	2	3	4	5		
C2	CI-activities should be led by a core and dedicated function (person or persons) in a company.	3.2	9.7	11.3	54.8	21.0	3.81	0.989
C3	Introduction to CI should begin at the time of employment of workers.	1.6	16.1	9.7	59.7	12.9	3.66	0.957
C4	Progress reporting on CI activities and results should be made available to ALL workers in a company.	4.8	29.0	14.5	37.1	14.5	3.27	1.176
C5	Any worker should be able to send information to be investigated for CI-purposes.	1.6	9.7	6.5	58.1	24.2	3.94	0.921
C6	There should be a rewards-system for workers that forward information that does lead to a CI-advantage for a company.	1.6	11.3	19.4	46.8	21.0	3.74	0.974

It was noted from the responses shown in Table 5.5 that the means of the responses in all of the questions were higher than 3. This implies that the participants generally agreed with all of the statements. This conclusion is used in a later section of the study.

5.4 Testing existing theories

This section presents the descriptive statistics of Section D of the questionnaire (Testing general views) and also comments on the statistics provided. This chapter was introduced as “Testing general views” in the questionnaire to avoid confusion when the participants answered the corresponding questions. Four theories, with two hypotheses each, were tested in this section. The two questions linked to each of the four theories were scrambled, according to the pattern described in section 3.4 (Section D – theory testing questions) of this chapter and were unscrambled and regrouped for the purpose of reporting findings. All eight of the questions were asked, according to a 5-point Likert-scale. The descriptive statistics of this section are shown in order of each theory that was tested in Table 5.6 below.

Table 5.6: Testing existing theories

Theory tested	Question nr.	Statement	Strongly disagree %	Disagree %	Not sure %	Agree %	Strongly agree %	Mean	Standard deviation
			1	2	3	4	5		
1	1	The effective application of human resources will lead to a competitive advantage for my company.	0.0	3.2	6.5	54.8	35.5	4.2	0.71
1	5	My company applies human resources effectively such that it leads to a competitive advantage for my company.	3.2	9.7	22.6	56.5	8.1	3.6	0.90
2	2	My company knows certain competitive aspects better than our competitors.	0.0	6.5	29.0	48.4	16.1	3.7	0.81
2	6	My company knows certain competitive aspects sooner than our competitors.	3.2	11.3	41.9	35.5	8.1	3.3	0.90
3	3	My company regularly identifies our most inhibiting constraints.	1.6	12.9	14.5	62.9	8.1	3.6	0.87
3	7	Once my company identifies our most inhibiting factors we address it until it is not inhibiting any longer.	3.2	17.7	19.4	51.6	8.1	3.4	0.99
4	4	My company is sensitive to the matters around sustainable development.	1.6	9.7	22.6	53.2	12.9	3.7	0.89
4	8	My company incorporates the principle of sustainable development in our operations.	1.6	11.3	25.8	46.8	14.5	3.6	0.93

It was noted from the responses shown in Table 5.6 that the means of the responses provided by the participants were higher than 3. This implies that the participants generally agreed with the statements. This also means that the four theories being tested are not rejected by metals manufacturers in South Africa. The highest difference between two means per theory occurred in Theory 1 ($0.6 = 4.2$ minus 3.6). The highest mean also occurred in Question 1 (Theory 1). In retrospect, it can be argued that it is only in the case of Question 1 where the phrasing of the sentence is more in general whereas the rest of the questions in this section are phrased specifically to test the views of the participants with regard to “my company”. It was, therefore, easier for the participants to agree with a more general statement than to evaluate a response based on the realities of their own company. This discussion is used again in a later section of this study.

5.5 Competitiveness in practice

This section presents the descriptive statistics for Section E of the questionnaire (Competitiveness in practice) and also comments on the statistics provided. This section links to section 3.5 (Section E – competitiveness in practice) in this chapter and was initiated from themes identified from the literature review completed in previous chapters. All seven of the questions were asked, according to a 5-point Likert-scale. The descriptive statistics for this section are shown in Table 5.7 below.

Table 5.7: Testing competitiveness in practice

Question nr.	Statement	Strongly disagree %	Disagree %	Not sure %	Agree %	Strongly agree %	Mean	Standard deviation
		1	2	3	4	5		
1	The human resources (HR) capacity utilization of my company can be significantly improved.	0.0	23.0	8.2	52.5	16.4	3.6	1.02
2	My company will have a better competitive position in relation to China should my company's level of competitive intelligence (CI) increase.	1.6	21.3	26.2	34.4	16.4	3.4	1.06
3	The efficiency of my company can be significantly improved.	0.0	1.6	13.1	55.7	29.5	4.1	0.69
4	South Africa's trading with China has benefits for our company.	21.3	36.1	16.4	21.3	4.9	2.5	1.19
5	The competitiveness of my company can be significantly improved.	0.0	6.6	14.8	52.5	26.2	4.0	0.83
6	The global trading market has benefits for our company.	1.6	14.8	13.1	44.3	26.2	3.8	1.05
7	Our company is cognizant of the competition laws of our clients' countries.	6.6	14.8	31.1	34.4	13.1	3.3	1.09

It was noted from Table 5.7 that the two highest means (4.1 and 4.0) were obtained for Questions 3 and 5 (statements) that confirm inadequate competitiveness in the companies of the participants. The lowest mean (2.5) was obtained for Question 4, which confirms that South Africa's trading with China is perceived as a threat rather than an opportunity. An additional analysis of this data follows in a later section.

The discussion with regard to the analysis of the data from the quantitative phase is provided in the next section.

6 A FACTOR ANALYSIS OF THE QUANTITATIVE RESULTS

In the previous section, the descriptive statistical results from the answers to the questionnaire were provided and discussed. In this section, the results are provided after the data were further analysed by means of an exploratory factor analysis in the cases of Section C and E, and a confirmatory factor analysis in the cases of Section B and D. The purpose of a factor analysis is to determine which items "belong together" – when answers are provided in a similar way and, therefore, measured the same factor (Pietersen & Maree, 2014:219). Pietersen and Maree (2014:219) further explain that items belonging to the same factor have an individual loading number showing the correlation between the items and the factor – a bigger loading number indicates a stronger correlation between an item and the factor. The statistical detail per factor is

often presented in a “factor pattern matrix” where detail about the items “belonging” to the factor is also displayed. The items per factor include:

- i) Cronbach's alpha coefficients were used to gauge reliability and internal consistency. According to Field (2009:681) values around 0.8 (and around 0.7 for ability tests) are an indication of good reliability.
- ii) Kaiser-Meyer-Olkin values to determine sample adequacy. Kaiser-Meyer-Olkin statistics vary between 0 and 1 where a value close to 1 indicates that patterns of correlation are relatively compact. A factor analysis should, therefore, yield distinct and reliable factors (Field, 2009:647). Kaiser (1974:34) recommends accepting values marginally greater than 0.5 as barely acceptable and to not accept values below 0.5. Furthermore, values between 0.5 and 0.7 are mediocre; values between 0.7 and 0.8 are good; values between 0.8 and 0.9 are great; and values above 0.9 are superb (Hutcheson & Sofroniou, 1999:152).
- iii) Eigenvalues of factors and Scree plots to assist with factor extraction.
- iv) Eigenvalues show the substance importance of the factor with Scree plots making an “elbow” (inflection) below the number of factors that should effectively be included (Field, 2009:640). Eigenvalues higher than 50% indicate a sufficient condition for a factor while the cumulative value of two variables above 50% indicates a sufficient condition for two factors.
- v) Communalities indicate the common variance present in a variable (component of a factor). A variable with no specific variance shows a communality of 1 and a variable that shares none of its variance with any other variable shows a communality of 0 (Field, 2009:872).
- vi) Factor means and standard deviations.

The content of the questionnaire is provided again as background for the factor analysis process:

- i) Section A: Demographic information
- ii) Section B: Testing for competitive intelligence building blocks
- iii) Section C: Testing towards a competitive intelligence framework
- iv) Section D: Testing of four theories

v) Section E: Testing for competitive intelligence in practice

Section B of the questionnaire is structured in six sets of four questions each to test for the six competitive intelligence building blocks. Section C consists of six arbitrary questions designed to test specific views that can assist with the developing of a competitive intelligence framework. Section D is structured in four sets of two questions each to test the four theories. Section E includes seven arbitrary questions designed to test views about competitive intelligence in practice. The factors from the various sections of the questionnaire are discussed next.

6.1 Factors: Section B

The six building blocks of competitive intelligence in Section B of the questionnaire delivered one factor for each of the building blocks. The factors are:

- Factor 1: Planning and focusing
- Factor 2: Collecting
- Factor 3: Analysing
- Factor 4: Communicating
- Factor 5: Processing/structuring
- Factor 6: Establishing a company awareness/culture

The factor pattern matrixes for the mentioned six factors are shown in Table 5.8 to Table 5.13 below.

Table 5.8: Factor 1, competitive intelligence building block 1

Question nr.	Statement	Factor 1: CI Building Block 1	Communalities
B1	Our company plans what CI information we need.	0.753	0.567
B7	The results of our CI efforts are such that it influences our company's strategic direction and decision-making.	0.875	0.766
B13	In our company we focus on CI information gathering that will benefit us.	0.893	0.797
B19	In our company we only gather specific information on which we base our CI.	0.645	0.417
Kaiser-Meyer-Olkin measure of sampling adequacy		0.714	
Eigenvalue of component 1		63.66%	
Cronbach's Alpha		0.809	
Factor mean		3.492	
Factor standards deviation		0.798	

The Cronbach's alpha coefficient for Factor 1 was 0.809 and, according to Field (2009:681), a good indication of reliability. The Eigenvalue of component 1 of Factor 1 was 63.66% – higher than 50% and indicates that a single factor from building block 1 of competitive intelligence is sufficient. This was also evident from the SPSS Scree plot. The factor mean indicates what the mean response to the four questions of Factor 1 was. The mean of Factor 1 (3.492) was slightly higher than neutral. The Kaiser-Meyer-Olkin coefficient for Factor 1 was 0.714, which can be viewed as good (Hutcheson & Sofroniou, 1999:152).

The remaining five factors that represent competitive intelligence building blocks 2-6 are presented below.

Table 5.9: Factor 2, competitive intelligence building block 2

Question nr.	Statement	Factor 2: CI Building Block 2	Communalities
B2	Our company uses the results from job interviews / job exits for our intelligence systems.	0.269	0.072
B8	Our company uses the feedback from employees who wish to contribute to our CI efforts.	0,889	0.791
B14	In our company we collect information to contribute to our CI efforts.	0.857	0.734
B20	Our company collects CI information from external sources.	0.859	0.738
Kaiser-Meyer-Olkin measure of sampling adequacy		0.718	
Eigenvalue of component 1		58.38%	
Cronbach's Alpha		0.710	
Factor mean		3.387	
Factor standards deviation		0.725	

The Kaiser-Meyer-Olkin coefficient for competitive intelligence building block 2 was 0.718. Although less than 0.8, this coefficient was still acceptable.

Table 5.10: Factor 3, competitive intelligence building block 3

Question nr.	Statement	Factor 3: CI Building Block 3	Communalities
B3	In our company CI information is analysed in order to achieve CI results.	0.884	0.781
B9	Collected information in our company is checked for accuracy and validity before being forwarded in our system.	0.854	0.729
B15	In our company analysed information can be obtained from a variety of information management systems.	0.782	0.612
B21	Our company continually analyses information to provide competitive advantages.	0.903	0.816
Kaiser-Meyer-Olkin measure of sampling adequacy		0.823	
Eigenvalue of component 1		73.45%	
Cronbach's Alpha		0.876	
Factor mean		3.426	
Factor standards deviation		0.909	

The Kaiser-Meyer-Olkin coefficient for competitive intelligence building block 3 was 0.823 and the Cronbach's alpha coefficient was 0.876 – both can be viewed as very acceptable. The high Eigenvalue of 73.45% also confirmed the solidness of competitive intelligence building block 3 as a factor.

Table 5.11: Factor 4, competitive intelligence building block 4

Question nr.	Statement	Factor 4: CI Building Block 4	Communalities
B4	In our company reported CI information is passed on to decision-makers.	0.74	0.547
B10	In our company we generally receive feedback of CI information.	0.805	0.649
B16	In our company helpful information is frequently communicated upwards and downwards.	0.822	0.675
B22	Non-sensitive CI findings are available to employees.	0.829	0.687
Kaiser-Meyer-Olkin measure of sampling adequacy		0.787	
Eigenvalue of component 1		63.95%	
Cronbach's Alpha		0.811	
Factor mean		3.379	
Factor standards deviation		0.786	

Factor 4 (competitive intelligence building block 4) received the second highest Kaiser-Meyer-Olkin coefficient (0.787), first component Eigenvalue (63.95%) and Cronbach's alpha (0.811) of all six of the building blocks.

Table 5.12: Factor 5, competitive intelligence building block 5

Question nr.	Statement	Factor 5: CI Building Block 5	Communalities
B5	Our company has structures whereby CI information can be reported.	0.824	0.679
B11	Our company maintains CI information in formal ICT systems.	0.718	0.515
B17	We know how to collect information that could be of competitive value to our company.	0.736	0.541
B23	We maintain profiles of our customers and competitors.	0.764	0.584
Kaiser-Meyer-Olkin measure of sampling adequacy		0.727	
Eigenvalue of component 1		58.01%	
Cronbach's Alpha		0.766	
Factor mean		3.302	
Factor standards deviation		0.802	

Factor 5 (competitive intelligence building block 5) received the second lowest factor mean coefficient (3.302) of all six of the building blocks. It was noted that competitive intelligence building block 5 came first of the two supporting building blocks.

Table 5.13: Factor 6, competitive intelligence building block 6

Question nr.	Statement	Factor 6: CI Building Block 6	Communalities
B6	Our company has CI training available for our employees.	0.524	0.275
B12	In our company we are encouraged to report information that can contribute towards our company's competitive position.	0.698	0.487
B18	Our company encourages the sharing of information that could be to the advantage of our company.	0.698	0.487
B24	Our office-bound employees understand what CI is.	0.816	0.666
Kaiser-Meyer-Olkin measure of sampling adequacy		0.604	
Eigenvalue of component 1		47.87%	
Cronbach's Alpha		0.625	
Factor mean		3.277	
Factor standards deviation		0.676	

Factor 6 (competitive intelligence building block 6) received the lowest Kaiser-Meyer-Olkin coefficient (0.604), first component Eigenvalue (47.87%), Cronbach's alpha (0.625) and factor mean coefficient (3.277) of all six of the building blocks. It was noted that competitive intelligence building block 6 came second of the 2 supporting building blocks.

The above set of six factors from Section B of the questionnaire represents the six building blocks of the competitive intelligence process. A summary of the six factors showing their means, standard deviations and Cronbach's alpha is presented in Table 5.14 below.

Table 5.14: Competitive intelligence building block grouping

<u>CI Building block</u>	<u>Mean</u>	<u>Standard deviation</u>	<u>Cronbach Alpha</u>
1: Planning and focus	3.49	0.80	0.81
2: Collection	3.39	0.73	0.71
3: Analysis	3.43	0.91	0.88
4: Communication	3.38	0.79	0.81
5: Process / structure	3.30	0.80	0.77
6: Organisational awareness / culture	3.28	0.68	0.63

From Table 5.14 it is clear that the order of importance in which the participants placed the competitive intelligence building blocks was: buildings blocks 1, 3, 2, 4, 5 and 6. It was noted that the top four in this order are the core competitive intelligence building blocks and the bottom two are the supporting competitive intelligence building blocks. The largest standard deviation was found in the case of the third competitive intelligence building block (Analysing) – the views of the participants varied the most.

The overall statistics of Section B of the questionnaire were confirmed as acceptable by the Statistical Consultation Services Department of the North-West University, Potchefstroom Campus.

6.2 Factors: Section C

Section C consists of six arbitrary questions designed to test specific views that can assist with the building of a competitive intelligence framework. Question 1 focuses on the ranking of stakeholders. The remaining five questions were calculated as a single factor with results as per the pattern matrix in Table 5.15 below.

Table 5.15: Testing for a competitive intelligence framework

Question nr.	Statement	Factor 6: CI framework	Communalities
C2	CI-activities should be led by a core and dedicated function (person or persons) in a company.	0.762	0.58
C3	Introduction to CI should begin at the time of employment of workers.	0.873	0.763
C4	Progress reporting on CI activities and results should be made available to ALL workers in a company.	0.745	0.555
C5	Any worker should be able to send information to be investigated for CI-purposes.	0.556	0.309
C6	There should be a rewards-system for workers that forward information that does lead to a CI-advantage for a company.	0.782	0.611
Kaiser-Meyer-Olkin measure of sampling adequacy		0.720	
Eigenvalue of component 1		56.36%	
Cronbach's Alpha		0.798	
Factor mean		3.684	
Factor standards deviation		0.749	

The Kaiser-Meyer-Olkin coefficient of the Section C factor was 0.720 and can be viewed as good (Hutcheson & Sofroniou, 1999:152). The factor mean was closer to 4 than to 3 and indicated an overall positive factor mean. The relatively high loading of the components of the Section C factor indicated that these components belong in a group. The statements in this factor are all inclined to be associated with idealised competitive intelligence practices and as such the high factor mean was anticipated.

6.3 Factors: Section D

Section D includes four sets of two questions each to test the four theories. During an initial attempt to do a factor analysis on the eight components of Section D, Question 1 was not accepted as part of the factoring. Questions 2 to 8 were, however, accepted. This correlates with the remarks during the descriptive statistics explanation in section 5.4 (Testing existing theories) in this chapter concerning Question 1 of Section D not “fitting in” with the theme of the remaining questions. Question 1 and Question 5 support Theory 1 and since Question 1 does not fit in with the theme of testing for theories in “my company” (see the explanation in section 5.4 of this chapter), the question was treated as a stand-alone question and its paired question, Question 5, was, therefore, also treated as a stand-alone question. The remaining six questions are paired in three sets of two questions in the questionnaire to test for three theories. The analysis of Section D is shown in Table 5.16 below.

Table 5.16: Testing for theories

Question nr.	Statement	Theory 1: D1, D5	Theory 2: D2, D6	Theory 3: D3, D7	Theory 4: D4, D8
D1	The effective application of human resources will lead to a competitive advantage for my company.	X			
D2	My company knows certain competitive aspects better than our competitors.		X		
D3	My company regularly identifies our most inhibiting constraints.			X	
D4	My company is sensitive to the matters around sustainable development.				X
D5	My company applies human resources effectively such that it leads to a competitive advantage for my company.	X			
D6	My company knows certain competitive aspects sooner than our competitors.		X		
D7	Once my company identifies our most inhibiting factors we address it until it is not inhibiting any longer.			X	
D8	My company incorporates the principle of sustainable development in our operations.				X
Cronbach's Alpha		0.379	0.689	0.758	0.819
Component mean			3.540	3.532	3.637
Component standards deviation			0.748	0.834	0.836

The attempt to define a factor from Question 1 and Question 5 (testing Theory 1) resulted in a Cronbach's alpha of 0.379 and was, therefore, rejected as a factor (Hutcheson & Sofroniou, 1999:152). Questions 1 and 5 are thus treated as stand-alone questions.

6.4 Factors: Section E

Section E consists of seven arbitrary questions designed to test views on competitive intelligence in practice. These questions surfaced during the literature review and when contemporary market realities were discussed. The inclusion of these questions was motivated during the pilot study phase when the industry experts voiced important viewpoints. The pattern matrix for Section E is shown in Table 5.17 below.

Table 5.17: Testing for competitive intelligence in practice

Question nr.	Statement	Factor 1	Factor 2	Communalities
E3	The efficiency of my company can be significantly improved.	0.909		0.825
E1	The human resources (HR) capacity utilization of my company can be significantly improved.	0.807		0.654
E5	The competitiveness of my company can be significantly improved.	0.793		0.627
E2	My company will have a better competitive position in relation to China should my company's level of competitive intelligence (CI) increase.	0.757		0.593
E6	The global trading market has benefits for our company.		0.773	0.631
E7	Our company is cognizant of the competition laws of our clients' countries.		0.748	0.559
E4	South Africa's trading with China has benefits for our company.		0.714	0.509
Factor Cronbach's Alpha		0.835	0.605	
Factor mean		3.791	3.213	
Factor standards deviation		0.731	0.830	
Kaiser-Meyer-Olkin measure of sampling adequacy		0.687		
Eigenvalue of component 1 (%)		38.93		
Eigenvalue of component 1, 2 (%) (cumulative)		62.83		

Each factor in Section E loaded a minimum of 0.714 and communalities ranged from 0.509 to 0.909. The means of both factors calculated at more than 3.

Factor 1 focuses on “my company” and can be considered a more inwardly focused perspective whereas Factor 2 looks at the bigger picture and can be considered a more outwardly focused perspective.

Factor 1 obtained a Cronbach's alpha of 0.835 and can be considered good (Field, 2009:681). Factor 2 obtained a Cronbach's alpha below 0.7 and can be considered acceptable but not good.

The factors discussed in this section are further explored in the next section for possible correlations and effects.

7 COMPARISONS WITH BIOGRAPHICAL DATA

A concise explanation of the elements contained in the questionnaire is provided below:

- i) Section A provided demographic data about the participants.
- ii) Section B provided six competitive intelligence building blocks referred to as BB1 to BB6 and the six building blocks were also defined as factors.
- iii) Section C provided one factor from Question 2 to Question 6. Question 1 of Section C tested the ranking of five listed stakeholders for use in a competitive intelligence framework. These five stakeholders provided five elements. In addition, the remaining five questions of Section C (Question 2 to Question 6) presented five elements.
- iv) Section D tested for four theories. Question 1 and Question 5 were designed to pair up to test Theory 1 but Question 1 did not fit in with the theme of Section D as described in section 7.3 (Factors: Section D) of this chapter. Question 1 and Question 5, therefore, presented two elements. In addition, Theory 2 (Question 2 and Question 6), Theory 3 (Question 3 and Question 7), and Theory 4 (Question 4 and Question 8) presented three elements.
- v) The seven questions from Section E delivered two factors. In addition the seven questions also delivered seven elements

The above explanation of the elements obtained from the questionnaire is depicted in Table 5.18 below.

Table 5.18: Illustration of the elements obtained from the questionnaire

Abbr.	Description of data element (in questionnaire)
BB1	Section B: CI Building block 1
BB2	Section B: CI Building block 2
BB3	Section B: CI Building block 3
BB4	Section B: CI Building block 4
BB5	Section B: CI Building block 5
BB6	Section B: CI Building block 6
C	Section C (Questions 2 - 6)
T1.1	Section D: Theory1, Question 1
T1.5	Section D: Theory1, Question 5
T2	Section D: Theory2
T3	Section D: Theory3
T4	Section D: Theory4
E-F1	Section E, Questions 1,2,3,5 (Factor 1)
E-F4	Section E, Questions 4,6,7 (Factor 2)
C1-CI	Section C, Question 1, Option: Clients
C1-Sup	Section C, Question 1, Option: Suppliers
C1-Own	Section C, Question 1, Option: Own departments
C1-BP	Section C, Question 1, Option: Business partners
C1-Gov	Section C, Question 1, Option: Government
C2	Section C, Question 2
C3	Section C, Question 3
C4	Section C, Question 4
C5	Section C, Question 5
C6	Section C, Question 6
E1	Section E, Question 1
E2	Section E, Question 2
E3	Section E, Question 3
E4	Section E, Question 4
E5	Section E, Question 5
E6	Section E, Question 6
E7	Section E, Question 7

Comparisons between the elements explained above and illustrated in Table 5.18 together with the biographical data obtained from the questionnaire are provided next.

In Table 5.19, the statistical significance (P-value) and effect size (practical significance) of differences between means of responses (males versus females) with regard to the elements are provided. The sample size was rather small (61) and as a result, some of the P-values exceeded 5%.

Table 5.19: The elements compared to gender

Questionnaire elements compared with gender						
Variable	Male		Female		P	Effect sizes
	Mean	Std.Dev.	Mean	Std.Dev.		
BB1	3.57	0.80	3.11	0.74	0.116	0.57
BB4	3.45	0.76	3.05	0.93	0.144	0.43
C	3.58	0.73	4.26	0.60	0.008	0.93
T1.5	3.73	0.78	2.80	1.14	0.002	0.82
T3	3.64	0.76	3.05	1.07	0.042	0.55
T4	3.77	0.76	3.00	0.97	0.006	0.80
E-F1	3.72	0.72	4.25	0.65	0.033	0.75
C3	3.61	0.98	4.00	0.82	0.241	0.40
C4	3.08	1.13	4.30	0.95	0.002	1.08
C5	3.86	0.96	4.40	0.52	0.092	0.56
C6	3.61	0.98	4.50	0.53	0.007	0.91
E1	3.54	1.03	4.10	0.88	0.115	0.54
E2	3.30	1.07	4.10	0.74	0.029	0.75
E3	4.08	0.70	4.50	0.53	0.076	0.60
E5	3.94	0.84	4.30	0.67	0.210	0.43
E6	3.72	1.11	4.20	0.63	0.191	0.43
E7	3.42	1.13	2.90	0.88	0.174	0.46

In the case of variable T1.5 (“My company applies human resources effectively such that it leads to a competitive advantage for my company.”), the responses of the male and female participants differed significantly. The statistical significance (P-value) was 0.002 and the effect size (practical significance) was 0.82. In the case of this variable it is clear that females do not feel as strongly as males that their companies apply human resources affectively to lead to a competitive advantage. Males also more coherently agreed and females less coherently disagreed with the statement. Males are stigmatized to be less sensitive than females to treating employees with care. It is assumed that this explanation featured in the above observation.

In Table 5.20, the statistical significance (P-value) and effect size (practical significance) are shown with regard to the differences in means obtained from the participants concerning the ferrous and non-ferrous industry and elements. The sample size was rather small (61) and, therefore, some of the P-values exceeded 5%.

Table 5.20: Elements compared to ferrous/non-ferrous industries

Questionnaire elements compared with ferrous / non-ferrous						
Variable	Ferrous		non-Ferrous		P	Effect sizes
	Mean	Std.Dev.	Mean	Std.Dev.		
C	3.76	0.66	3.33	0.92	0.056	0.46
C1-Own	2.95	1.36	3.46	1.05	0.220	0.38
C3	3.77	0.87	3.20	1.15	0.050	0.49
E4	2.43	1.17	2.93	1.33	0.173	0.38
E7	3.48	1.13	2.93	1.03	0.109	0.48

In the case of variable C3 ("Introduction to CI should begin at the time of employment of workers"), the responses obtained from the participants of the ferrous and non-ferrous industry differed significantly to the statement made. The statistical significance (P-value) was 0.002 and the effect size (practical significance) was 0.49.

In Table 5.21, the statistical significance (P-value) and effect size (practical significance) are shown of the differences in means of the responses obtained from the participants concerning their years of service. The sample size was rather small (61) and, therefore, some of the P-values exceeded 5%.

Table 5.21: Elements compared to years of service

Questionnaire elements compared with: 10 or more / less than 10 years of service						
Variable	10 or more		less than 10		P	Effect sizes
	Mean	Std.Dev.	Mean	Std.Dev.		
C	3.61	0.77	3.94	0.62	0.143	0.43
E-F4	3.12	0.77	3.56	0.97	0.086	0.46
C3	3.58	0.99	3.93	0.83	0.238	0.35
C5	3.83	0.95	4.29	0.73	0.106	0.47
C6	3.65	1.00	4.07	0.83	0.152	0.43
E4	2.38	1.14	3.08	1.26	0.059	0.56
E6	3.69	0.99	4.15	1.21	0.157	0.38

In the case of variable E4 ("South Africa's trading with China has benefits for our company"), the participants with more than ten years of service did not agree with this statement whilst the participants with less than ten years of service were neutral to the statement. The statistical significance (P-value) was 0.059 and the effect size (practical significance) was 0.56. The standard deviation from the group of participants with less than ten years of service was also more than the group of participants with more than ten years of service, which means that the

latter group was more in agreement with the statement made in the questionnaire than the former group.

The correlation between the CI building blocks and other elements was investigated next.

8 CORRELATION BETWEEN THE ANALYSED QUANTITATIVE RESULTS

The data obtained from the questionnaire yielded descriptive information and factors. In the previous section, comparisons were drawn between the results from the questionnaire and the biographical data provided by the participants. In this section, possible correlations between the mentioned elements are explored. Spearman's correlation coefficient (ρ) was used to determine possible correlations. Spearman's correlation coefficient (ρ) is constrained to lie between 0 (no effect) and 1 (a perfect effect) and can also indicate a negative (but not below -1) (Field, 2009:57). According to Cohen (1992), a ρ of 0 means no effect and a ρ of 1 means a perfect effect. The Spearman correlation coefficient can be viewed as the non-parametric alternative to the Pearson correlation coefficient as it makes no assumptions about the distribution of two variables (Pietersen & Maree, 2014:239).

This section aims to further contribute to the “so what” questions of the study – the overarching results from the quantitative phase of the study should lead to a meaningful qualitative phase and should also support the objectives of the study.

The competitive intelligence building block factors all correlated well with one another. The Spearman's ρ for BB1 with BB2 (0.698), BB3 (0.826), BB4 (0.699), BB5 (0.732) and BB6 (0.685), respectively, was all close to 0.7 or higher. This was no surprise, as the underlying theme of competitive intelligence was prominently woven into the questions when specific questions were selected for the questionnaire. The competitive intelligence building blocks are: BB1 (Planning and focusing), BB2 (Collecting), BB3 (Analysing), BB4 (Communicating), BB5 (Processing/structuring) and BB6 (Establishing a company awareness/culture).

The competitive intelligence building blocks correlated well with some of the theories (Spearman's ρ follows after the theory in brackets):

- i) BB3 with T2 (0.598); T3 (0.617) and T4 (0.549)
- ii) BB4 with T3 (0.618) and T4 (0.590)
- iii) BB5 with T3 (0.631)
- iv) BB6 with T2 (0.524), T3 (0.598) and T4 (0.530)

The theories in the above correlations are: T2 (The knowledge-based theory of companies), T3 (The theory of constraints) and T4 (The theory of sustainable development). In the above example the competitive intelligence building block 5 (Processing/structuring) correlates well with T3 (The theory of constraints) with a Spearman's rho coefficient of 0.631. This also makes intuitively sense as the Theory of constraints can only effectively exist in a structured business environment.

The theories also correlated with themselves in some cases (Spearman's rho follows after the theory in brackets):

- i) T1.5 with T3 (0.531) and T4 (0.500)
- ii) T2 with T3 (0.612) and T4 (0.604)
- iii) T3 with T4 (0.795)

T1.5 is the second statement in which the first theory is tested regarding whether the competitiveness of the participant's company can be significantly improved. It was again noted that Question T1.1 did not correlate with any of the other questions as it did not conform to the structure of testing the views of the participants concerning the competitiveness of their company.

Section C tested for aspects regarding a competitive intelligence framework and some of the statements correlated with others (Spearman's rho follows after the aspects in brackets):

- i) C2 with C3 (0.656)
- ii) C3 with C4 (0.513)
- iii) C4 with C6 (0.581)

Section E tested for aspects regarding competitive intelligence in practice and some of the statements also correlated with others (Spearman's rho follows after the aspects in brackets):

- i) E1 with E3 (0.627) and E5 (0.594)
- ii) E2 with E3 (0.669)
- iii) E3 with E5 (0.661)

In all of the cases investigating the internal correlations between the elements in Table 5.18 above, the correlations made sense intuitively or practically.

9 REVIEW OF THE QUANTITATIVE RESEARCH PHASE

This review is structured by 1) summarising the results of this phase, and 2) comparing the results of this phase with the aims of the questionnaire. This review set the basis for the design of the qualitative phase of this research.

9.1 Results of the quantitative phase

The following objectives were reached in the quantitative phase of the study:

- i) A new questionnaire was designed from a grass roots level to obtain specific demographic information from the participants. The questionnaire was also used to test for competitive intelligence practices, to obtain information for the development of a competitive intelligence framework, to test four relevant existing theories, and lastly, to test for aspects regarding competitive intelligence in practice.
- ii) Multiple testing and pilot testing of the questionnaire took place to ensure validity and reliability.
- iii) The capture of the answers to the questionnaire was done on Google Forms and the questionnaire was presented to the participants via a text-embedded hyperlink.
- iv) Participants were invited to complete the questionnaire by inviting metals manufacturers employed by two industry companies (SEIFSA and SAISI) to participate in the study.
- v) A fair response on the questionnaire with acceptable Kaiser-Meyer-Olkin values was obtained.
- vi) Descriptive statistics with frequency distributions, arithmetic means and standard deviations were used.
- vii) A factor analysis was done and the data were interpreted.
- viii) An Analysis of the means of the data was done.
- ix) Correlation analyses were done.

The results of this phase ensured that the aims of the questionnaire and the research questions could be tested.

9.2 Evaluation: questionnaire results versus the aims

The information obtained from analysing the responses of the participants provided in the questionnaire is used in the following section to test the objectives with each of the five sections of the questionnaire.

9.2.1 Understanding the demographic realities of the participants

The demographic information was presented in section 5.1 of this chapter. The demographic information obtained from the participants can be summarised as follows:

- i) The participants were mostly senior males with a degree or diploma employed in a management position where they have been working for quite some time.
- ii) The companies are mostly from the ferrous industry with less than 200 employees with their head office in Gauteng.

9.2.2 Determining current competitive intelligence practices

The building blocks of the competitive intelligence process were tested in metals manufacturing fraternities and the results are summarised in Table 5.14 (Responses grouped per competitive intelligence building block). It is evident that:

- i) All six of the building blocks were positively received by the participants with an arithmetic mean above 3.0.
- ii) The participants place the competitive intelligence building blocks in the following order of importance (see Table 5.14): Building block 1 (Planning and focusing), building block 3 (Analysing), building block 2 (Collecting), building block 4 (Communicating), building block 5 (Processing/structuring) and building block 6 (Establishing a company awareness/culture).

9.2.3 Developing a competitive intelligence framework

In this section of the questionnaire, a ranked response was obtained in the first question in terms of stakeholder importance in a competitive intelligence framework. The participants place the list of stakeholders in the following order of importance: 1) Clients, 2) Business partners, 3) Own internal department, 4) Suppliers, and 5) the government. From questions 2 to 6 statements were made with regard to how an idealistic competitive intelligence framework should look like and the responses were positive with an arithmetic mean above 3.0.

9.2.4 Testing existing theories

This section tested for confirmation of the four theories, as described in section 5.4 (Testing existing theories) and section 6.3 (Factors: Section D). The four theories (described in section 3.4) and shown in Table 5.16 are:

- i) Theory 1: The resource-based theory of companies.
- ii) Theory 2: The knowledge-based theory of companies.
- iii) Theory 3: The theory of constraints.
- iv) Theory 4: The theory of sustainable development.
- v) The arithmetic mean with regard to all four of the theories was above 3.5, which confirms the theories for the metals manufacturers in South Africa.

9.2.5 Testing for competitive intelligence in practice

In section 3.5 (Section E – competitiveness in practice) and section 5.5 (Competitiveness in practice), competitive intelligence in practice were discussed and subsequently analysed in section 6.4 (Factors: Section E). The arithmetic means of six of the seven questions were 3.3 or higher and in the case of one of the statements (“South Africa’s trading with China has benefits for our company”) the arithmetic mean was below 3.0. The factor analysis of this section delivered 2 factors: one factor with an internally focused perspective (a factor mean of 3.791) and one with a wider perspective (a factor mean of 3.213). The quantitative phase of this study, therefore, supports the research questions and objectives.

10 DESIGN OF THE INTERVIEW GUIDE AND COLLECTION OF DATA

This research study was of an explanatory sequential mixed methods design where the empirical research consisted of a quantitative phase followed by a qualitative phase that allowed for triangulation. In a methodological triangulation, both quantitative and qualitative methods of data collection are used (Easterby-Smith *et al.*, 1991:83). The aim of the interview process was to collect data that enabled the process of methodological triangulation and subsequently, the formulation of conclusions. Seven semi-structured interviews were, therefore, conducted. The seven interviews were scheduled as a first batch of interviews and were all conducted although data saturation was obtained after the first five interviews. The interviewees each have at least 30 years of experience in the South African metals manufacturing industry. Some of the interviewees are employed as top management in metals manufacturing companies, others are employed in industry consulting and in one case, a former chief

information officer of one of the largest metals manufacturers in South Africa accepted a senior operations role on an international level. Most interviewees have exposure to smaller metals manufacturers as well. The interviewees are, therefore, specialists and shared their views on eight questions.

Notes were made of all the interviews and if the background noise was not too severe, the interviews were also recorded. The semi-structured interviews were conducted by prompting a response and then allowing each of the interviewees free reign to respond – to provide examples to motivate their responses. The results of the interviews were not formally analysed by making use of Atlas.ti but were grouped into themes and sorted to add more meaning in order to reach crystallisation. The responses of the interviewees were interpreted by the researcher in context. The researcher has also worked in the South African metals manufacturing industry for more than three decades. The interviewees are senior employees working in the South African metals manufacturing fraternities and their credibility and trustworthiness were never doubted. In order to obtain acceptable levels of trustworthiness and credibility, the interviewees were asked if they would repeat their interview if necessary and all of them agreed. The data collected and analysed from the quantitative phase of the empirical research were comprehensive and the interviews were designed to confirm aspects and also to fill gaps identified during the quantitative phase. More than ten interviews were originally planned but saturation was obtained after five interviews. The researcher nevertheless continued with the seven scheduled interviews to confirm saturation. The interview guide is presented in Appendix B. The questions are provided together with the summarised responses of the interviewees.

10.1 Question 1 and responses

Question: The competitive intelligence building blocks are: 1) Planning and focusing, 2) Collecting, 3) Analysing, 4) Communicating, 5) Processing/structuring, and 6) Establishing a company awareness/culture. During the questionnaire phase of the research, competitive intelligence building block 1 was rated as the most important building block by the participants of the metals manufacturing industry in South Africa. Do you agree with this rating?

Summary of responses:

The interviewees mostly agreed with the rating. Some remarked that competitive intelligence building block 5 and 6 should be rated higher. One of the interviewees referred to the framework of “Planning-Organising-Leading-Controlling” where “planning” is placed as the first building block.

10.2 Question 2 and responses

Question: Competitive intelligence building blocks 5 and 6 were deemed least important by the participants. Do you agree with this statement?

Summary of responses:

The interviewees mostly agreed with the statement made although some comments were made that building blocks 5 and 6 are most important whilst other comments were made about building blocks 5 and 6 being not core building blocks. One interviewee said “competitive intelligence is not yet established in South Africa which explains the low ranking of building blocks 5 and 6”.

10.3 Question 3 and responses

Question: What would you suggest should be done for competitive intelligence building blocks 5 and 6 to receive more attention?

Summary of responses:

Some responses were that formal participation structures should be established and promoted and that such structures should include awareness drives, good communication, increased ethical competition and less dependency on human championship.

10.4 Question 4 and responses

Question: In what order would you have rated the importance of the building blocks?

Summary of responses:

Most interviewees agreed with the rated order of the building blocks although one response was that building block 6 should be the highest.

10.5 Question 5 and responses

Question: Question C1 of the questionnaire requested the participants to rate the most important stakeholder who need to be taken into consideration for a competitive intelligence framework from a list of stakeholders: 1) clients, 2) suppliers, 3) own internal department, 4) business partners, and 5) the government. The participants rated “clients” as the most important stakeholder. Do you agree with this rating?

Summary of responses:

The interviewees agreed with this rating.

10.6 Question 6 and responses

Question: What other stakeholders would you add to the list used in the questionnaire?

Summary of responses:

The interviewees mostly agreed that the list is complete. Additional stakeholders listed included unions, competitors, anti-trust trade frameworks, and international influences.

Some of the interviewees felt that the bigger, global market and its dynamics, energy suppliers, and logistics networks to distribute products, are also important.

10.7 Question 7 and responses

Question: One of the questions was “South Africa’s trading with China has benefits for our company”. The participants disagreed with this statement. Do you believe that South Africa’s trading with China has benefits for the metals manufacturers in South Africa?

Summary of responses:

- The interviewees mostly disagreed that South Africa’s trading with China has benefits for the metals manufacturers in South Africa.
- The interviewees felt that South Africa’s trading with China has no benefits for the metals manufacturers of South Africa.
- Some of the interviewees were unsure. The playing field is not level with China’s inputs costs, government subsidies and tax benefits – making trade unfair. The advantage is that China’s trading with South Africa will force South Africa to become competitive and the South African industry is adapting to China fast but it will cost many local jobs.
- Some of the interviewees felt that the trading between China and South Africa does not highlight a win-win business principle.
- Some of the interviewees disagreed – China is flooding South Africa with products and this flooding has severe repercussions for the South African industry and results in downscaling in local industries. Businesses are forced to import metals, which leads to negative lead time and poor quality. South Africa is in effect worse off. The South Africa/China relationship is hurting our economy.

- Some of the interviewees are of the opinion that trading between China and South Africa is good for the general commercial market but not for the metals industry.
- Some of the interviewees mentioned that the China/South Africa relationship is politically motivated without proper thinking about the impact on local industries.

10.8 Question 8 and responses

Question: In another question, the participants agreed with “The global trading market has benefits for our company”. What would your explanation be for why the participants agreed with this statement but disagreed that South Africa’s trading with China has benefits?

Summary of responses:

- Some of the interviewees answered that global trading is inevitable and should be embraced, but trading with China is making the playing field uneven.
- Some of the interviewees were of the opinion that South Africa has to import and export but the unbalanced imports from China will kill the metals industry.
- The following thoughts were shared by the interviewees on trade between China and South Africa:
 - Global trading is good. To buy and sell in international communities is good. China’s behaviour in South Africa is much like the “dumping” of products.
 - Global trading is good but China embarrasses local companies with their poor quality in the “speciality steel” market and their poor on-time delivery.
 - Not everything about China is negative but the main issue is that the playing field is uneven. Government and companies should have done much better strategic planning five years ago.
 - South Africa is balancing import/export relationships with other countries on a global scale. If South Africa exports to China and imports from China in a balanced manner, then it would have been a different trade scenario.
 - The playing field is not level in terms of price undercutting, the Chinese government’s subsidising and unequal competition.
 - Chinese products are sold below market value in other countries and it’s impacting our local industries.
 - The poor quality of lead times from Chinese imports results in risks for South African manufacturers and that risk is then factored into pricing. So consumers end up paying more because of the risks associated with Chinese under-delivery.

11 TRIANGULATION OF QUANTITATIVE AND QUALITATIVE DATA

The interviewees were asked for their opinion concerning competitive intelligence building block 1 rated as the most important and were told that the participants mostly agreed with this option during the quantitative phase. The interviewees mostly agreed with this ranking. In cases where some of the other building blocks were deemed more important by some of the interviewees, it coincided with frustration about the lack of competitiveness with regard to South African metals manufacturers. The responses provided during the interviews varied and portrayed some frustrations voiced by the interviewees who wished that competitive intelligence could become more prominent and established in South Africa. The frustration felt by the interviewees about the lack of competitiveness correlated well with the responses received from the questionnaire where the participants agreed that there is room for improvement in efficiency and human resources capacity in their companies. The findings from the two data measurement exercises correlated well.

The majority of the interviewees agreed with the position of competitive intelligence building blocks 5 and 6 in the competitive intelligence framework although some of the interviewees wished for building block 2 to feature more prominent in the framework. The findings obtained from the interviews correlated well with the outcomes of the questionnaire.

The suggestions of the interviewees concerning building blocks 5 and 6 in receiving more attention sparked a variety of ideas. Building block 2 was mentioned and should actively be driven – ownership was debated. This question was not tested in the questionnaire.

The suggestions of the interviewees regarding the order of importance of the competitive intelligence building blocks varied. Some of the interviewees agreed and others disagreed. Some of the interviewees offered different opinions as to how the order of importance should be changed. The findings of the two data measurement exercises largely correlated well.

In the questionnaire, a question was asked to rank the importance of listed stakeholders in a competitive intelligence framework. The majority of the participants agreed that “clients” was the most important option in a modern South African context.

However, the interviewees suggested that other stakeholders should also be added to the option list, such as labour unions, global market trade framework bodies, local anti-competition law industry bodies, energy suppliers, competitors, and logistic network operators.

Moreover, the interviewees were asked to provide their opinion about “South Africa’s trading with China has benefits for our company” and were told that the questionnaire participants did

not agree with the statement. The interviewees also did not agree with the statement. The findings of the two data measurement phases correlated well.

Concerning the last question, the interviewees agreed that global trading is good but disagreed with China's "right-of-way" into South African markets. Strong terms were used to describe the frustration experienced by metals manufacturers, such as 1) "unfair playing fields", 2) "unbalanced trading conditions", 3) "not win-win business", 4) "China is allowed to 'dumping' in South Africa", and 5) "China's poor quality and poor lead times hurt the local economy".

Triangulation included the comparison of three sources of information:

- i) The literature reviews on competitive intelligence and related fields, and the South African metals manufacturers.
- ii) The responses and the analysis of the questionnaires (the quantitative empirical phase).
- iii) The responses from the interviewees (the qualitative empirical phase).

The responses from the seven interviewees from metals manufacturer fraternities in South Africa align well with the responses obtained from the questionnaire and the information gained from the literature reviews. This alludes to this study's credibility and trustworthiness in a positive way. The results from the empirical study contribute to the findings and conclusions provided in the final chapter.

12 SUMMARY

Chapter 5 was devoted to the statistics and findings of the empirical research study. In this chapter, the questionnaire was used to test multiple aspects of competitive intelligence, such as its practise by metals manufacturers in South Africa, a competitive intelligence framework, relevant theories, and some aspects related to competitive intelligence in practice. A systematic approach was used during the design of the questionnaire to substantiate the overall approach of the quantitative phase of this research study. Although only 63 questionnaire responses were received the overall analysis of the completed questionnaires showed good sample adequacy, reliability and internal consistency which did not warrant further data collection. The data was analysed by means of frequencies, descriptive statistics, factor analysis, analysis of means and correlation analysis. The competitive intelligence building blocks were ranked, stakeholders for a competitive intelligence framework were ranked, and the four theories that were tested were not rejected. The questionnaire, data collection, interpretation, and analysis of the collected data were followed by the qualitative phase of this research where the results of the interviews were compared with the results of the quantitative phase (questionnaire) and the literature reviews to

gain additional insight into the realities of the world of metals manufacturers in South Africa. The conclusions gained from this chapter are provided in Chapter 6.

CHAPTER 6

RESEARCH CONCLUSIONS

1 INTRODUCTION

Chapter 5 reported on the empirical research and focused on a summary of the important outcomes of the quantitative and qualitative phases. The study was approached in an explanatory sequential mixed methods design. The empirical research consisted of a quantitative phase followed by a qualitative phase. A questionnaire was developed for the quantitative phase and was used to collect primary data from metals manufacturers in South Africa to test competitive intelligence practices, a competitive intelligence framework and existing theories. Frequencies, descriptive statistics, factor analysis, analysis of means and correlation analysis of the collected data enabled the testing of the results of the quantitative phase against the objectives of the questionnaire. This in turn, enabled the development of an appropriate interview guide, which was used during the data collection in the qualitative phase. The results from the qualitative empirical phase enabled the formulation of findings and conclusions. In this chapter, a competitive intelligence framework for improving the sustainability of South African metals manufacturers is presented. This chapter also review the findings of this research and conclude with recommendations.

2 REVIEW OF THE REALITIES OF METALS MANUFACTURERS IN SOUTH AFRICA

South Africa has more than 50 commodities available with the world's largest reserves of manganese, chrome, vanadium and platinum while also boasting major reserves of titanium, iron ore and coal. In addition, South Africa has abundant labour resource available, a good infrastructure and world-class manufacturing expertise. The metals manufacturers of South Africa have a good upstream commodity supply and a good logistics chain for the acquisition of unprocessed products for further processing. Despite these seemingly favourable conditions, the metals manufacturers in South Africa are barely surviving or are experiencing severe losses. The main reason for this is that metals manufacturers are not competitive, according to the "new" and increasingly stricter global competitiveness yardstick used. Some of the reasons can include the following:

- i) Globally, trading is fast becoming a reality for South Africa and global trading communities are even a step ahead of South Africa in terms of factors, such as productivity, human resource utilisation and protection from governments.

- ii) In South Africa, there are regulatory requirements that imply cost factors, which are not necessarily the same for all of the global competitors.
- iii) The effect of other governments subsidising metals manufacturers are creating barriers for the entry of South African producers.
- iv) The commitment of South African metals manufacturers to deliver products of quality does not always count in their favour.
- v) The insecurity of labour and costs of labour is hampering production stability.
- vi) A poor regulatory approach followed by the South African government regarding imports from other countries is opening the door for short cuts – to the detriment of the industry.
- vii) The South Africa Competition Commission is doing a good job of identifying and punishing anti-competitive behaviour but there is not an industry body that champions fair competitive behaviour and a barrier is, therefore, created that prevents international joint venture bids.
- viii) Contemporary reports of organised corruption are creating huge unbalances regarding profits for a few but the competitiveness of remaining producers is severely impacted.
- ix) From the empirical study, it seems that the South Africa/China relationship was forged due to political reasons and the South African metals manufacturers are not protected.
- x) The South African government is slow to adapt to stimuli threatening the well-being of local metals manufacturers.
- xi) If the South African government does not re-align their priorities, the sustainability of the metals manufacturers will be negatively influenced.

The above-mentioned factors were obtained from the two literature reviews, the empirical study and from comments provided by knowledgeable experts in the metals manufacturing industry during the semi-structured interviews. The mentioned realities of metals manufacturers in South Africa highlight the need for a competitive intelligence framework to address the sustainability of these manufacturers.

3 RESEARCH SYNOPSIS

The review of the realities of metals manufacturers in South Africa in the previous section shows a multi-faceted situation threatening South African's dreams of prosperity. This research aimed

to positively contribute to the dire situation by directing the research methodology and design, literature review and empirical study at addressing the research problem statement, research questions and research objectives that were stated in chapter 1. The empirical study in addition delivered findings about competitive intelligence in practice that was highlighted in the previous section. An overall review of the results of this research including a competitive intelligence framework that can be used by metals manufacturers in South Africa is presented.

3.1 Research outcome versus objectives

The two main objectives of this research (as indicated in Chapter 1 on page 8) were to i) determine the current practices and ii) develop a competitive intelligence framework that can aid towards the improved sustainability of the metals manufacturers in South Africa.

The research methodology and design incorporated the use of a questionnaire to determine current competitive intelligence practices by metals manufacturers in South Africa. The questionnaire was used in the empirical phase of this research to collect primary data from metals manufacturers. The analysis of the primary data showed that the competitive intelligence practice of metals manufacturers is above average. A 5-point Likert-scale was used in the questionnaire to test for competitive intelligence practices with the outcomes for 6 building blocks of competitive intelligence as follows:

- i) Planning and focus (mean 3.49)
- ii) Collection (mean 3.39)
- iii) Analysis (mean 3.43)
- iv) Communication (mean 3.38)
- v) Process / structure (mean 3.30)
- vi) Organisation awareness / culture (3.28)

The empirical research furthermore shows that competitive building block 1 is considered most important and building blocks 5 and 6 considered least important by metals manufacturers.

This research enabled the development of a competitive intelligence framework that can aid towards the improved sustainability of metals manufacturers in South Africa. This scalable framework will be presented in a later section in this chapter.

3.2 Research outcome versus questions

The research questions (as indicated in Chapter 1 on page 9) are answered below:

- i) How do strategic intelligence, a value chain analysis and competitive strategies contribute to the competitive intelligence of metals manufacturers in South Africa?

According to Xu (2007:49) strategic intelligence means that the right information is placed in the hands of the right individuals at the right time so that these individuals are able to make informed business decisions about the strategic direction of a company based on information that is influencing a particular industry. The goal of competitive intelligence building block 4 (Communication) is to ensure that information that can lead to a strategic intelligence and a competitive intelligence is communicated to the decision-makers in a company. Competitive intelligence building block 5 (Structure) can contribute to mechanisms whereby strategic intelligence can be communicated to decision-makers.

According to Bose (2008:512) a value chain analysis is one of the tools that contributes to competitive intelligence. Value chain analysis enables the critical analysis of the components of a value chain which can lead to the elimination of inefficiencies and increased productivity.

According to Schuller and Lidbom (2009:935) companies should have competitive strategies in order to deliver a superior and sustainable performance, and should also continually adapt and innovate their strategies to remain competitive and sustainable. The metals manufacturers in South Africa regard building block 1 (Planning) as the most important building block in a competitive intelligence process. The planning of competitive strategies is required to contribute to a company's competitive intelligence and can, therefore, be viewed as the most important phase in the competitive intelligence process.

- ii) How does competitive intelligence contribute to business performance and sustainable profitable growth for metals manufacturers?

Competitive intelligence aims at increasing the competitiveness of companies and enhances business performance, sustainability, sustainable profitability and growth. Competitive intelligence is used to a fair degree by the metals manufacturers in South Africa as indicated in section 3.1 in this chapter. An increased level of competitive intelligence should therefore be positive for a company's business performance and

profitable growth. The aim with the competitive intelligence framework presented in this chapter is to increase competitive intelligence by metals manufacturers.

- iii) What is the degree to which competitive intelligence is used by metals manufacturers?

This research question is answered in section 3.1 in this chapter. Section C of the questionnaire made statements to be associated with idealised competitive intelligence practices. In Table 5.21 (Elements compared to years of service) in section 7 in chapter 5, it showed that respondents with less than 10 years of service in the industry were more optimistic about idealised competitive intelligence practices than respondents with more than 10 years of service. This shows that younger leaders are more bullish towards idealised competitive intelligence practices than older leaders.

- iv) What value does competitive intelligence add to strategic planning and decision-making for metals manufacturers?

The aim of competitive intelligence is to focus on the external environment of a company and increase its competitiveness by directly being part of the strategic planning in a company and positively contributing to strategic decision-making.

- v) How does competitive intelligence form a pivotal component of strategic management?

The competitive intelligence process is aimed at delivering value to a company's strategic planning process. A company should include its external competitive factors as part of its strategic planning process. Competitive intelligence focuses on the external competitive environment of a company and as such forms a pivotal component of strategic management.

- vi) How will a framework look that accommodates all mentioned variables (competitive intelligence, strategic intelligence, strategic planning and sustainable profitable growth)?

Competitive intelligence contributes to business performance and sustainable profitable growth for metals manufacturers and forms a pivotal component of strategic management. The aim of competitive intelligence is to be part of a company's strategic planning and by contributing to its strategic intelligence. A framework that can aid towards improved competitiveness intelligence, and that can contribute to the sustainability of metals manufacturers in South Africa will be presented in a later section in this chapter.

3.3 Research outcome versus research problem

The research problem is summarised (as indicated in Chapter 1 on page 8) as:

With regard to competitive intelligence i) the current practices of South African metals manufacturers are currently unknown, and ii) it is unknown to what extent and how these manufacturers can improve their competitive intelligence to lead to improved business sustainability.

This research investigated and confirmed the current competitive intelligence practices of South African metals manufacturers.

This research developed a competitive intelligence framework than can be used by metals manufacturers to increase their competitive intelligence. The extent to what improvement can be gained by metals manufacturers by using this framework is subjective and to be confirmed.

4 RESEARCH CONCLUSIONS

Some conclusions were arrived at:

Conclusion 1

The first of the two main objectives of this research was to determine current competitive intelligence practices of South African metals manufacturers. This research investigated and confirmed the current competitive intelligence practices of South African metals manufacturers. Therefore, the conclusion is that this research has achieved the first of the two main objectives of this research.

Conclusion 2

The second of the two main objectives of this research was to develop a competitive intelligence framework that can aid towards the improved sustainability of the metals manufacturers in South Africa. This research, through its literature review and empirical research phases, developed a competitive intelligence framework that can aid towards the improved sustainability of the metals manufacturers in South Africa. Therefore, the conclusion is that this research has achieved the second of the two main objectives of this research.

Conclusion 3

The researched aimed to test theories during the quantitative empirical phase. Four theories were tested and were not rejected by the metals manufacturers of South Africa. Therefore, the conclusion is that this research has achieved the aim to test theories during its empirical phase.

5 COMPONENTS OF A COMPETITIVE INTELLIGENCE FRAMEWORK

As indicated earlier, the key contribution of this study is the development of a competitive intelligence framework. In this section, the components of a competitive intelligence framework to improve the sustainability of the South African metals manufacturers are explored. These components are incorporated in the framework in a later section.

Throughout the study it was indicated that competitive intelligence focuses on the external environment of companies. A sound competitive intelligence framework for South African metals manufacturers assumes that both the internal factors, such as efficiency, risks and sustainability, as well as external factors are accounted for. Some internal factors are mentioned below to provide context.

- i) Production efficiencies
- ii) Human resources efficiencies
- iii) Proper production maintenance
- iv) Human skills
- v) Leadership and leadership skills
- vi) Legal compliance
- vii) Regulatory compliance
- viii) ISO 9001, ISO 14000, OHSAS (ISO 18000) compliance
- ix) Internal stability control
- x) Internal energy consumption and control
- xi) Internal waste control
- xii) Internal relations control

- xiii) An internal value chain analysis
- xiv) Adoption of best practices in all spheres of business

The elements of a competitive intelligence framework will be discussed below.

5.1 The external elements of companies

Competitive intelligence focuses on the view of companies of the world and includes factors, such as:

- i) Government
- ii) Government's support of local metals manufacturers
- iii) Government's shielding of negative influences from abroad
- iv) Suppliers
- v) Business partners
- vi) Clients
- vii) Competitors
- viii) Local and global economic factors
- ix) Local and global political factors
- x) Local and global meteorological factors
- xi) Labour unions
- xii) Global market trade framework bodies
- xiii) Local and global anti-competition bodies
- xiv) Energy suppliers
- xv) Logistics network operators
- xvi) The public demand for metals and non-metals products
- xvii) Watchdog councils

- xviii) Monitoring groups
- xix) Global monitoring groups for CO2 admissions, carbon and water footprints
- xx) Institutions, such as Gartner and Boston Consulting Group
- xxi) Futurists, such as Ray Kurzweil and Stephen Hawking, and their predictions with regard to metals manufacturing and related fields.
- xxii) Councils monitoring aspects of business sentiments and acceptable practices
- xxiii) National and international results of value chain analyses

The external elements mentioned above should be included in a competitive intelligence framework. A good point of departure for companies using competitive intelligence is a current status assessment to determine if the use of competitive intelligence creates advantages.

5.2 A re-assessment of competitive intelligence

Companies should follow a well-planned process if competitive intelligence is not yet implemented. This process should include the assessment of the realities of companies, such as the number of employees, company health, business threats and prospects of sustainability. A competitive intelligence function should be tailor-made to suit the practical realities of a company. It would, therefore, not make sense for a company with less than 200 employees to establish a large competitive intelligence office. In some cases, a competitive intelligence function can partially be outsourced when companies join industry bodies that can provide advice and manage collective leadership on behalf of the company. Otherwise the leaders in a smaller company can take up the competitive intelligence role.

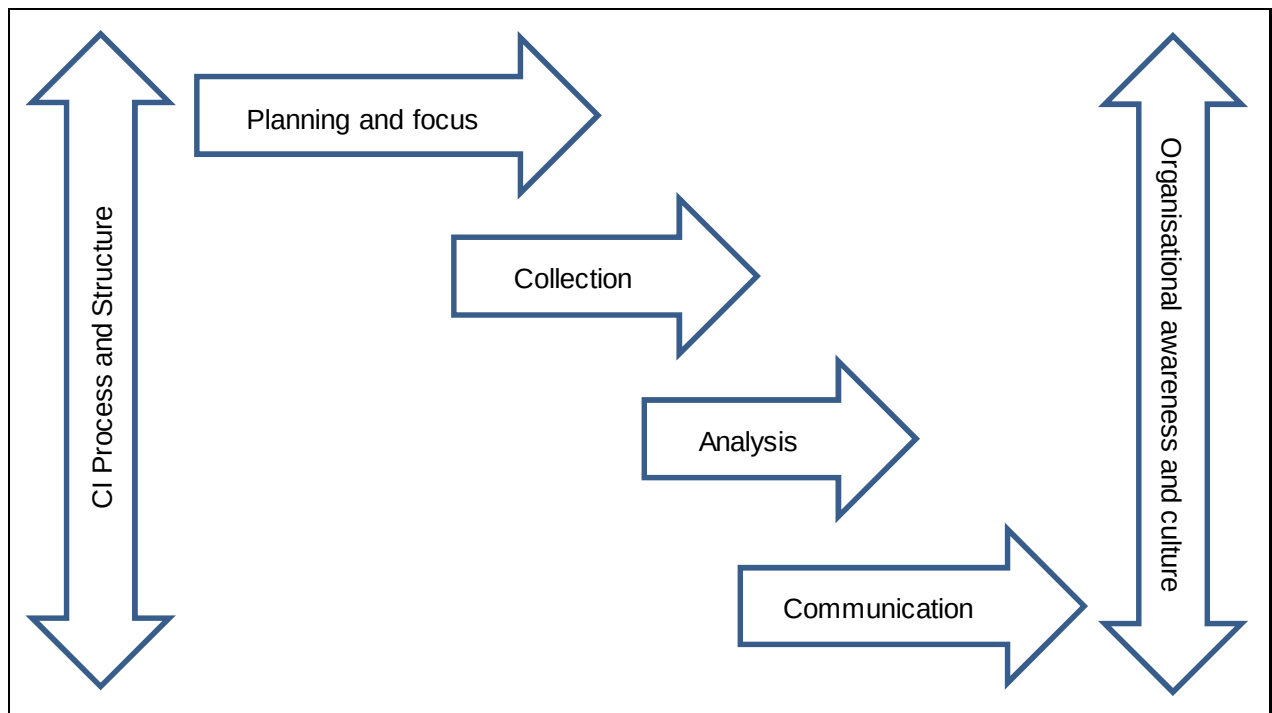
In the case where competitive intelligence is already an established function in a company, a current status assessment of how well the function is performing in the company is advised. An internal questionnaire can be used to test current competitive intelligence practices or the efficiency of a competitive intelligence office can be assessed by making use of an international competitive intelligence yardstick.

Whether competitive intelligence is implemented for the first time or assessed, regular assessments of a value-adding factor, efficiency and performance improvements are recommended.

5.3 Ongoing competitive intelligence practices

Once competitive intelligence is established in a company, then the function should deliver value to the company's strategic planning process on an ongoing basis. Competitive intelligence is a process and should, therefore, be managed to deliver its intended value. The competitive intelligence process is repeated in Figure 6.1:

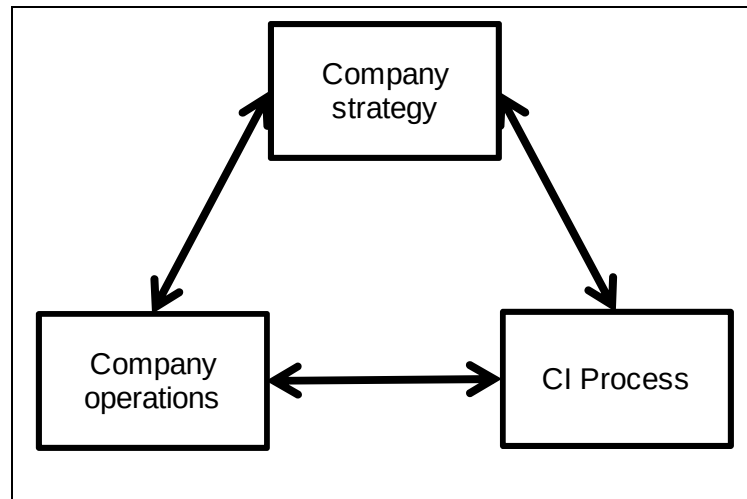
Figure 6.1: The competitive intelligence process



Source: Adapted from Dishman and Calof (2008).

The four core building blocks of competitive intelligence are: 1) planning and focusing, 2) collecting, 3) analysing, and 4) communicating. In Figure 6.1, the four core building blocks of a competitive intelligence process partially overlap to illustrate that although these four core building blocks follow a particular order, a subsequent building block can be visited before a specific building block is fully completed. The two supporting building blocks of competitive intelligence are: 1) processing and structuring, and 2) establishing a company awareness/culture. In Figure 6.1, the two supporting building blocks of a competitive intelligence process are present throughout the process and for all four of the core building blocks. A competitive intelligence process should feature in companies on a continual basis and should be highlighted during business strategic planning cycles, as shown in Figure 6.2:

Figure 6.2: The competitive intelligence process in a company



Source: The researcher.

Figure 6.2 illustrates that the competitive intelligence process should be part of a company's operations and embedded within the core functions of a company. The first support building block (processing and structuring) should establish the necessary mechanisms to allow for competitive intelligence to receive attention in a company on an ongoing basis. The second support building block (establishing a company awareness/culture) should establish the necessary mechanisms to ensure that the established competitive intelligence processes are utilised on a continual basis. A competitive intelligence process is specifically utilised during a company's strategic planning cycle. The researcher mentions in section 2.1.3 (Competitive intelligence definition and process: Observations) in Chapter 3 that it is not guaranteed that the valuable outputs of a competitive intelligence function necessarily influence decisions to benefit a company.

5.4 Ensuring that the outputs of competitive intelligence are valued

The fourth building block in the competitive intelligence process is "communicating". The aim of this building block is proper communication from the competitive intelligence process to the decision-makers in a company. The researcher believes that the good intention of the fourth building block (communicating) should be emphasised by double checking mechanisms to ensure that valuable competitive intelligence information not only reaches the intended decision-makers but is also fully understood. Decision-makers can, for example, fully understand valuable competitive intelligence information but then still not provide answers to the critical "so what" question. Valuable competitive intelligence information should be used to develop "so what" scenario planning options and these options should be integrated with a

company's strategic planning. A company's external environment is, however, continually changing and this should be taken into account as well.

5.5 Re-assessing the external environment

The external environment of a company should be re-assessed on a regular basis. Not only should the elements listed in section 5.1 of this chapter (The external elements of companies) be re-evaluated but the list of elements should also be re-evaluated to make sure it's complete. One of the interviewees, who participated during the qualitative phase of this study, mentioned that the leadership of companies in the metals manufacturing industry often complains of their hardships and the unequal playing field with regard to China. He mentioned that he would always ask the company the following question: "But why did you not see this coming five years ago?" and the typical response would be a shrug of shoulders. In this example, China should have been added to the list of external elements to be regularly evaluated before one of these elements actually manifest. The list of external elements should be regularly re-evaluated and should not always be evaluated by only the company itself. Industry organisations, such as SAISI and SEIFSA can advise companies of elements to be added to the list. Other forms of bodies, as those mentioned in section 5.1 (The external elements of companies) in this chapter can also be consulted.

5.6 Reporting to top level

Regular reporting to top management on the health of the competitive intelligence function should occur. Reporting can include items, such as:

- i) The internal effectiveness of the competitive intelligence function.
- ii) Competitive intelligence outputs made available to the company.
- iii) The feedback received from the reporting that was made available to the company.
- iv) Information about company strategic planning sessions.
- v) The health of competitive intelligence in the company.
- vi) Comparison between previous and current measurements of competitive intelligence in the company.
- vii) Cost-to-company of the competitive intelligence function.

5.7 Full ownership from top level management

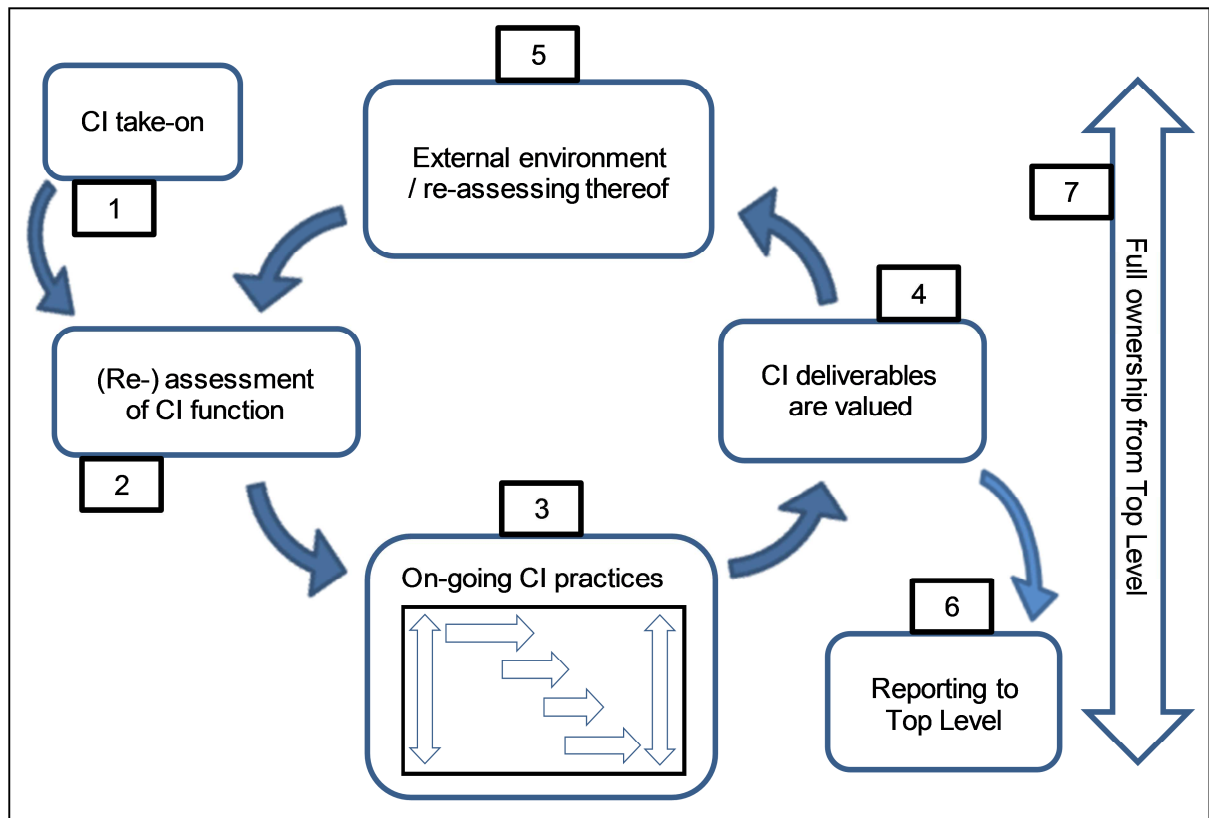
The competitive intelligence function in a company should also not be viewed as part of a company's normal day to day functions, such as finances and human resource management. The top management of companies should show a keen interest in a competitive intelligence function and its contribution to companies. Some of the companies mentioned in section 5.5 (Re-assessing the external environment) in this chapter, did have a competitive intelligence function but still did not see the China problem coming. It is unknown whether a competitive intelligence function in some of those companies actually did see the China problem but top management did not view this problem as a serious matter or whether the competitive intelligence function did not pick up on the China problem. Different outcomes would have been achieved if top management 1) clearly viewed the China problem as a serious matter or 2) had the ability to do something about the problem.

The above-mentioned components were fitted below in a competitive intelligence framework.

6 A COMPETITIVE INTELLIGENCE FRAMEWORK

The framework shown in Figure 6.3 below incorporates the components as presented in section 5 (Components of a competitive intelligence framework) of this chapter.

Figure 6.3: A competitive intelligence framework



Source: The researcher

In Figure 6.3, the components of a competitive intelligence framework are illustrated. Each component is tagged with the number of the building block of the framework. Competitive intelligence can be viewed as a process but this process can also be interpreted as a building block in the form of a framework to improve the sustainability of the South African metals manufacturers. The framework is a process that self-corrects by measuring the effectiveness and strategic value to a company and optimally adjusting its value-adding – if the framework is implemented by companies in a pragmatic manner. On a basic entry level, this framework can be implemented and managed by a single individual – the owner of a small company. In such a case, the single individual should devote time and effort by putting on the hat of a competitive intelligence office on a regular basis and should execute the steps of the framework. This individual should fully embrace this role by delivering the outputs required. In the case of larger companies, the framework can be implemented as a competitive intelligence function that requires a group of individuals to manage – each individual managing specific responsibilities. The summary in section 2 (Review of the realities of metals manufacturers in South Africa) of this chapter highlights the need for a competitive intelligence framework to improve the sustainability of the South African metals manufacturers. The framework presented in this

section, can be used as a basis to address the improved sustainability needs of metals manufacturers.

7 RESEARCH RECOMMENDATIONS

It is recommended that the metals manufacturers of South Africa should adopt the competitive intelligence framework developed in this research to guide their companies towards improved competitiveness and sustainability. It was evident from data gained from the empirical phase of this study that such a framework is of the utmost importance and that metals manufacturers are feeling “sold out” by their business realities and the government. The recommended framework can assist metals manufacturers in building confidence in the competitiveness of the local metals manufacturing industry.

8 STUDY LIMITATIONS

This study was conducted in a pragmatic manner with a progressively walk-through approach towards the building blocks of research. The researcher, who has 30 years of experience in the metals manufacturing industry, utilised contacts, experiences and industry representative organisations in the metals manufacturing industry in South Africa during this research. Another possible approach would be to involve a broader footprint and to make direct contact with the metals manufacturers of South Africa.

9 CONTRIBUTION OF THIS STUDY

The metals manufacturers in South Africa are in dire straits – the competitiveness and sustainability of the industry are not up to global standards. This can be ascribed to the superior advantage of metals manufacturers worldwide and the lack in local government protection against global bullying. The in-depth research during this study concerning the realities faced by South African metals manufacturers makes a clear case of a dire need for a competitive intelligence framework to assist metals manufacturers to improve their competitiveness and sustainability and to better establish competitive intelligence in South Africa. This study developed through two literature reviews and an empirical phase a competitive intelligence framework that can assist metals manufacturers. The developed framework is scalable and can be used by small to large metals manufacturers. In addition, the study developed a multi-section questionnaire from a grass roots level which can be refined and re-used in future. This study tested four theories which were not rejected by metals manufacturers. The views of metals manufacturers towards the importance of stakeholders in a competitive intelligence framework were tested with clients being rated most important and the government being rated least

important. This study also confirmed that metals manufacturers in South Africa views the perceived unfair advantage of Chinese imports into South Africa as threatening to their businesses.

10 PRACTICAL IMPLICATION

The competitive intelligence framework developed during this study was built on the 1) the insights gained from the literature reviews, 2) the insights gained from the empirical phase, and 3) the experience and exposure of the researcher to the metals industry in South Africa. The practical value of this competitive intelligence framework is vast – it can be implemented by metals manufacturing fraternities without needing major investments in time or resources. It can be implemented by metals manufacturers within weeks and can be embedded in a step-wise fashion.

11 SUGGESTIONS FOR FUTURE RESEARCH

This study tested opinions of the metals manufacturers in South Africa by making use of a questionnaire and semi-structured interviews were conducted as well. Suggestions for future research include:

- i) The same study can be undertaken by directly administrating the questionnaire to employers in the metals manufacturing industry.
- ii) The same study can test the difference in outcomes when the questionnaire is administered online or given to participants to complete.
- iii) Upstream industries can be included as these industries are facing the same challenges as the metals manufacturing industry.

12 CLOSING REMARKS

The researcher – having an avid interest in the metals manufacturing industry of South Africa – would be satisfied if the results of this study have a markedly positive impact on the sustainability of the South African metals manufacturing industry.

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APPENDIX A

QUESTIONNAIRE

INTRODUCTION

This questionnaire consists of five parts:

- i) In Section A information about the respondents and the metals manufacturers are obtained.
- ii) In Section B the respondents indicate to what degree they agree or disagree with some statements about competitive intelligence (CI).
- iii) Section C is about developing a competitive intelligence (CI) framework.
- iv) Section D is about testing some views.
- v) Section E is about competitiveness in practice.

The questionnaire also contains some definitions of concepts in order to assist respondents.

SECTION A: DEMOGRAPHIC INFORMATION

In this section please select and mark an option with an "X".

A1 I am working in the metals manufacturing sector and mainly with the following metals:

Metal	"X"
Iron	
Steel	
Stainless steel	
Aluminium	
Copper	
Zinc	
Lead	
Nickel	
Brass	
Bronze	
Tin	
OTHER (please specify)	

A2 The number of employees in my company:

less than 200	200 - 1000	1001 - 3000	more than 3000

A3 My job position in the company:

Management	Specialist	Assistant	Other

A4 The level of my job position in the company:

Executive / Top	Senior	General	Other

A5	My gender:	Male	Female	
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A6	Years of service in my current industry:	less than 2	2 or more, less than 4	4 or more, less than 6	6 or more, less than 10	10 or more
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A7	The province in South Africa where the company's head office is situated or where the main decisions are made:																				
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">Province</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">"X"</td> </tr> <tr><td style="border: 1px solid black; padding: 2px;">Western Cape</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Eastern Cape</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Free State</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Gauteng</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">KwaZulu-Natal</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Limpopo</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Mpumalanga</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Northern Cape</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">North West</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> </table>	Province	"X"	Western Cape		Eastern Cape		Free State		Gauteng		KwaZulu-Natal		Limpopo		Mpumalanga		Northern Cape		North West	
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Mpumalanga																					
Northern Cape																					
North West																					

A8	The department in the company where I report:																
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">Department</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">"X"</td> </tr> <tr><td style="border: 1px solid black; padding: 2px;">Head office / Corporate</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Production</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Marketing / Sales</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Finance</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Maintenance</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Human resources</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">Other</td><td style="border: 1px solid black; width: 30px; height: 15px;"></td></tr> </table>	Department	"X"	Head office / Corporate		Production		Marketing / Sales		Finance		Maintenance		Human resources		Other	
Department	"X"																
Head office / Corporate																	
Production																	
Marketing / Sales																	
Finance																	
Maintenance																	
Human resources																	
Other																	

A9	My age:	less than 25	25 or more, less than 30	30 or more, less than 40	40 or more, less than 50	50 or more
----	---------	--	--	--	--	--

A10	My highest qualification										
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">less than matric</td> <td style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">matric</td> <td style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">diploma</td> <td style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">degree</td> <td style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">post-graduate</td> </tr> <tr> <td style="border: 1px solid black; width: 100%; height: 15px;"></td> <td style="border: 1px solid black; width: 100%; height: 15px;"></td> <td style="border: 1px solid black; width: 100%; height: 15px;"></td> <td style="border: 1px solid black; width: 100%; height: 15px;"></td> <td style="border: 1px solid black; width: 100%; height: 15px;"></td> </tr> </table>	less than matric	matric	diploma	degree	post-graduate					
less than matric	matric	diploma	degree	post-graduate							

A11 My company operates in the following sub-industries:

Metal	"X"
Non-ferrous metals	
Ferrous metals	
• Building & construction	
• Hardware, furniture, railroad	
• Fasteners	
• Cables, wire products & gates	
• Electrical appliance White goods	
• Automotive	
• Agricultural	
• Roofing & Cold forming	
• Plate & Sheet metal works	
• Tube & Pipe	
• Packaging	
• Mining	
• Unallocated / other	

SECTION B: COMPETITIVE INTELLIGENCE

This section is about competitive intelligence (CI) in your company.

Competitive intelligence (CI) definition:

Competitive intelligence (CI) is the process through which information from multiple sources is collected according to expressed information needs, then evaluated, interpreted, communicated and applied in strategic decision-making.

Please indicate to what extent you agree with the following statements on a scale of 1 to 5, where 1 equals strongly disagree and 5 equals strongly agree. Mark your selection with an "X".

Scale:

1	- Strongly disagree
2	- Disagree
3	- Not sure
4	- Agree
5	- Strongly Agree

Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1	2	3	4	5

B1 Our company plans what CI information we need.

1	2	3	4	5

B2 Our company uses the results from job interviews / job exits for our intelligence systems.

1	2	3	4	5

B3 In our company CI information is analysed in order to achieve CI results.

1	2	3	4	5

B4 In our company reported CI information is passed on to decision-makers.

1	2	3	4	5

B5	Our company has structures whereby CI information can be reported.	1	2	3	4	5
B6	Our company has CI training available for our employees.	1	2	3	4	5
B7	The results of our CI efforts are such that it influences our company's strategic direction and decision-making.	1	2	3	4	5
B8	Our company uses the feedback from employees who wish to contribute to our CI efforts.	1	2	3	4	5
B9	Collected information in our company is checked for accuracy and validity before being forwarded in our system.	1	2	3	4	5
B10	In our company we generally receive feedback of CI information.	1	2	3	4	5
B11	Our company maintains CI information in formal ICT systems.	1	2	3	4	5
B12	In our company we are encouraged to report information that can contribute towards our company's competitive position.	1	2	3	4	5
B13	In our company we focus on CI information gathering that will benefit us.	1	2	3	4	5
B14	In our company we collect information to contribute to our CI efforts.	1	2	3	4	5
B15	In our company analysed information can be obtained from a variety of information management systems.	1	2	3	4	5
B16	In our company helpful information is frequently communicated upwards and downwards.	1	2	3	4	5
B17	We know how to collect information that could be of competitive value to our company.	1	2	3	4	5
B18	Our company encourages the sharing of information that could be to the advantage of our company.	1	2	3	4	5
B19	In our company we only gather specific information on which we base our CI.	1	2	3	4	5

B20 Our company collects CI information from external sources.	1	2	3	4	5

B21 Our company continually analyses information to provide competitive advantages.	1	2	3	4	5

B22 Non-sensitive CI findings are available to employees.	1	2	3	4	5

B23 We maintain profiles of our customers and competitors.	1	2	3	4	5

B24 Our office-bound employees understand what CI is.	1	2	3	4	5

SECTION C: COMPETITIVE INTELLIGENCE FRAMEWORK

This section is about developing a competitive intelligence (CI) framework.

C1 A competitive intelligence framework needs to take into consideration of number of stakeholders such as:

- i) Clients
- ii) Suppliers
- iii) Own internal departments
- iv) Business partners
- v) Government (frameworks, etc.)

Select in order of importance to you from the list below the most important stakeholders that a competitive intelligence framework should address.

Indicate by numbering from 1 – 4 in order where 1 is the most important.

	1, 2, 3 or 4
Clients	
Suppliers	
Own internal departments	
Business partners	
Government	

Please indicate to what extent you agree with the following statements on a scale of 1 to 5, where 1 equals strongly disagree and 5 equals strongly agree. Mark your selection with an "X".

Scale:

- 1 - Strongly disagree
- 2 - Disagree
- 3 - Not sure
- 4 - Agree
- 5 - Strongly Agree

Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1	2	3	4	5

C2 CI-activities should be led by a core and dedicated function (person or persons) in a company.	1	2	3	4	5

C3	Introduction to CI should begin at the time of employment of workers.	1	2	3	4	5
C4	Progress reporting on CI activities and results should be made available to ALL workers in a company.	1	2	3	4	5
C5	Any worker should be able to send information to be investigated for CI-purposes.	1	2	3	4	5
C6	There should be a rewards-system for workers that forward information that does lead to a CI-advantage for a company.	1	2	3	4	5
SECTION D: GENERAL VIEWS						
This section is about testing some views.						
Please indicate to what extent you agree with the following statements on a scale of 1 to 5, where 1 equals strongly disagree and 5 equals strongly agree. Mark your selection with an "X". <u>Scale:</u> 1 - Strongly disagree 2 - Disagree 3 - Not sure 4 - Agree 5 - Strongly Agree						
		Strongly disagree	Disagree	Not sure	Agree	Strongly agree
		1	2	3	4	5
D1	The effective application of human resources will lead to a competitive advantage for my company.	1	2	3	4	5
D2	My company knows certain competitive aspects better than our competitors.	1	2	3	4	5
D3	My company regularly identifies our most inhibiting constraints.	1	2	3	4	5
D4	My company is sensitive to the matters around sustainable development.	1	2	3	4	5
D5	My company applies human resources effectively such that it leads to a competitive advantage for my company.	1	2	3	4	5
D6	My company knows certain competitive aspects sooner than our competitors.	1	2	3	4	5
D7	Once my company identifies our most inhibiting factors we address it until it is not inhibiting any longer.	1	2	3	4	5

D8	My company incorporates the principle of sustainable development in our operations.	1	2	3	4	5

SECTION E: COMPETITIVENESS IN PRACTICE

This section is about competitiveness in practice.

Please indicate to what extent you agree with the following statements on a scale of 1 to 5, where 1 equals strongly disagree and 5 equals strongly agree. Mark your selection with an "X".

Scale:

- 1 - Strongly disagree
- 2 - Disagree
- 3 - Not sure
- 4 - Agree
- 5 - Strongly Agree

Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1	2	3	4	5

E1	The human resources (HR) capacity utilization of my company can be significantly improved.	1	2	3	4	5

E2	My company will have a better competitive position in relation to China should my company's level of competitive intelligence (CI) increase.	1	2	3	4	5

E3	The efficiency of my company can be significantly improved.	1	2	3	4	5

E4	South Africa's trading with China has benefits for our company.	1	2	3	4	5

E5	The competitiveness of my company can be significantly improved.	1	2	3	4	5

E6	The global trading market has benefits for our company.	1	2	3	4	5

E7	Our company is cognizant of the competition laws of our clients' countries.	1	2	3	4	5

THANK YOU

Thank you for participating in this questionnaire and thereby contributing to this research that will be beneficial to the metals manufacturers of South Africa.

APPENDIX B

INTERVIEW GUIDE

Question 1

The CI building blocks are: 1) Planning and focus, 2) Collection, 3) Analysis, 4) Communication, 5) Process / structure, and 6) Organisation awareness / culture. During the questionnaire-phase of the research CI building block 1 was rated as the most important building block by the respondents from the metals manufacturing industry in South Africa. Do you agree with this rating?

Question 2

CI Building blocks 5 and 6 were deemed as least important by the respondents. Do you agree with this?

Question 3

What would you suggest should be done for CI Building blocks 5 and 6 to receive more attention?

Question 4

In what order would you have rated the importance of the building blocks?

Question 5

Question C1 of the questionnaire requested the respondents to rate the most important stakeholder that need to be taken into consideration for a CI framework from a list of stakeholders consisting of i) clients, ii) suppliers, iii) own internal departments, iv) business partners, and v) government. The respondents rated “clients” as the most important stakeholder in the list. Would you agree with this rating?

Question 6

What other stakeholders would you have added to the list used in Question C1 in the questionnaire?

Question 7

One of the questions was “South Africa’s trading with China has benefits for our company”. The respondents disagreed with this statement. Do you believe that South Africa’s trading with China has benefits for the metals manufacturers in South Africa?

Question 8

In another question the respondents agreed with “The global trading market has benefits for our company”. What would your explanation be for why respondents would agree with this statement but disagree that South Africa’s trading with China would have benefits?