

An assessment of entrepreneurial orientation in the maintenance divisions of a South African steel manufacturer

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ABSTRACT

In this study entrepreneurial orientation behaviour, with specific reference to a South African steel manufacturer was examined.

The primary objective of this study is to investigate the impact of entrepreneurial orientation in the maintenance divisions on the perceived success of a South African steel manufacturer.

A literature study was conducted to define entrepreneurship, intrapreneurship and the constructs of entrepreneurial orientation. The literature study investigated the characteristics of entrepreneurs as well as the benefits that results from entrepreneurial orientation. The determinants of entrepreneurial orientation and the measuring variables of perceived business success were investigated.

An overview of the history, operations, management structure and demographics was given as well as the policies and plans pertaining to the maintenance divisions in the organisation which was the object of the study.

The study population for the assessment was selected from the Cold Rolling department of the Vanderbijlpark Works of ArcelorMittal, South Africa. The department consisted of five Steel production plants. Questionnaires were administered to the target group of 267 maintenance employees, of which 174 usable questionnaires were returned on which statistical analysis were conducted. The data was tested for reliability by calculating Cronbach's Alpha coefficients for the different variables of entrepreneurial orientation and perceived success of the organisation. The demographical data was analysed and presented. Descriptive statistics were calculated from the individual responses and presented for the different variables. The relationship between the gender of the respondents and the different entrepreneurial orientation variables was tested to determine whether there were significant practical differences in the means.

Lastly, the influence of entrepreneurial orientation constructs on business success was determined and discussed.

Conclusions were drawn from the demographic data as well as the different variables of entrepreneurial orientation and perceived success. Recommendations based on the assessment of the data, were made on relevant topics supporting the entrepreneurial orientation of maintenance employees in the study population. The suggested action plan was supported by the assessment, conclusions and recommendations that can be used to improve the entrepreneurial orientation and subsequently improve the perceived business success of the organisation.

The study is concluded with analysis of the achievement of objectives of the study and suggestions made for further research that can be conducted.

Keywords: steel, manufacturing, maintenance, entrepreneurship, entrepreneurial orientation, intrapreneurship, and perceived success.

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DEVOTION

On my way to the first study school in Potchefstroom, I asked myself why I was doing this.

The answer came divinely: *“So that you can mean more to more people”*.

ABBREVIATIONS

ROI - Return on investment

ROE – Return on equity

EVA – Economic value added

MVA – Market value added

VFL – Visible felt leadership

CMS – Cold Mills South

CMN – Cold Mills North

MBA - Master of Business Administration

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CHAPTER 1

NATURE AND SCOPE OF THE STUDY

1.1 INTRODUCTION

The character of the modern business environment is built on continuous change as a result of fast changing technologies, the dynamic nature of customer demand and intense global competition (Ireland & Webb, 2009:469). In order for businesses to sustain competitive advantage, they have reacted to these new challenges by downsizing, unbundling, focusing on core business, reengineering, decentralization, outsourcing, restructuring and relying on self-directed work teams (Burns, 2008:10). However, competitive advantage can no longer be achieved by simply lowering costs, improving quality or service as these factors have now become the benchmark for remaining competitive (Morris, Kuratko & Covin, 2008:7).

Entrepreneurship creates the energy of economic growth and wealth in developing countries (Gurol & Atsan, 2006:26). Globalised organisations striving to succeed during difficult economic times need to anchor themselves in their entrepreneurial roots by developing corporate entrepreneurship, also called intrapreneurship, in order to stimulate internal self-renewal and subsequently growth (Heinonen, 2007:310). Miller (1983:771) summarises entrepreneurial organisations as entities that engage in product-market innovation, are prone to undertake somewhat risky ventures and are first movers to produce proactive innovations. Entrepreneurial orientation becomes an organisational characteristic. Bhardawaj, Agrawal & Momaya (2007a:131) hold that entrepreneurship in organisations is only possible through high levels of entrepreneurial activity amongst employees of organisations.

Entrepreneurial orientation may be understood as a usually common or lasting mind set, inclination or interest towards entrepreneurship (Covin & Lumpkin, 2011:857). An entrepreneurial organisation can be described as an organisation that is willing to pursue opportunities, moving first rather than react to the actions of others and emphasise new and innovative products and services (Van Aardt, 2008:14). Covin and Lumpkin (2011:857) further add that it is an organisation's actions that convey its entrepreneurial status and that the behaviour of the employees may be seen as

the core and essential supporting element in the entrepreneurial process. Furthermore it must also be noted that constructs of behaviours and character are included in the most commonly used entrepreneurial orientation measure, known as the Miller/Covin and Slevin scale (Covin & Lumpkin, 2011:858).

According to Dess and Lumpkin (2005:147), the five dimensions of entrepreneurial orientation are infused to become the strategy-making practices that businesses use to identify and launch business ventures. It therefore represents the mind-set of the employees and creates a perspective about entrepreneurship that reflects in organisations on going processes and business culture.

Morris *et al.* (2008:50) present a framework of corporate entrepreneurship that presents entrepreneurship as an overall orientation within a business. This framework indicates that an organisation's performance is directly and positively influenced by entrepreneurial orientation. This is because entrepreneurial orientation is interwoven with the vision and mission of the business, the strategies and objectives, organisation structures, operations and the overall business culture. The overall theme of this framework is a reinforcement of personal creativity, product and process innovation and on-going managerial development within organisations.

Large organisations in South Africa contribute around two-thirds of the gross national product and many of the major organisations have developed the necessary competitive advantage to compete globally (Van Aardt, 2008:12). In doing so, they contribute through exporting products and earn valuable income for the country. Entrepreneurial organisations actively develop entrepreneurial skills and approaches within the organisation in order to promote continuous organisational innovation (Spinelli & Adams, 2012:87).

This chapter presents the nature and scope of this study and more specifically aims to state the problem on which the study is based and provide a reason for undertaking the study. It also presents the primary and secondary objectives of the study and describes the scope of the study. The chapter concludes by providing a summary of the research methodology used in this study, present the limitations to the study and briefly describing the layout of the study.

1.2 Problem statement

ArcelorMittal developed from Iscor that was founded in 1927 to function as both an independent domestic producer of different steel products as well as a provider of jobs. The organisation was privatised in 1989 and the predecessor of the current parent organisation took control in 2004 (Annexure B).

From struggling beginnings after privatisation, the organisation applied determined cost-cutting exercises and exhibited sterling financial returns from the year 2000 onwards (Young, 2009:1). However, these results should be seen against a backdrop of a massive global surge in demand for commodities (Krauss, 2008:1) and it is uncertain how much of ArcelorMittal's returns during this period can be ascribed to favourable market conditions. The global economic crisis did not spare ArcelorMittal and share prices dropped from a high of R265 during June 2008 to a low R23 at the start of 2010 as the organisation saw demand for its products drop dramatically while prices offered in the market were slashed (ArcelorMittal, 2012).

Demand for ArcelorMittal's products fell drastically while internal management styles showed inflexibility and intolerance of deviations from the norm. The question arises whether Arcelormittal personnel are at all prepared to face the challenges of the most drastic global economic crisis since the organisation's inception more than 70 years ago (BBC, 2009).

Previous studies were performed to judge the level of corporate entrepreneurship in ArcelorMittal South Africa (Nel, 2009:125). Respondents in these studies perceived their leaders to take a long-term and opportunity-obsessed view of the organisation and management succeeded in inspiring employees to act in the same way. An intrapreneurial climate may be invigorated through leadership that are opportunity obsessed and take a long-term view.

The entrepreneurial spirit of visionary thinking and opportunity creators was declared as Leadership brand value by senior management (Arcelormittal Annual Report, 2010). The human resource general manager of Arcelormittal South Africa group, Themba Khosi, outlined in the combined leadership development guide of 2011, the

10 Golden Rules for ArcelorMittal Leaders. “Rule 6: Thinks strategically, has an entrepreneurship spirit, is dynamic and challenges assumptions” (ArcelorMittal, 2011). The Arcelormittal online university provides development courses through which any employee can under guidance of his or her supervisor, undertake further e-learning courses in amongst others, entrepreneurship. This will lead to rousing employees at any level to vigorously endeavour discover and pursue opportunities for growth (Cohen, 2004:16).

By assessing the entrepreneurial orientation in the maintenance divisions of the Cold Rolling plants of the steel manufacturer, ArcelorMittal South Africa, the degree to which the constructs of entrepreneurial orientation impact on the perceived success of the organisation, can be determined.

1.3 OBJECTIVES OF THE STUDY

The research objectives are divided into primary and secondary objectives.

1.3.1 Primary objective

The primary objective of the research is to assess the impact of entrepreneurial orientation in maintenance divisions on the perceived success of a South African steel manufacturer.

1.3.2 Secondary objectives

In order to achieve the stated primary objective the following secondary objectives are formulated for this research:

- To define entrepreneurship and intrapreneurship from literature;
- To define entrepreneurial orientation and identify the constructs measuring entrepreneurial orientation from a literature review;
- To identify and comprehend the success factors of maintenance divisions in steel manufacturers from literature;

- To describe ArcelorMittal South Africa and state the causal factors for the study;
- To correlate the perceived business success with the current published state of business success of ArcelorMittal, South Africa;
- To assess the entrepreneurial orientation within a South African steel manufacturer through a questionnaire;
- To validate the reliability of the questionnaire measuring the entrepreneurial orientation by means of statistical analysis;
- To assess the relationship between entrepreneurial orientation and the perceived success factors;
- To assess the relationship between selected demographic factors and the constructs of entrepreneurial orientation and perceived success factors of maintenance divisions of a South African steel manufacturer; and
- To use the results from empirical research to draw conclusions and make recommendations on how to exploit entrepreneurial orientation in order to benefit the perceived business success of the organisation.

1.4 SCOPE OF THE STUDY

This section endeavours to give an overview of the organisation where the study was done.

1.4.1 Field of study

The field of this study falls within the subject discipline of entrepreneurship with specific reference to entrepreneurial orientation of employees in maintenance divisions within a South African steel manufacturer.

1.4.2 The geographical demarcation

The study was conducted within the steel manufacturing plants in Vanderbijlpark, Vereeniging, Newcastle and Saldanha. The steel manufacturing plants are part of a global steel manufacturing group. The geographical locations of the operational units that formed part of the investigation are indicated in Figure 1.1.

Figure 1.1: Presentation of steel manufacturing operations in South Africa

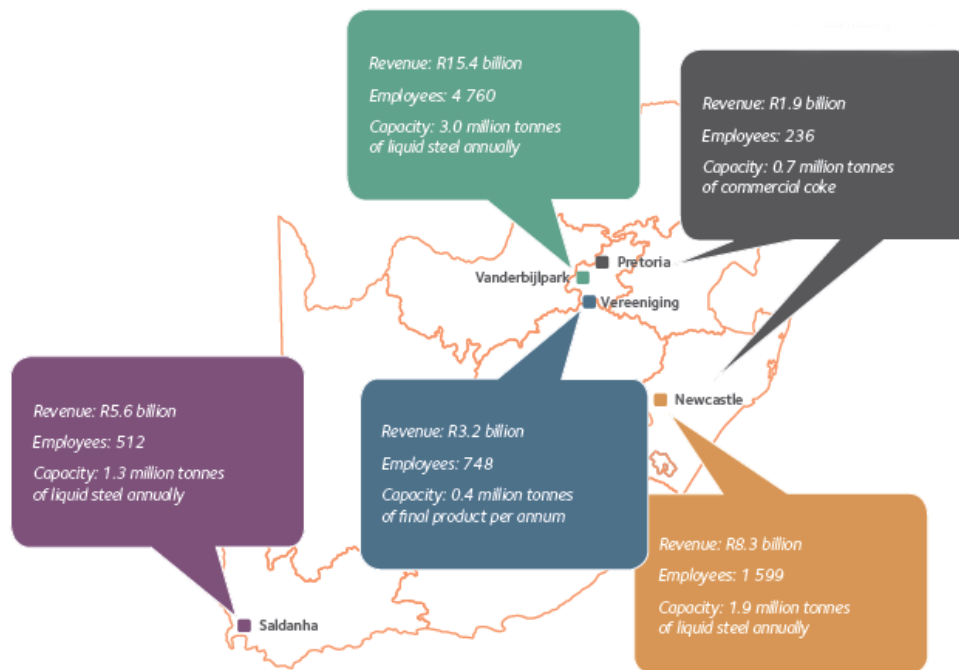


Source: http://www.arcelormittal-reports.com/reports/ar_2011/ov_operations.php

1.4.3 The organisation under investigation

The steel manufacturing plants in South Africa manufacture and supply flat, round and profiled products to the steel industries in South Africa and abroad. The steel manufacturing plant in South Africa employs approximately 9000 permanent employees. The employees contributing to support functions and the commercial coke and chemical operations were not included in the study. The target population of 7600 includes the employees from all maintenance departments as indicated in Figure 1.2.

Figure 1.2: Presentation of steel manufacturing operations



Source: http://www.arcelormittal-reports.com/reports/ar_2012/sustainability/sus-org-business.php

1.5 RESEARCH METHODOLOGY

This research is based on the entrepreneurial orientation of maintenance divisions and investigates the influence thereof on the business success of the organisation.

The research included literature which has been studied on the above mentioned constructs. The constructs were conceptualised as well as the relationships between them as found in the literature. The research included an empirical study performed on site, based on a questionnaire developed from the constructs identified in the literature review.

Being part of the middle management setting, the researcher requested permission and support from the Business Improvement department in order to ensure effective execution of the empirical study.

1.5.1 Literature review

Various publications on entrepreneurial orientation were reviewed during the completion of the literature review. These included text books related to the field of organisational behaviour.

In addition, literature on maintenance management and performance management strategies were reviewed. Journals and websites were also accessed including, Journal of Business Research and SA Journal of Human Resource Management.

The following topics were explored:

- Entrepreneurship and the factors that influence orientation towards entrepreneurship;
- The dominant characteristics of corporate entrepreneurs;
- Defining the elements of perceived business success;
- The link between entrepreneurial orientation and business success;
- Elements of entrepreneurial orientation: *Autonomy, Innovativeness, Risk-taking, Pro-activeness and Competitive aggressiveness*; and
- The organisational structure and role of the maintenance divisions in which the research will be done.

The following sources were consulted to obtain a broad overview of the topic:

- Written publications;
- Previous unpublished dissertations;
- Internal organisation publications;
- Scientific journals; and
- Internet articles.

1.5.2 Empirical research

The empirical research was performed by means of a questionnaire applied to a study population identified for the research followed by statistical analysis.

1.5.2.1 Research instrument design

The empirical study was performed by utilising and adapting the questionnaire developed by Lotz and Van der Merwe (2013:187) to measure entrepreneurial orientation within the maintenance divisions of a South African steel manufacturer. Lotz and Van der Merwe (2013:187) designed the questionnaire founded on the entrepreneurial orientation constructs as identified by Lumpkin and Dess (2001:442). The five constructs regarding entrepreneurial orientation include *Autonomy*; *Innovation*; *Risk-taking*; *Pro-activeness* and *Competitive aggressiveness*.

The next section of the questionnaire measures the perceived business success factors of *Business Growth* and *Business Development and Improvement*.

1.5.2.2 Study population

The study was conducted within selected steel manufacturing plants in Vanderbijlpark Works.

The target population included employees from all maintenance departments. The sample selection was done by using a stratified random sampling technique, where each functional department within the organisation was defined as a stratum and a number of maintenance teams were identified from each stratum to participate in the survey on an individual basis.

The current organograms as shown in Table 1.1 include all maintenance teams within each maintenance division and was utilised to determine the sample population for inclusion in the survey. The population included maintenance managers, engineers, technicians and all the different artisans. Factors that were considered are the availability of employees, due to shift work and planned downtime in operations.

Table 1.1: Presentation of study population

Job Grading	Vanderbijlpark	Vereeniging	Newcastle	Saldanha	Total
Manager	51	3	12	9	75
Engineer	46	3	11	4	64
Technician	153	10	40	31	234
Millwright	277	10	130	29	446
Superintendent	104	13	34	11	162
Fitter	356	49	125	33	563
Shift Specialist	3	0	0	12	15
Electrician	161	31	18	7	217
Plater/Welder	103	26	85	0	214
Maintenance Operator	163	33	124	0	320
Planner	110	10	52	12	184
Instrument Mechanic	55	2	24	3	84
Other	11	1	12	0	24
Total	1593	191	667	151	2602

Source: Arcelormittal employee data as on 2014-02-18

There are 2602 employees in the combined maintenance divisions of ArcelorMittal, South Africa. The smaller Saldanha and Vereeniging Works have 151 and 191 maintenance employees respectively, while Newcastle Works has 667 maintenance employees. The target population in Vanderbijlpark Works is part of the 1593 maintenance employees.

1.5.2.3 Gathering of data

The questionnaire was produced in English only and was available in hard copy format. It was circulated attached to a letter addressed to the respondents explaining the background and purpose of the study.

Data was gathered with the assistance of the maintenance managers at the different plants who assist all individuals with the completion of the questionnaire. Preceding

the survey, process communication was sent out to all heads of departments, plant managers and maintenance managers, explaining the purpose of the survey, as well as the confidentiality surrounding the survey. This communication was intended to improve the response rate.

1.5.2.4 Statistical analysis

The data analysis focused on the effect that entrepreneurial orientation of the respondents has on the success of the organisation. The collected questionnaires were processed and analysed by the Statistical Consultation Services of the North-West University (Potchefstroom campus). The perception of respondents regarding the different constructs measuring entrepreneurial orientation as well as the variables measuring the perceived success of the organisation were measured through descriptive statistics. The central tendency was measured by the use of means, while the scatter of the data around the mean was measured by standard deviation calculation.

The reliability of the questionnaire was determined by calculating Cronbach's Alpha coefficients to determine the internal consistency or average correlation of the different items in the questionnaire. Cronbach's Alpha coefficients of 0.7 or higher were regarded as acceptable levels of reliability for this study.

Finally, the influence of entrepreneurial orientation constructs on perceived business success was tested through multiple regression analysis.

1.6 LIMITATIONS OF THE STUDY

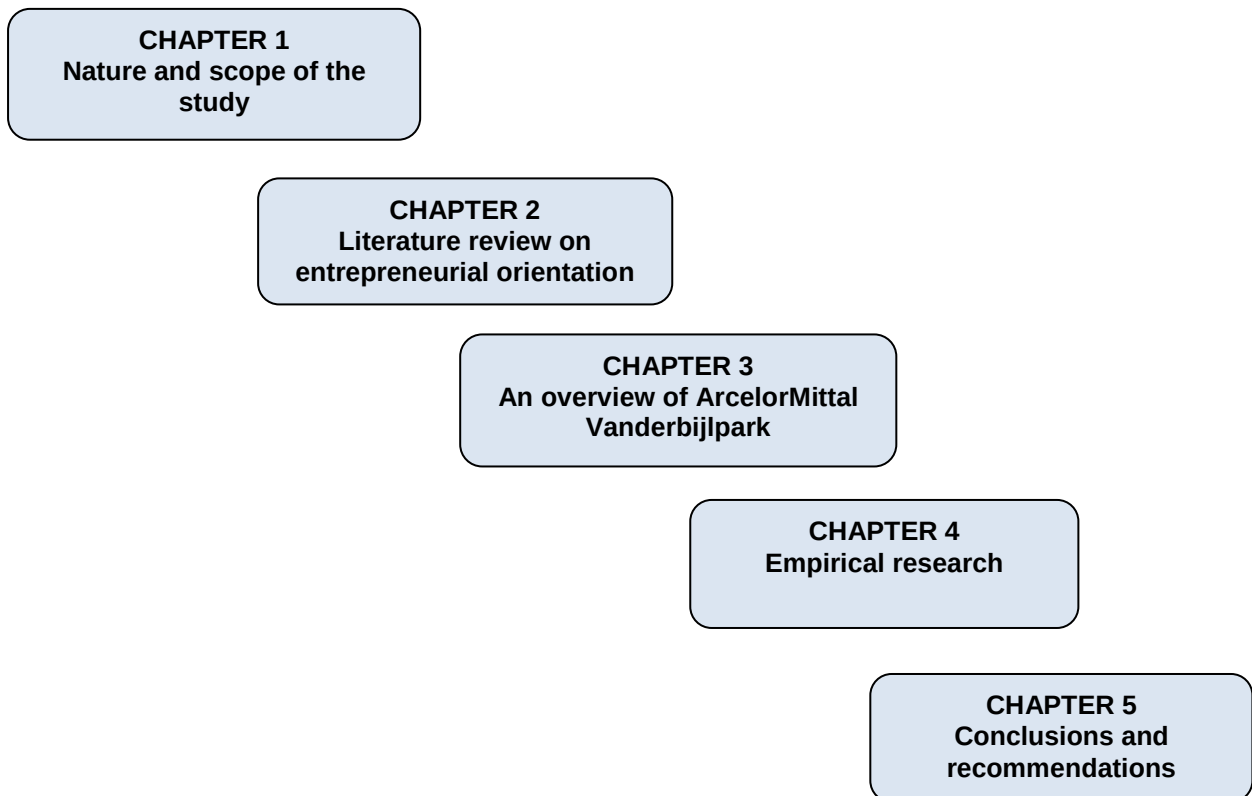
The selected population included respondents spread across the maintenance divisions from Cold Rolling plants in the Vanderbijlpark Works. Thus the study population does not represent the total steel manufacturing maintenance population of South Africa. The results can thus not be extrapolated to make deductions about entrepreneurial orientation in South African maintenance divisions of steel manufacturers. The scope of the study was limited to entrepreneurial orientation of

employees who are actively involved in day-to-day maintenance tasks and their perceptions of business success.

1.7 LAYOUT OF THE STUDY

The layout of the study is graphically presented in Figure 1.3

Figure 1.3: The graphical layout of the study per chapter



Chapter 1 - Nature and scope of the study

Chapter 1 serves to supply the background to the study. Important constructs on entrepreneurial orientation is touched as well as a discussion on the influence of entrepreneurial orientation on the overall performance of an organisation. The reader is introduced to the organisation. The problem statement highlights the objectives and strategy of the organisation, and from this the primary and secondary objectives of the study are derived. The remainder of the chapter covers the scope of study and research methodology.

Chapter 2 - Literature study on entrepreneurship

Chapter 2 contains the literature review on entrepreneurial orientation. Some concepts that are explored include the following: entrepreneurial characteristics, entrepreneurial orientation and its constructs; *Autonomy*, *Innovativeness*, *Risk-taking*, *Pro-activeness* and *Competitive aggressiveness*. The perceived business success factors, *Business Growth* and *Business Development and Improvement*, for maintenance divisions as an integral part of the organisation are reviewed.

Chapter 3 - An overview of the organisation under review

Chapter 3 reviews the general operations, including maintenance activities, in steel manufacturers in South Africa. It also describes the elements, tools and systems utilised as part of the the steel manufacturing plants in South African maintenance programs.

Chapter 4- Empirical research

Chapter 4 contains an explanation of the research methodology that was followed to complete the empirical study. This includes the data gathering process, as well as an analysis of the findings and presentation of results.

Chapter 5 -Conclusions and recommendations

In the final chapter, conclusions are drawn from both the literature study as well as the results of the empirical research. The conclusion aims to present a response to the problem statement and objectives as defined in Chapter 1. Practical recommendations for how entrepreneurial orientation can be employed to support business goals are made. Finally, achievement of the objectives of the study is revisited and recommendations on future research are made.

CHAPTER 2

LITERATURE REVIEW ON ENTREPRENEURSHIP, INTRAPRENEURSHIP AND ENTREPRENEURIAL ORIENTATION

2.1 INTRODUCTION

The term "entrepreneur" originates from the French language, where it describes the term "to take between" (Deakins & Freel, 2006:3). Certain behavioural traits were attributed to an entrepreneur in the early 1800s by Jean-Baptiste Say, when he stated that an entrepreneur is the economic agent who combined others into a productive organism through estimating and exploiting demand for a product and the means to produce it (Vosloo, 1994:148).

Entrepreneurship has earned long-standing recognition in the economic theory, though the exact nature, measurement and its prevalence are still being debated (Maas & Herrington, 2007:7). It is generally accepted that entrepreneurship encompasses personal traits beyond specific skills, to "a way of thinking, reasoning and acting that is opportunity obsessed, represents a holistic approach and is leadership balanced" (Spinelli & Adams, 2012:87).

Economic development and growth depends strongly on entrepreneurial activity and is generally regarded as vital to economic survival (Heinonen & Poikkijoki, 2006:80). Entrepreneurial activity in developed countries provides a means of revitalising stagnated and declining economies, as it presents new employment opportunities. Entrepreneurship is indispensable for developing countries, because it generates the energy for economic progress, job creation and social adjustment (Gurol & Atsan, 2006:26). Lumpkin and Dess (1996:135) hold that start-up businesses as well as existing organisations experience entrepreneurship to be the driving energy in business expansion, technological development and wealth creation. In the United States of America, studies have shown that small entrepreneurial firms consistently create the majority of all new jobs (Spinelli & Adams, 2012:10), and entrepreneurial activities represents the major energies behind new business development and job creation (Lumpkin & Dess, 1996:135). In the developing economies from the East,

researchers have empirically demonstrated that firms where management has shown strong entrepreneurial traits have achieved very rapid growth and injected a high energy stimulus into the national economy of China (Zhang, Yang & Ma, 2008:676). Farinós, Herrero and Latorre (2011:326) advocate that, for organisations to succeed in today's globalised world, it is required to find new ways to conduct business, continuously develop new technologies and products, discover new markets to enter, and creating value for stakeholders through developing and exploiting profitable business opportunities. Coakes, Smith and Alwis (2011:30) further highlight that innovative behaviour in organisations can be attributed to determinants such as institutional arrangement, economic opportunities, technological capabilities, organisational learning capability, as well as entrepreneurial behaviour.

When new and innovative opportunities are launched and managed from within existing medium to large organisations, the term corporate entrepreneurship is used to describe a specialised application of entrepreneurship (Fattal, 2003:14). Corporate entrepreneurship, also called intrapreneurship, is regarded as the tool management utilises most to ensure innovation, business development and internal renewal, in order to meet the challenges of a changing business environment (Bhardwaj, Agrawal & Momaya, 2007b:131).

The Global Entrepreneurship Monitor uses an index to measure the total number of economically active persons in a country involved in starting a new business, and in its 2012 report it found that South Africa's total entrepreneurial activity rate (TEA) decreased from 9.1% in 2011 to 7.3% in 2012. This is significantly below the average of 14.3% for efficiency driven economies (Turton & Herrington, 2012:7). The GEM report further points out that, in order for South Africa to achieve an increase in TEA rates, a focus on developing an increased pool of potential and intentional entrepreneurs, will be crucial (Turton & Herrington, 2012:17).

In this study the term 'organisation' will be generally used to describe an entity that performs activities related to business with the purpose to create value.

In the following section the definition of entrepreneurship and the characteristics of the entrepreneur is defined and further investigated. The terms intrapreneurship, corporate entrepreneurship and entrepreneurial orientation, is analysed. The constructs measuring entrepreneurial orientation is presented as the independent variables and the perceived success factors of maintenance divisions in a manufacturing organisation. As discussed in Chapter 3, entrepreneurial orientation and the perceived success factors is presented as the dependant variables for the purpose of this study. The chapter will finally be summarised.

2.2 DEFINITION AND IMPACT OF ENTREPRENEURSHIP

The concept of entrepreneurship and the effect it has on regional economies forms the building blocks of corporate entrepreneurship (or intrapreneurship). The current section explores this underlying construct of entrepreneurship.

2.2.1 Original views of an entrepreneur and development of the term entrepreneurship

The term “entrepreneurship” is defined in the Oxford English dictionary (2009:477) as a person who sets up a business or businesses, taking on financial risks in the hope of profit. The current view is to adapt this definition to reflect a desire for the continuity and long term commitment to the activity, rather than a single act to fulfil a need (Van Aardt, 2008:11). Entrepreneurs have often been depicted by the broad community as robbers who exploited workers for their own success or have been admired by their compatriots as captains of industry and leaders in developing the economy of a country (Van Aardt, 2008:11). Entrepreneurs are however those who, through hard work and long hours, generate business success. Entrepreneurs are in modern days considered to be the heroes of the free market since innovation and creativity have supported many to build large enterprises from small businesses (Van Aardt, 2008:11).

The term “entrepreneur” was developed from the French word “entreprendre”, which is derived from the German term “unternehmen”, both of which mean “to undertake” (Tan, Williams & Tan, 2005:355) or indicate a kind of intermediary (Deakins & Freel,

2006:3) that use unique or 'different' techniques to perform economic transactions (Long, 1983:52). According to Antoncic and Hisrich (2003:17) and (Stevenson & Jarillo, 1990:17), the origin of the term was developed by 16th century economist, Richard Cantillon. Cantillon defined an entrepreneur as someone who bears the risk of profit or loss when buying and selling at certain prices.

Tan *et al.* (2005:355) hold that during the 18th century, entrepreneurs included those who were paid to build military bridges, harbours and fortifications, where work included both a promise and an employment. From this can be derived that the original entrepreneurs were those contracted to perform risky or dangerous work. Tan *et al.* (2005:355) also note that French economists have extended the definition of an entrepreneur to include people who bear risk and uncertainty in order to create new innovations. Cantillon regards the entrepreneur as a pivotal agent in balancing supply and demand in an economy, to the extent that she has developed her definition to include chimney sweepers and robbers (Herbert & Link, 1988:56).

According to Stevenson and Jarillo (1990:18), the overabundance of studies on entrepreneurship can be divided into what happens when an entrepreneur acts, why an entrepreneur acts, and how an entrepreneur acts. The uniqueness of the definition of Stevenson and Jarillo (1990:19) is that a Schumpeterian (behavioural or outcomes-based) approach is followed. The focus is based on the principle that opportunities are pursued without regard to the resources controlled by these individuals. This is a frequently used definition. Stevenson and Jarillo (1990:19) propose that it is an innate behaviour of individuals that makes them entrepreneurs and not circumstances. Antoncic and Hisrich (2003:8) and Stevenson and Jarillo (1990:18) concur that entrepreneurship is the process of uncovering and developing an opportunity to create value through innovation and seizing that opportunity without regard to either resources or the location of the entrepreneur.

The concept of entrepreneurship and the term entrepreneur developed over centuries and is summarised in Table 2.1. There is however no unified consensus on the definition of the term entrepreneurship (Berglann, Moen, Roed & Skogstrom, 2011:180).

Table 2.1: Evolution of the concept of entrepreneurship

Period	View
Unknown	“French word meaning 'go-between': person's function is to facilitate transactions on trade routes.”
Middle ages	“A person entrusted with resources to manage large government projects.”
1600s	“A person who contracted with government, but who would carry the risk of profit or loss.”
1700s	“The concepts of an originator and a backer or investor of the originator were separated.”
1800-1950s	“An entrepreneur was equated to today's concept of a manager, in that he organised and operated an enterprise for his benefit.”
1950s	“An entrepreneur could not simply be a manager, but had to have contributed a new innovation to the process to be differentiated from a manager.”
Current view	“Entrepreneurship encompasses business acumen, managerial skills as well as a personal perspective.”

Source: Hisrich, Peters and Shepherd (2008:6-8)

Table 2.2 depicts some definitions for entrepreneurship from historical research. The definitions in this table are based on a behavioural approach to entrepreneurship. This approach views entrepreneurship as a series of behaviours or actions undertaken, resulting in the creation of an entrepreneurial operation (Maes, 2004:11).

Table 2.2: Historical perspective of definitions of entrepreneurship

Source	Definition of Entrepreneurship
Miller (1983)	"An organisation's actions relating to product-market and technological innovation."
Kanter (1985)	"The creation of new combinations."
Gartner (1985, 1989)	"Process of new venture creation; the process by which new organisations come into existence."
Schuler (1986)	"Practice of creating or innovating new products or services within existing businesses or within newly formed businesses."
Jones and Butler (1992)	"Process by which organisations identify opportunities and act creatively to organise transactions between factors of production in order to create value."
Krueger and Brazeal (1994)	"Quest for an opportunity irrespective of the existence of resources."
Kouriloff (2000)	"Process of creating a new venture."
Shane and Venkatraman (2000)	"Detection, creation and utilisation of opportunities to bring into existence future goods and services."
Low (2001)	"Creation of a new enterprise."
Kouriloff (2000)	"Process of creating a new venture."

Source: Adapted from Maes (2004:7)

Maes further identified the following multiple dimensional components of entrepreneurship that emanated from the various definitions formulated on entrepreneurship as per Table 2.2.

These include components such as:

- The individual;
- The process;
- The environment;
- The organisation;
- The project; and
- The opportunity.

2.2.2 Definition of an individual entrepreneur

The function-based characterisation originated by Cantillon is utilised to define an entrepreneur as a person who conceptualises, organises, launches and nurtures a business opportunity through innovation into a potentially high growth venture in the midst of complex and unstable circumstances (Rwigema & Venter, 2004:6).

Schumpeter (1934:85) defines entrepreneurs by the role they play in an economy. He highlights the importance of innovation as an entrepreneurial attribute in his work "The theory of economic development." He assigns the role of modifying and developing new markets, maximising the benefits of advanced technology and adjusting organisational structures to enhance their production department to entrepreneurs. The Austrian School of Economic Development (Kirzner, 1973:50) also defines an entrepreneur as a character fulfilling a role in an economic system. The school views an economy as an unpredictable collection of changes in perceptions that continuously experiences waves of unbalance within markets, as players adjust what they perceive to know and foresee. Entrepreneurs are expected to be sensitive to price signals emanating from the market which would indicate the need for resource reallocation and then be quick to act on it in order to fulfill demand, resulting in making profit (Kirzner, 1973:50). Drucker (1985:25) confirms this view by stating that the entrepreneur is a person who 'always searches for change, responds to it and exploits it as an opportunity.'

Recent research by Caliendo, Fossen and Kritikos (2012:397), has identified self-employment as a measurable construct of entrepreneurship. Van Aardt (2008:11)

presents a process-orientated definition of entrepreneurship, by combining the act of initiating, creating, building and expanding an entrepreneurial team as well as to gather other resources to take advantage of an opportunity in the marketplace to create long term value. Van Aardt (2008:11) further holds that this definition focuses on growth, expansion and long-term financial gain, and therefore excludes small business that are aimed only at the survival of their owner from being regarded as an entrepreneurial venture.

Garland and Garland (1997:38) attempted to define an entrepreneur by combining the abovementioned views to some extent by developing a classifying framework for entrepreneurs. Their classification is presented in Table 2.3.

Table 2.3: Classification of entrepreneurs

Classification	Self- actualization method	Personal measurement of success	Personal attributes or outlook
Macro Entrepreneur	Being at the helm of a business	Effecting change to the world through innovation	- High tolerance of risk - Innovative - Never complacent even when being successful
Micro Entrepreneur	Having a large degree of freedom	Financial rewards that facilitate freedom	- Value business only as means to support lifestyle
Conventional Entrepreneur	Recognition and financial success in business	Combination of enjoyment of life and work and financial rewards	- Enjoys challenges of business, but not prepared to take undue risks to achieve goals

Source: Garland and Garland (1997:38)

Common concepts, such as renewal and innovation, are prominent features in an array of definitions that has been formulated over the years. “An entrepreneur can thus be defined as an individual who recognises and exploits an opportunity in order to create a viable venture.” Entrepreneurs are expected to possess certain key

attributes or traits and play a pivotal role in the economic process by creating value and job opportunities.

In the next section, some specific characteristics of an entrepreneur will be explored.

2.2.3 Characteristics of the entrepreneur

Over the years several characteristics have been identified to describe the nature or features of the entrepreneur. Spinelli and Adams (2012:38) presented seven themes of desirable and acquirable attitudes and behaviours of entrepreneurs.

These are:

- Commitment and determination;
- Courage;
- Leadership;
- Opportunity obsession;
- Tolerance of risk, ambiguity and uncertainty;
- Creativity, self-reliance and adaptability; and
- Motivation to excel.

Clifford and Cavanagh (1985:3) hold that it is also accepted that entrepreneurs can be described by traits that they exhibit and that these qualities are both the result of inborn characteristics, as well as skills acquired and practised (Timmons, 1973:85).

Original research in entrepreneurial behaviour has been published during 1848, where entrepreneurs have been identified as risk takers (Timmons & Spinelli, 2009:44). It is important to highlight the fact that entrepreneurs are taking calculated risks and are not blindly plundering into risky adventures. Risks need to be minimised and hedged, while stress and conflict needs to be tolerated for the higher performance it generates (Spinelli & Adams, 2012:41). Foba and De Villiers (2007:5) convoluted on the characteristics of entrepreneurs by listing *Risk-taking*, strategy, *Innovativeness*, *Autonomy*, and team building to be regarded as the most important characteristics that distinguish entrepreneurs.

Spinelli and Adams (2012:38) have identified motivation to excel as a critical characteristic for entrepreneurs. Motivation to excel refers to individuals that are self-starters, driven by a strong desire to compete against their own self-imposed standards, and to pursue and attain challenging goals. These individuals are very clear on what they can and cannot do and do not cheat on themselves (Spinelli & Adams, 2012:41).

Spinelli and Adams (2012:43) have found that successful entrepreneurs are both opportunity-driven and strong managerial people who are able to think themselves out of a corner and never accept no for an answer.

Romero and Martínez-Román (2012:179) view general and specific business education programs as the most important elements that develop innovative behaviour of self-employed people. General education is a source of motivation of self-employed people and develops their management styles. Self-employed people who achieved tertiary qualifications are more strongly motivated towards entrepreneurship and innovation. In addition, these educated self-employed people tend to develop an entrepreneurially orientated management style when undertaking projects by energising innovative activities.

Leadership was also identified by Spinelli and Adams (2012:40) as an important entrepreneurial characteristic. Successful entrepreneurs tend to have extensive experience, possess intimate knowledge of the technology and marketplace they compete in, as well as sound general management skills along with a proven track record (Spinelli & Adams, 2012:40). Typical lead entrepreneurial attitudes or behaviour, include having high self-concept, displaying high energy and a sense of urgency, being a team-builder, intellectually honest and maintains effective dialog within the team and with others outside the venture (Spinelli & Adams, 2012:40).

Further studies by Romero and Martínez-Román (2012:179) show that a management style which promotes the importance of teamwork, business planning and the control and forecasting of the organisation's performance, significantly supports innovation in small businesses. Recent research amongst university hospitality students by Altinay, Madanoglu, Daniele and Lashley (2012:495), shows a

positive relationship between *Innovativeness* and the intention to start a business. Positive relationships have also been observed between *Risk-taking* propensity and the tolerance of ambiguity, as well as between *Innovativeness* and *Risk-taking* propensity. Being innovative, having propensity for taking risks and being tolerant for ambiguity, are therefore accepted as traits supporting entrepreneurial behaviour. Caliendo *et al.* (2012:405) have found through research that high levels of trust (measured on aggregate), significantly increases the probability of entry into self-employment. Being aware of the negative consequences of unconditional trust further increases the probability of self-employment.

Gries and Naudé (2011:222) have determined that being entrepreneurial is in itself valued as a human attribute and their research has shown, that this valuation of entrepreneurship as a choice, depends on whether people have agency. Agency refers to the independent choice to enter into entrepreneurial activity and not being forced to do so. It has been found that where entrepreneurship is taken on as a necessity, or someone is forced due to not being able to find formal employment as a result of insufficient skills or lack of employment opportunities, this value is diminished. Thus the potential value of entrepreneurship is reflected through having the choice of not being an entrepreneur (Gries & Naudé, 2011:222).

Chen, Zhu and Anquan (2005:541) advocate that entrepreneurship is regarded as the ability to develop the capacity to tolerate uncertain circumstances, the ability to seize opportunities, and the ability to learn from failures. Spinelli and Adams (2012:38) have also identified commitment and determination, courage, and opportunity obsession as key entrepreneurial characteristics. Other types of desirable and acquirable attitudes and behaviours include being tenacious and decisive, able to commit quickly, being persistent in solving problems, and willing to make personal sacrifice (Spinelli & Adams, 2012:38).

Courage is not the result of bravery, but has its source in broadly understood knowledge, experience and integrity of the entrepreneurial individual (Spinelli & Adams, 2012:39). Types of attitudes or behaviours include moral strength, fearless experimentation, not being afraid of conflict or failure and an intense curiosity in the face of risk.

Opportunity obsession has to do with an attitude of taking leadership in shaping an opportunity, being market-driven and having intimate knowledge of the customers' needs and wants. The opportunity obsession is with value creation and enhancement and not with the money or other resources, or with appearances and image (Spinelli & Adams, 2012:41).

Spinelli and Adams (2012:41) have also highlighted creativity, self-reliance and adaptability as desirable characteristics of the entrepreneur. Creativity, self-reliance and adaptability have to do with solid and highly adaptive forms of organisation that can respond quickly and effectively under high levels of uncertainty and rapid changes (Spinelli & Adams, 2012:41). The entrepreneur has no fear of failure and most successful entrepreneurs possess the ability to focus on the goal, while being alert to market changes (Spinelli & Adams, 2012:41).

Recent research has found a significant relation between emotional intelligence and entrepreneurial behaviour (Zampetakis, Beldekos & Moustakis, 2009:171). This implies that employees with a high characteristic of emotional intelligence are more aware of the factors contributing to their experience of positive and negative emotions. The awareness of the factors that extract certain emotions, and understanding the effects of those emotions, enable persons with high emotional intelligence to effect appropriate actions to propagate entrepreneurial behaviour.

Concluding this section on entrepreneurship and the entrepreneurial characteristics, considering the various definitions presented, the perspective on the characteristics of entrepreneurs, and how they act throughout the entrepreneurial process, the following definition of entrepreneurship is proposed:

“Entrepreneurship is a creative process breathed by individuals who are opportunity obsessed, who can combine a package of resources in order to create value, cognitively carrying the accompanying financial, psychological and social risk, driven by the need to achieve rewards of monetary and personal nature.”

Having defined entrepreneurship and discussed the process of entrepreneurship, the following section will focus on the entrepreneurial process at the level of the established large business.

2.3 INTRAPRENEURSHIP AND CORPORATE ENTREPRENEURSHIP

2.3.1 Introduction

While the term entrepreneurship has been used to describe the entrepreneurial activities of individuals operating in the context of a small to medium-sized business, the term intrapreneurship is often used for the entrepreneurial activities within an existing large business. Intrapreneurship, in its simplest form, means entrepreneurship within an existing organisation (Antoncic & Hisrich, 2003:9). The different terms, corporate entrepreneurship, intrapreneurship, internal corporate entrepreneurship and strategic entrepreneurship, are generally used in literature (Christensen, 2004:304).

According to Brinkmann (2011:203), the concept of intrapreneurship has been evolving for more than 30 years, and has subsequently gained momentum since the 1990s. One of the originators of the term intrapreneurship, Pinchot, has defined the term intrapreneur as an abbreviation for intra-corporate entrepreneur. According to Pinchot (1985:3), intrapreneurs are those individuals who take personal responsibility for generating innovative ideas of any kind within the organisation. Pinchot (1985:1) states that intrapreneurs may be creators or inventors, but are commonly known to be the dreamer who shapes an idea into a profitable reality. Teltumbde (2006:129) has observed that intrapreneurs are people who dream of something unusual beyond their everyday sphere of influence. Morris and Kuratko (2002:62), advocate that the term corporate entrepreneurship indicates that the fundamentals of entrepreneurship are still unchanged while the context of application changed.

For the purpose of this study, the terms "corporate entrepreneurship" and "intrapreneurship" will be treated as synonymous and will be used as it is applied in the publications referenced by this study.

2.3.2 Definition of intrapreneurship (corporate entrepreneurship)

Antoncic and Hisrich (2001:498) define intrapreneurship (corporate entrepreneurship) as entrepreneurship within an existing corporation without any reference to the size of the organisation. It is described as a process inside an organisation that leads to new business ventures and also to other innovative activities and orientations. These activities include development of new products, services, technologies, administrative techniques, strategies and competitive stances. This definition by Antoncic and Hisrich represents the broadest approach that has been employed.

Sharma and Chrisman (1999:12) support this view and propose that any definition of corporate entrepreneurship should be as broad and inclusive as possible. It reflects the early stage of development of the field and avoids the need to excessively retrench any terms as new knowledge becomes available. It provides considerable freedom for a theoretical and empirical process that will eventually permit the unique parts of the concept to be compiled, to emerge.

Table 2.4 provides a historical overview of definitions of the term intrapreneurship.

Table 2.4: Historical perspective of definitions on intrapreneurship

Source	Definition of intrapreneurship
Pinchot (1985)	"Entrepreneurship inside large organisations."
Kuratko, Montagno and Hornsby (1990)	"Entrepreneurship inside the organisation."
Stopford and Baden-Fuller (1994)	"Creation of new businesses inside existing organisations."
Carrier (1996)	"The introduction and implementation of a significant innovation for the organisation by one or more employees working within an established organisation."
Hostager, Neil, Decker and Lorentz (1998)	"Individuals and groups working within the corporation to: (1) identify ideas for new products or services: (2) turn these ideas into profitable products or services."

Antoncic and Hisrich (2001)	“A process that goes on inside an existing organisation, regardless of its size, and leads not only to new business ventures, but also to other innovative activities and orientations such as development of new products, services, technologies, administrative techniques, strategies and competitive positioning.”
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Source: Adapted from Maes (2004:21-23)

Table 2.5 provides a historical overview of the term corporate entrepreneurship. This overview provides observations relating to the growth of the body of knowledge about corporate entrepreneurship concepts. Tables 2.4 and 2.5 were adapted from Maes (2004) and include secondary references.

Table 2.5: Historical perspective of definitions of corporate entrepreneurship

Source	Definition of corporate entrepreneurship
Jennings and Lumpkin (1989)	“The extent to which new products and/or new markets are developed.”
Covin and Slevin (1991)	“Extending the organisation’s domain of competence and corresponding opportunity set through internally generated new resource combinations.”
Zahra (1991)	“The process of creating new business within established organisations to improve organisational profitability and enhance an organisation’s competitive position or the strategic renewal of existing business.”
Zahra (1993)	“A process of organisational renewal that has two distinct but related dimensions: (1) innovation and venturing: and (2) strategic renewal.”
Zahra (1995)	“The sum of an organisation’s innovation, venturing and renewal efforts.”
Carrier (1996)	“A process of creating new business within established organisations to improve organisational profitability and enhance an organisation’s competitive position.”
Covin and Miles (1999)	“The presence of innovation plus the presence of the objective of rejuvenating or purposefully redefining organisations, markets, or industries in order to create or sustain competitive superiority.”

Dess, Lumpkin and McGee (1999)	“Consisting of two types of phenomena and processes: (1) the birth of new businesses within existing organisations, whether through internal innovation or joint ventures/alliances; and (2) the transformation of organisations through strategic renewal, i.e. the creation of new wealth through the combination of resources.”
Zahra, Neubaum and Huse (2000)	“The sum of an organisation’s venturing and innovation activities.”
Ucbasaran, Westhead and Wright (2001)	“A process of organisational renewal associated with two distinct but related dimensions: (1) Creating new businesses through market developments or by undertaking product, process, technological and administrative innovations; (2) redefinition of the business concept, reorganisation, and the introduction of system-wide changes for innovation.”
Hornsby, Kuratko and Zahra (2002)	“Corporate entrepreneurship centres on re-energizing and enhancing the ability of an organisation to acquire innovative skills and capabilities.”

Source: Adapted from Maes (2004:21-23)

Sharma and Chrisman (1999:18) define intrapreneurship as an innovative process, lead and directed by an individual or group of individuals in an organisation that results in either organisational renewal or the establishment of a new organisation, while accepting both the creation of new business as well as improvement of current business as an aim. Dess, Lumpkin and McGee (1999:85) concur with this point of view, by promoting the idea that corporate entrepreneurship may be viewed as supporting two types of phenomena and processes:

- The birth of new business within existing organisations, whether through internal innovation or joint ventures; and
- The transformation of organisations through the creation of new wealth through the combination of resources.

Additional to the abovementioned, Covin and Miles (1999:48) and later adopted by Burns (2008:13), describe three of the most common phenomena that are often

viewed as examples of entrepreneurship within established large organisations, namely:

- The birth of new business within an existing organisation. This phenomenon has typically been referred to as "corporate venturing" (Ramachandran, Devarajan & Ray, 2006:85). Corporate venturing usually springs from a core competency or process developed within an organisation (Thornberry, 2003:330).
- The second phenomenon is where an individual or individuals promote new product ideas within a corporate context. This phenomenon has originally been used by Pinchot (1985:3). Intrapreneurship, which is the abbreviation for intra-corporate entrepreneur, relates to intrapreneurs in organisations who take new ideas and turn them into profitable new realities.
- The third phenomenon is where an entrepreneurial philosophy seeps into and changes an entire organisation's outlook and operations (culture). In this instance, the term "corporate entrepreneurship" refers to where the entire organisation, rather than exclusive individuals, starts to act in ways that usually would be described as entrepreneurial (Amo & Kolvereid, 2005:7-8).

Guth and Ginsberg (1990:6) have divided corporate entrepreneurship into two strategic managerial choices, namely that it allows both new business creation and the transformation of organisations through strategic renewal, which in this instance is regarded as the transformation of an organisation through renewal of the fundamental pillars on which it is built. Zahra (1993:321) supports this view and separates innovation and venturing on the one hand, and strategic renewal on the other, as two mutually inclusive dimensions of corporate entrepreneurship.

Intrapreneurship literature focuses on the ability to identify and exploit opportunities. In support of this trend, Hayton and Kelly (2006:407) define corporate entrepreneurship as activities that centre on the organisation-wide discovery and pursuit of new opportunities through innovation, new business creation, or the introduction of new business models. Vosloo (1994:147) emphasises that a

corporate entrepreneur must continuously explore the environment to identify creative opportunities and to recognise any other person performing entrepreneurial functions in an established organisation.

Many definitions of the term intrapreneurship include activities such as innovation or renewal. According to Kuratko, Ireland and Hornsby (2001:60), a futuristic view of entrepreneurship should include acts of creation, renewal or innovation, and being cognitively aware of economic or business activities that occur within or outside an established organisation. The innovative or renewal (entrepreneurial) activities that take place within an established organisation are therefore described as corporate entrepreneurship or intrapreneurship.

Hough and Scheepers (2008:16) as well as Scheepers, Hough and Bloom (2007:240) view corporate entrepreneurship as the development of new business ideas, as well as exploring new opportunities within large, established organisations.

2.3.3 Definition of the corporate entrepreneur

Thornberry (2001:526) and Pinchot (1985:41) agree that an entrepreneurial mind-set is needed to take advantage of opportunities as it arises within organisations. Proactive empowerment is, according to Eesley and Longenecker (2006:18), key to the practical implementation of creating new business products and opportunities in an organisation. Zahra (1995:227) views formal or informal activities by intrapreneurs with the aim to create new businesses in established organisations through product or process innovation and market developments, as intrapreneurship. These activities normally take place at the organisational, divisional, and functional or project (task) level, with the sole purpose of strengthening the organisation's competitive position and financial performance (Zahra, 1995:227).

By examining the parallels and contrasts between entrepreneurs and intrapreneurs, Lusching and Bagby (2001:12) define an intrapreneur (or corporate entrepreneur) as an agent who stimulate productivity and efforts that add value. These activities depend heavily on innovative processes. In comparison, entrepreneurs provide their own settings while the intrapreneur has to operate within the setting of an

established organisation, where structural and procedural constraints can exist. Teamwork and group innovation is always a key characteristic of the entrepreneurial process.

Luschinger and Bagby (2001:12) further contrast the intrapreneurial characteristics in that the intrapreneur has less control over his environment than an entrepreneur, as well as in the fact that he operates in a formal reporting structure. The intrapreneur therefore has to manage his environment acutely, in order to obtain the resources and support needed to secure corporate entrepreneurial success. However, a rather obvious point is that intrapreneurs normally carries far less personal risk of failure of an initiative inside a safety cage of a large established organisation, and can therefore afford to averse less risk in approach than the entrepreneur.

Additional dissimilarities between entrepreneurs and intrapreneurs are outlined by Morris and Kuratko (2002:63) in agreement with Luschinger and Bagby (2001:12), in the fact that an entrepreneur can make fast decisions and aggressively pursue opportunities, while an intrapreneur most often need to promote initiatives through the approval process of the corporation's management. This means that intrapreneurial initiatives commonly are scrutinised thoroughly in the approval structures of the organisation, while the entrepreneur has few people with whom to discuss ideas.

Muhanna (2006:63) and Vosloo (1994:147) are authors who prefer to define an intrapreneur by focussing on the individual traits of an intrapreneur, and states that such intrapreneurial behaviour includes high scores on the dimensions of *Innovation*, *Pro-activeness* and *Risk-taking*, as well as the ability to explore the business environment and identify opportunities inside an established organisation.

Ireland, Kuratko and Morris (2006:10) add the dimension of disregard for currently available resources to an intrapreneur, while Du Preez (1992:86) adds the acceptance of uncertainty which is inherent to an entrepreneur, when he describes an intrapreneur as a person who identifies and develops opportunities thereby

creating new ideas, products and services within the existing business, bearing the risk of managing them.

Ross and Unwalla (1986:48) further build on definitions of an intrapreneur, by describing the intrapreneurial personality as:

- Focussing on results, not activity;
- Questioning the status quo;
- Being motivated by problem-solving, effecting change and innovation;
- Being frustrated by bureaucratic systems; and
- Being ambitious and competitive.

2.3.4 The benefits of intrapreneurship (corporate entrepreneurship)

Zahra and Covin (1995:55) have found that the relationship between corporate entrepreneurship and corporate financial performance as defined by Morris and Sexton (1996:8), can both be substantiated, and tends to strengthen over time.

Research has identified, amongst others, the following views on benefits of corporate entrepreneurship for the organisation:

- Peltola (2012:44) has identified corporate entrepreneurship as a potential survival strategy for organisations operating in highly competitive business environments, especially organisations that experience declining business performance;
- Hough and Scheepers (2008:16) have identified corporate entrepreneurship as the chosen strategy where organisations need to increase financial performance;
- Özdemirci (2011:613) recognises the benefit of corporate entrepreneurship as a tool for improving competitive positioning and transforming organisations, their markets and industries, in order to create value;

- Kuratko and Hornsby (1998:30) agree that corporate entrepreneurship activities are performed with the aim of improving an organisation's competitive position and financial performance;
- Cornwall and Perlman (1990:15) argue that, due to the fact that entrepreneurship is essentially concerned with creating value, increasing shareholders' wealth would be an appropriate measure to determine the benefit and effectiveness of corporate entrepreneurship; and
- Zahra and Covin (1995:47) provide two reasons for organisations to relate entrepreneurial activities in an organisation to ensuing organisational performance:
 - *Innovativeness* creates a competitive advantage by increasing the organisation's market reputation, adaptability and financial returns; and
 - Intrapreneurial organisations are by definition more pro-active than traditional organisations, and therefore their quick market response generates competitive advantage.

Luschinger and Bagby (2001:11) provide two examples of corporate entrepreneurs whose enduring actions improved the financial returns of their respective companies:

- Despite the inhibiting warnings of David Packard of Hewlett-Packard, Chuck House persevered in developing new electronic instrumentation. This innovative product line later provided the financial means for the Hewlett-Packard Company to endure; and
- Art Fry persisted with the accidental development of the iconic "Post-It" product to be a saleable product, against bureaucracy inside the 3M organisation.

To be successful, intrapreneurship must be approached by management as a strategic management activity (Chen, Zhu & Anquan, 2005:532). It transpires as a way of thinking that combines all parts of a business to the point where strategic

managers and organisational culture concurs to generate a strong impetus to innovate, take risks and aggressively pursue new venture opportunities. Dess and Lumpkin (2005:147) conclude that these ideas capture the concept known as "entrepreneurial orientation".

To conclude this section on intrapreneurship or corporate entrepreneurship, considering the various definitions presented, the perspective on the influence of intrapreneurs and how they support the organisational process, the following definition of corporate entrepreneurship is proposed:

“Corporate entrepreneurship is a creative process supported by individuals and groups of individuals who are utilising their personal entrepreneurial traits inside an established organisation to create new value, products, processes or new business, in order to maintain competitive advantage.”

2.4 ENTREPRENEURIAL ORIENTATION

2.4.1 Introduction

Continuous change as a result of rapid-changing technologies, increasing changes in customer expectations, and the mounting levels of global competing forces, are common realities for today's organisations (Ireland & Webb, 2009:1). Drejer (2006:143) is of the opinion that the key competitive success factor in this competitive atmosphere will be the ability of an organisation to continuously develop new products, processes or services, providing consumers with increased functionality and performance. Ramachandran, Devaranjan & Ray (2006:86) send a stern warning to organisations which are not continually innovative, that the unintentional strategic decision might see them out of business within a few years.

An entrepreneurial orientation represents the processes, practices and decision-making activities that can lead existing organisations to the development and delivery of new innovative products, services and processes (Chang, Lin, Chang & Chen, 2007:999). This is consistently suggested in the literature as the key success factor to higher performance (Yamada & Eshima, 2009:1). Three dimensions of

entrepreneurial orientation, namely *Innovativeness*, *Pro-activeness* and *Risk-taking* have been identified by researchers and are used consistently in the literature (Rauch, Wiklund, Lumpkin & Frese, 2009:763). For the purpose of this study, the opinion of Lumpkin and Dess (1996:136) that five dimensions should be used to measure entrepreneurial orientation, is accepted by adding *Autonomy* and *Competitive aggressiveness* to the original three.

These challenges demand that decision-makers effectively manage uncertainty and their crucial resources to position their organisations in ways that will allow it to adapt to these changes and challenges.

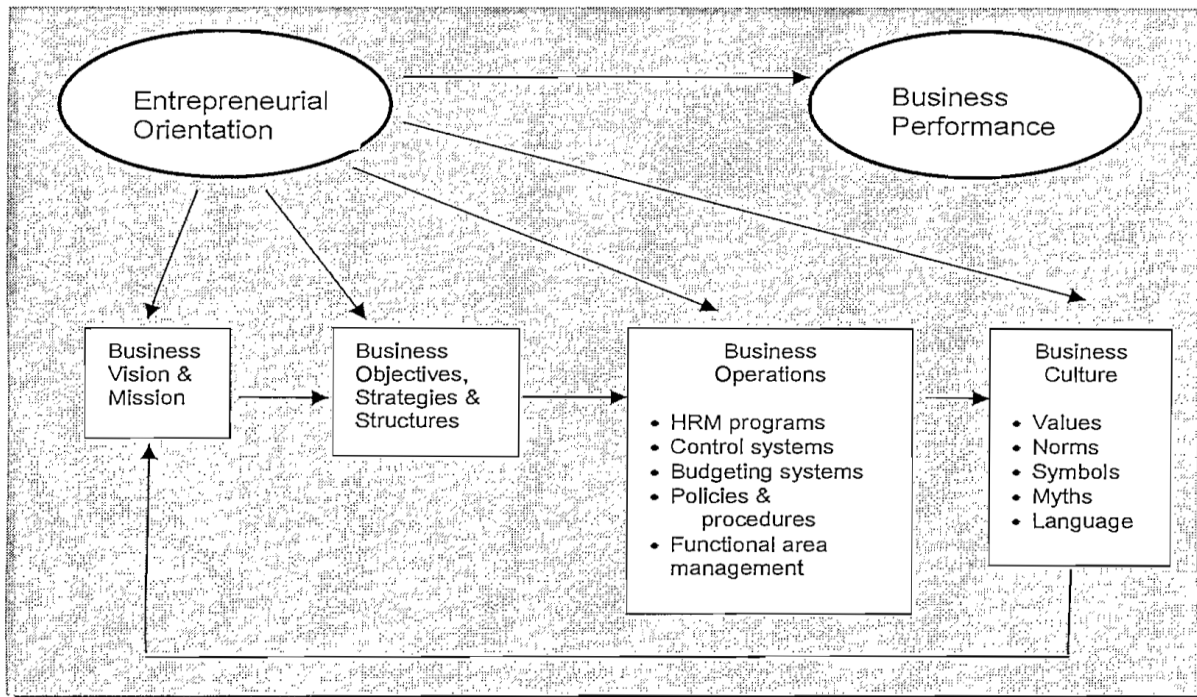
2.4.2 Defining entrepreneurial orientation

Lumpkin and Dess (1996:139) believe that nearly all entrepreneurial processes are supported by a fundamental set of strategy making process dimensions that reflects the business processes, operational methods and management styles the organisation use to act entrepreneurially. Miller (1983:770) provides the starting point for the abovementioned dimensions of entrepreneurial orientation and suggests that an entrepreneurial organisation engages in product market innovation, undertakes somewhat risky ventures and is first to come up with proactive innovations. These three dimensions, *Innovativeness*, *Risk taking* and *Pro-activeness* are supported by Morris, Kuratko, and Covin (2008:54), Zahra, Jennings and Kuratko (1999:50) and Covin and Slevin (1989:76).

Although Miller (1983) never employed entrepreneurial orientation in any of his initial scripts on the topic (Covin & Lumpkin, 2011:855), many researchers credit Miller for the creation of the term, entrepreneurial orientation. Miller has however noted some important entrepreneurial determinants and imperatives (Miller, 1983:787). The central theme of his research has concluded that entrepreneurship is integrated with variables of the environment, organisation structure, managerial- strategy and leader personality. Miller (1983:787) states that these entrepreneurial relationships vary systematically in different organisations.

Morris *et al.* (2008:50) present a framework of corporate entrepreneurship that presents entrepreneurship as an overall orientation within an organisation. This framework as presented in Figure 2.1 indicates that an organisation's performance is directly and positively influenced by entrepreneurial orientation.

Figure 2.1: Strategic integration of entrepreneurship throughout the business



Source: Morris *et al.* (2008:50)

The framework indicates that entrepreneurial orientation is interrelated to the vision and mission of the organisation, the strategies and objectives, organisational structures, operations and the overall organisational culture. The overall theme of this framework is a reinforcement of individual creativity, product and process innovation, and on-going managerial development within organisations.

Within the field of entrepreneurship, preference is now given to studies of the topic of entrepreneurial orientation, rather than to corporate entrepreneurship, although many researchers consider entrepreneurial orientation to be integrally linked to corporate entrepreneurship (Covin & Lumpkin, 2011:857). Entrepreneurial orientation as defined by Covin and Lumpkin (2011:857), presents a general or lasting paradigm of thought, inclination towards, or interest in entrepreneurship.

Wakkee, Elfering and Monaghan (2010:4) as well as Brundin, Patzelt and Shepherd (2008:231), agree with this definition. Scheepers, Hough and Bloom (2007:241) advise that *Autonomy* is an inter-organisational condition that influences the organisational climate. Scheepers *et al.* (2007:241) advocate that *competitive aggressiveness* is a sub-set of the *Pro-activeness* sub-dimension. Covin and Slevin (1989:77) define the term entrepreneurial orientation as a direction of thought for organisations actively involved in venture creation, and include *Innovativeness*, *Risk-taking* and *Pro-activeness* as constructs of measuring.

The references above have provided some definitions. In order to further define the constructs of entrepreneurial orientation, different elements of entrepreneurship, intrapreneurship, and individual traits towards venture creation, will be scouted for definitions.

- Entrepreneurship

The statement that entrepreneurial orientation measures the degree of entrepreneurship within an organisation (Scheepers *et al.*, 2007:241), is supported by Kreiser, Marino and Weaver (2002:1) as well as Barringer and Bluedorn (1999:428), with the popular view that the active nature of entrepreneurship in organisations can be measured in terms of entrepreneurial orientation.

- Strategic management

According to McGuinness (2008:8), entrepreneurship is compared to the content, while entrepreneurial orientation is compared to the process of how to be entrepreneurial. He also proposes that the differences between entrepreneurship and entrepreneurial orientation correspond to the distinctions made between content and process in the strategic management literature.

- Organisational learning

Entrepreneurial orientation plays an important role in fostering high levels of acquisitive and experimental learning within organisations (Kreiser, 2011:1045).

Organisations that strive to maximize the effect of entrepreneurial orientation on the performance of the organisation must encourage organisational learning (Wang, 2008:650). Learning orientation energises an organisation's internal self-renewal activities and is a vital aspect of an organisation's strategic management activities (Covin, Green & Slevin, 2006:59). Organisational learning encompasses how organisations derive, learn from, refine and redefine major business-related decisions (Covin *et al.*, 2006:59).

- Organisational level

Entrepreneurial orientation can be a strong organisational level trait, or attribute on the premise that for organisational-level attributes to exist. The quality in question should be sustained to some degree over time (Covin & Lumpkin, 2011:859). Covin and Lumpkin (2011:858-859) also proposed that some unrelated elements pertaining to an organisation's attitude toward entrepreneurship, can be associated with entrepreneurial orientation. In other words organisational culture values contributing to entrepreneurship are associated with the observed levels of entrepreneurial orientation. Such elements are not included in or define entrepreneurial orientation.

- Self-efficacy

Poon, Ainuddin and Junit (2006:67) have also found that entrepreneurs who display a high sense of generalised self-efficacy, will be more likely to create organisations that have an entrepreneurial orientation. Self-efficacy has also been defined as a belief that entrepreneurs pose the energy, resources, role perceptions and ability to accomplish a specific task (McShane & von Glinow, 2010:45). Self-efficacy also refers to an individual's perceived ability to achieve high levels of competence (Poon *et al.*, 2006:64).

- Individual level

Kollmann, Christofer and Kuckertz (2007:336) have proved through research that the entrepreneurial orientation construct may be transferred to the individual level. It shows that environmental factors, namely the cultural environment, the political/legal

environment and the economic environment, all influence the entrepreneurial orientation of the start-up entrepreneur.

- Performance of organisations

Recent research has also revealed that a strong relationship exists between entrepreneurial orientation and the performance of organisations (Sharma & Dave, 2011:50). Higher levels of entrepreneurial orientation in an organisation will subsequently lead to higher organisational performance. Rauch, Wiklund, Lumpkin and Frese (2009:774) supported this view through the results of a recent meta-analysis that shows that entrepreneurial orientation is a significant predictor of an organisation's performance. *Risk-taking* shows the highest impact on the performance of the organisation as compared to *Innovativeness* and *Pro-activeness* (Sharma & Dave, 2011:50).

2.4.3 Caveats of entrepreneurial orientation

A contentious issue arises from literature, namely that two principle ways are utilised to construct entrepreneurial orientation.

- Uni-dimensional against multidimensional

A concept is viewed as a uni-dimensional construct or a multidimensional construct. Earlier studies by Covin and Slevin (1989) and Miller (1983) view entrepreneurial orientation as a uni-dimensional construct, which means that all the dimensions needed to be present for an organisation to be recognised as entrepreneurial oriented (Covin & Lumpkin, 2011:862). Entrepreneurial orientation as a uni-dimensional construct therefore implies that the elements of entrepreneurial orientation need to be evident through all levels of the organisation. Other studies however suggested that entrepreneurial orientation can be considered as a multi-dimensional construct, which manifest as a set of independent dimensions (Casillas & Moreno, 2010:287; Lumpkin & Dess, 1996:165; Wiklund & Shepherd, 2005:74). George and Marino (2011:1000) conclude that entrepreneurial orientation is created

by its dimensions, rather than the dimensions being elements of entrepreneurial orientation.

- Multiplication instead of summation

Many scholars have proposed to use five dimensions to determine the level of entrepreneurial orientation within organisations (Johnson, 2011:9; Lumpkin and Dess, 1996:136; Scheepers *et al.*, 2007:41). Slevin and Terjesen (2011:978-979) have investigated whether multiplication instead of summation in terms of innovation $\times$ *Pro-activeness* $\times$ *Risk-taking* = entrepreneurial orientation; instead of innovation + *Pro-activeness* + *Risk-taking* = entrepreneurial orientation; is most appropriate. The significance of the multiplicative measure is that each variable is required to be in existence in order for it to be a construct. The predictive power of a multiplicative measure is stringent, and apparently not significantly supported in the samples assessed during the research.

2.5 DETERMINANTS OF ENTREPRENEURIAL ORIENTATION

Three dimensions namely, *Innovativeness*, *Risk-taking* and *Pro-activeness*, are supported by Morris *et al.* (2008:54), Zahra, Jennings and Kuratko (1999:50), and Covin and Slevin (1989:76). Lumpkin and Dess (1996:139-140) proposed to add two other dimensions, namely *Competitive aggressiveness* and *Autonomy*. According to Dess and Lumpkin (2005:147), these five dimensions culminate to become the strategy-making practices that organisations use to identify and launch new business ventures. It therefore represents a paradigm and a perspective about entrepreneurship that are reflected in an organisation's operational processes and business culture.

The five dimensions of an entrepreneurial orientation; *Autonomy*, *Innovativeness*, *Risk-taking*, *Pro-activeness* and *Competitive aggressiveness*, are discussed next in more detail.

2.5.1 Autonomy

Autonomy relates to the independent actions of an individual or a team in creating an idea or a vision and carrying it through to fruition (Lassen, Gertsen & Riis, 2006:361; Lumpkin & Dess, 1996:140). In the context of entrepreneurial orientation, *Autonomy* is instrumental to the process of leveraging an organisations existing strengths, identification of opportunities, and encouraging the deployment of new ventures and/or improved business practices.

To encourage *Autonomy* from a top-down approach, includes aspects such as management support for programs, incentivising acts that foster a climate of entrepreneurship and welcoming autonomous decision making. To encourage *Autonomy* from the bottom up will require special incentives and structures specially designed to develop and build support for entrepreneurial initiatives (Lumpkin, Cogliser & Schneider, 2009:49).

Merely engaging in actions such as flattening hierarchies and delegating authority to operating units with the intension to foster autonomous activity, prove to lack impetus. *Autonomy* requires much more than a change in design. Organisations need to actually grant *Autonomy* and individuals must be encouraged to exercise it (Mumford, Scott, Gaddis & Stange, 2002:724).

Finally, Dess and Lumpkin (2005:150) are of the opinion that the construct of *Autonomy* must be continuously measured and actively monitored. This implies that management creates a delicate balance between having the patience and budget to tolerate the explorations of autonomous groups, and having the strength to cut back efforts that are not bearing fruit. It must also be undertaken with a clear purpose to generate new sources of competitive advantage.

2.5.2 Innovativeness

Innovativeness reflects an organisation's preparedness to engage in and promote new ideas, novelty, experimentation and creative processes that may result in new products, services, or processes (McFadzean, O'Loughlin & Shaw, 2005:353).

Lumpkin and Dess (1996:141) were the first to emphasise the importance of innovation, proposing that innovation is the single dimension that has to be employed by all entrepreneurial businesses. The argument is raised that, even in the presence of other dimensions, if innovation is not actively employed there is no business level entrepreneurship (Gürbüz & Aykol, 2009:323).

In the dynamic environment of today where customer needs, product/service technologies and competitive forces often change unpredictably; innovation has become a prerequisite to deal with the continuous change and uncertainty (Kropp, Lindsay & Shoham, 2008:104).

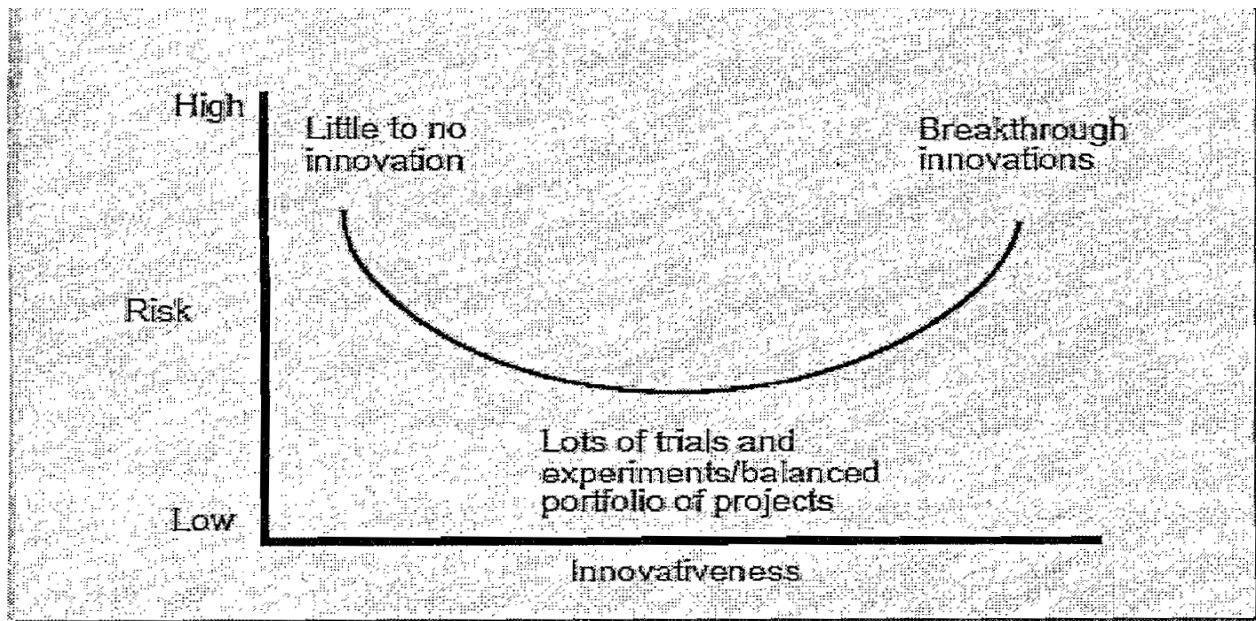
2.5.3 Risk-taking

Risk is defined by Dewett (2004:258) as measure of uncertainty about whether potentially important and/or disappointing outcomes of a decision will be realised. In this regard, Mullins and Forlani (2005:51) characterise risk dually with the potential to act prematurely on an unconfirmed opportunity (sinking the boat), or with the potential to lack action (missing the boat). Risk is integral to the operations of any organisation and almost every decision taken by managers involves risk (Von Stamm, 2008:387). *Risk-taking* behaviour, such as incurring heavy debt or making large resource commitments, often typify corporate entrepreneurial businesses that have an entrepreneurial orientation, in the interest of obtaining high returns by exploiting opportunities in the marketplace (Bhardwaj *et al.*, 2007b:134). It is not rated an extreme or uncontrollable risk, but rather a moderate and calculated risk (Morris *et al.*, 2008:62).

Intrapreneurs are therefore not typified as high risk-takers (Lambing & Kuehl, 2007:19). Corporate entrepreneurs rather try to define the risk they have to take, minimise it as much as possible, and manage it (Spinelli & Adams, 2012:41), and should thus be viewed as risk-aware and opportunity-focussed (McBeth & Rimac, 2004:18).

A concerning assumption about *Risk-taking*, which is often made, proposes that *Innovativeness* and *Risk-taking* are directly correlated. This assumes that doing more innovative things means taking higher risks. According to Morris *et al.* (2008:62), the relationship is far more complex. This relationship is depicted in Figure 2.2.

Figure 2.2: Correlation between Innovativeness and risk



Source: Morris *et al.* (2008:63)

Figure 2.2 shows that the relationship between risk and *Innovativeness* is pictured as curvilinear. It implies that risk is also high when organisations ignore new product/service opportunities and engages in little to no innovation. In this regard, Burns (2008:291) warns that whilst no innovation presents low risk in the short-term, the risk increases in the long-term. In essence, organisations that do not innovate are faced with the risk of not perceiving market and technology shifts that are capitalised on by competitors. The opposite is also true, namely that where organisations that attempt to come up with a breakthrough innovation to create new markets and redefine industries, can also face high risk (Morris *et al.*, 2008:63). Between these two extreme points risk is lower and more manageable. Here many trials and experiments are pursued continuously, which in effect means that management are balancing a portfolio of innovation. The latter approach to

innovation can be regarded to more closely resembling an entrepreneurial orientation.

In conclusion, Nieuwenhuizen (2003:9) believes that risk or *Risk-taking* has always been seen as essential to the activity of capturing profits from the creation of new combinations of productive resources, because profit is generated from an entrepreneur's perception of an opportunity and then investing to capitalise on it. Factors such as globalisation, deregulation, technological and social change, and information technology, are forcing organisations to anticipate rapid and unexpected change, which has long been the central theory of entrepreneurship (Shane, Locke & Collins, 2003:264).

2.5.4 Pro-activeness

Pro-activeness refers to a posture of anticipating and seizing opportunities in the marketplace (Lumpkin and Dess, 2001:439). First mover advantages include securing access to rare or scarce resources, advancing to new knowledge of key factors and issues, carving out market share, and a position with high barriers for rivals to enter (David, 2007:200). The introduction of novel products or breakthrough technologies by first movers are however not always successful, as it is not always accepted by the market. Careful analysis of the environment and extensive feasibility studies are proven to be essential for a proactive strategy to lead to a competitive advantage (Dess & Lumpkin, 2005:151).

Lumpkin and Dess (1996:146) however, argue that although the idea of acting in anticipation of future demand is an important component of entrepreneurship, an organisation or proposition can be novel, forward thinking and fast without always being first. Subsequently, Lumpkin and Dess (1996:146) suggest that *Pro-activeness* refers to processes aimed at anticipating and acting on future needs of consumers by acting ahead of the competition. Some of the activities that are thus associated with *Pro-activeness* include the identification of new opportunities and continuous monitoring of market trends and new venture team formation (Kropp *et al.*, 2008:104).

A pro-active organisation is thus a leader in the market, since it has the will and the foresight to seize new opportunities, even if it is not always the first to do so (Gürbüz & Aykol, 2009:323).

2.5.5 Competitive aggressiveness

Competitive aggressiveness, as a dimension of an entrepreneurial orientation, refers to an organisation's inclination to directly challenge its competitors with the intention (Lumpkin & Dess, 1996:148) to compete for a market position (Chang, Lin, Chang & Chen, 2007:1000). It is important to note that, within the entrepreneurial orientation context, *Competitive aggressiveness* is a reaction to competitive trends and demands that already exist in the marketplace and depicts a response to threats from competitors.

Organisations that are competitively aggressive are characterised by responsiveness. This may take the structure of either head-to-head confrontation, for example, when a business enters a market that another competitor has identified, or of an organisation being reactive, for example, when a business lowers prices in response to a competitive challenge (Lee & Sukoco, 2007:550). *Competitive aggressiveness* also reflects a readiness to be unconventional rather than relying on traditional techniques of competition, which includes, amongst others, adopting unconventional campaigns to challenge industry leaders, analysing and targeting a competitor's weakness, and focusing on high value-added products (Lumpkin & Dess, 2001:434).

Although closely related, Lumpkin and Dess (1996:147) have found an important distinction between *Competitive aggressiveness* and *Pro-activeness* that needs clarification. *Pro-activeness* refers to how an organisation relates to market opportunities by seizing initiative and acting opportunistically in order to shape the environment, while *Competitive aggressiveness* refers to how organisations relate to competitors, either way to compete in the market with the focus on market share.

In conclusion, these five dimensions collectively permeate the decision-making styles and practices of an organisation and often work together to enhance an organisation's entrepreneurial performance (Dess & Lumpkin, 2005:147).

2.6 MEASURING ENTREPRENEURIAL ORIENTATION

The initial constructs measuring entrepreneurial orientation may be traced back to Miller and Friesen in 1982 (George & Marino, 2011:1003-1004). Miller and Friesen (1982:7) used the following dimensions to build a measuring construct to discriminate between entrepreneurial and conservative organisations:

- The environment;
- Information processing;
- Organisation structure;
- Decision-making style;
- Product innovation; and
- Risk-taking.

George and Marino (2011:1004) further reported that Covin and Slevin (1989:77) progressed to develop an instrument focusing on *Innovation*, *Risk-taking* and *Pro-activeness*, which have become the standard for measuring entrepreneurial orientation within organisations. Wang (2008:638) adopted a fourth dimension, namely *Competitive aggressiveness*, to add to *Pro-activeness*, *Risk-taking* and *Innovativeness*. Lumpkin and Dess (1996:139-140) concurred with the views of Covin and Slevin (1989:76) and added *Autonomy* and *Competitive aggressiveness* as constructs for measuring entrepreneurial orientation.

To ensure that the behaviours being assessed are driven by stable response tendencies, the Miller/Covin and Slevin's scale on measuring entrepreneurial orientation has been further developed to measure both dispositions and behaviours (Covin & Lumpkin, 2011:859). Research further shows that the construct of measurement developed by Covin and Slevin (1989) has been used in a cohort of empirical studies of entrepreneurial orientation since its foundation (George & Marino, 2011:1004).

Lumpkin and Dess (2001:439) have further developed the instrument to associate the dimensions of entrepreneurial orientation with an organisation's performance. It has been found that external factors, such as industry and environmental variables, and or internal characteristics, structural and managerial arrangements can influence how an entrepreneurial orientation will be configured in an existing organisation to achieve high performance (Lumpkin & Dess, 1996:151-152).

Although not adopted wholly in this study, a method to use secondary data, such as the financial statements of an organisation, has been developed by Miller and Le Breton-Miller (2011:1052) using the constructs, *Innovation*, *Pro-activeness* and *Risk-taking*, to measure entrepreneurial orientation. This method utilises an organisation's research and development to sales ratio to assess *Innovativeness*, while *Pro-activeness* is measured by the percentage of profits reinvested in the organisation each year and compared to competitors in the same industry, while the volatility of the organisation's share price, excluding industry or economic fluctuations, measures *Risk-taking*. Short, Broberg, Coglisier and Brigham (2010:330) have designed some alternative methods for measuring entrepreneurial orientation. The computer-aided text analysis tool measures entrepreneurial orientation by screening published documents for language that is indicative of an organisation's entrepreneurial orientation level.

The measuring instrument (structured questionnaire) of Lotz and Van der Merwe (2013:15) was used in this study to assess the entrepreneurial orientation in the maintenance divisions of a South African steel manufacturer. The items measuring the dimensions of entrepreneurial orientation compiled by Lotz and Van der Merwe (2013:15), is based on the following measuring instruments, namely: *The corporate entrepreneurship climate instrument* (Morris, Kuratko & Covin, 2008); *Entrepreneurial climate* (Oosthuizen, 2006); *Measuring intrapreneurship* (Hill, 2003); *Corporate entrepreneurship assessment instrument* (Hornsby, Kuratko & Zahra, 2002); *Intrapreneurship items* (Antoncic & Hisrich, 2001); *Entrepreneurial orientation items* (Lumpkin & Dess, 2001); *The Entrescale* (Knight, 1997) and *The organisation structure and strategic posture scale* (Covin & Slevin, 1989).

The elements measuring perceived success of the organisation were adjusted to fit the maintenance environment inside manufacturing organisations.

2.7 DETERMINANTS OF SUCCESS FACTORS OF MAINTENANCE DIVISIONS IN A SOUTH AFRICAN STEEL MANUFACTURER

Empirical studies support the proposition that business performance is a multidimensional concept (Frank, Kessler & Fink, 2010:184; Lumpkin & Dess, 1996:137; Wiklund & Shepherd, 2005:77). Madsen (2007:188) support the view that there is a positive relationship between entrepreneurial orientation and business performance, meaning in practice that businesses that adopt a more entrepreneurial orientation, perform better, although there is no consensus on the suitable measures to define business performance (Madsen, 2007:195). Therefore, multiple performance measures should be used to determine business performance, rather than a single dimension.

A common distinction made between business performance measures, includes financial and non-financial measures (Rauch, Wiklund, Lumpkin & Frese, 2009:765). Several studies show that performance under entrepreneurial orientated organisations is context-specific (Covin & Slevin, 1989; Wiklund & Shepherd, 2005) and may even vary according to national culture (Knight, 1997; Rauch, Wiklund, Frese & Lumpkin, 2004).

For the purposes of this study, the dependant variables “perceived success factors of a maintenance division”, included operational, financial, people and future (long-term) dimensions as indicated in Table 2.6.

Table 2.6 Determinants of perceived success factors

SUCCESS FACTORS	REFERENCES
Financial	Van der Post (1997:75) holds that the following financial measures provide a solid foundation from which one can draw inferences regarding the effectiveness and success of an organisation and that all efforts and systems are eventually aimed at ensuring sustainable financial returns.

Sales growth	(Covin & Slevin, 1991; Covin, Green & Slevin, 2006; Frank <i>et al.</i> , 2010; Madsen, 2007; Richard, Wu & Chadwick, 2009) and (Wiklund & Shepherd, 2005).
Growth in profits	(Wiklund & Shepherd, 2005).
Growth in cash flow	(Frank <i>et al.</i> , 2010 and Wiklund & Shepherd, 2005).
Return on assets	(Covin & Slevin, 1991 and Richard <i>et al.</i> , 2009).
Growth in market share	(Madsen, 2007).
Non-financial	Kuratko & Audretsch (2009:3) propose that entrepreneurial orientation implies, among others, that a commitment to innovation must be at the heart of the strategic management process, while Collis and Montgomery (2005:33) argue that an uninterrupted flow of expenditure needs to be directed towards innovation in order to ensure acceptable long term levels of strategic intellectual stock. This can ensure a sustainable competitive advantage to a successful firm. Researchers propose the following non-financial measures as important measures to draw inferences regarding the success of an organisation.
Growth in employment	(Gürbüz & Aykol, 2009), (Madsen, 2007) and (Wiklund & Shepherd, 2005).
New product/service/process	(Lee & Sukoco, 2007) and (Wiklund & Shepherd, 2003).
Customer satisfaction	(Wiklund & Shepherd, 2003).
Commitment to innovation	Kuratko & Audretsch, (2009:3); Collis and Montgomery (2005:33); Christensen, Johnson & Rigby, (2002:22) and Wolpert, (2002:78).
Effectiveness and efficiency	Dess, Ireland, Zahra, Floyd, Janney & Lane, (2003:370); Kuratko and Audretsch (2009:9) and Jacobs, Chase & Aquilino, (2009:6).
Human capital	Bulut & Alpan, (2006:67) and Hayton (2005:22).

Source: Lotz and Van der Merwe (2013)

Furthermore, Lotz and van der Merwe, (2013:27) have found that their study relied entirely on the perceptions of the respondents when measuring financial success. This limited the affectivity of their research and can thus lead to misinterpretation of results. To close the gap between perception and reality, actual data on business success such as turnover, profits and market share, should be collected and correlated with the perceived business performance. Aktan and Bulut, (2008:70) propose that financial performance of an organisation should be measured firstly by past performance factors such as profit, ROI and ROE, and secondly by market based measures from stock market values, EVA and MVA.

2.8 SUMMARY

The pressure placed on profitable growth within organisations as a consequence of the increased competition and increasing tempo of technological progress, forced organisations to promote innovation and entrepreneurship.

Researchers aiming to define an entrepreneur, tend to follow different approaches. One school of authors tend to focus on the steps required from an entrepreneur to bring a new venture to fruition, while another focuses on the essential personal traits or characteristics that a person has to display to be regarded as an entrepreneur. A third group defines an entrepreneur as a prominent role player in the economic system. Finally, some choose to classify entrepreneurs by the intrinsic values that motivate them to operate in a specific environment.

Summarising the various definitions found in literature, an entrepreneur can be defined as an individual who recognises and exploits an opportunity in order to create a viable venture. Entrepreneurs are expected to possess certain key attributes or traits and play a pivotal role in the economic process by creating value and job opportunities.

The concept of entrepreneurship is viewed in literature as a holistic way of life where certain characteristics and values play an important role. In summary, it can be stated that entrepreneurship is a creative process breathed by individuals who are opportunity obsessed, who can combine a package of resources in order to create

value, cognitively carrying the accompanying financial, psychological and social risk, and driven by the need to achieve rewards of monetary and personal nature.

Entrepreneurship is widely regarded as an important driver in economic terms. The literature review supports the concepts of intrapreneurship, corporate entrepreneurship or internal venturing, and generally includes employed innovators who display entrepreneurial traits, while acting within an existing organisation. Most researchers agree to the concept that intrapreneurship is an intrinsic value of an organisation, versus the concept that both entrepreneurship and established organisations exist and are involved where required.

Corporate entrepreneurship can be defined as a creative process supported by individuals and groups of individuals who are utilising their personal entrepreneurial traits inside established organisations to create new value, products, processes or new business in order to maintain competitive advantage.

Entrepreneurial orientation is recently reviewed with more intensity than corporate entrepreneurship, although many scholars consider entrepreneurial orientation to be an aspect of corporate entrepreneurship. First researchers agreed that the essential dimensions of entrepreneurial orientation are the constructs of *Innovativeness*, *Risk-taking* and *Pro-activeness*, and that Lumpkin and Dess (1996:140) have included the constructs *Autonomy* and *Competitive aggressiveness* later.

It was found in general that innovation refers to an organisation's inclination to engage in and support new ideas, novelty, experimentation and creative processes that may result in new products, services or processes.

Risk-taking is reflected by the calculated preparedness of individuals to commit substantial proportions of an organisation's resources to new projects in pursuit of the opportunity to create new value. *Risk-taking* is a cognitive venturing into unknown territory or circumstances without knowing what the results will be, but is always calculated carefully.

Pro-activeness is in essence the actions that entrepreneurs take when anticipating and pursuing new opportunities to compete for markets. When these actions are executed effectively and with the correct timing, organisations gain first mover advantage.

Autonomy refers to empowered employees who make decisions that influence the performance of their own work, in a way that they believe to be most effective. *Autonomy* may also be viewed as an internal influencer of organisational climate. *Competitive aggressiveness* is frequently characterised to follow a dual strategy by adopting an offensive confrontational posture or an aggressive response aimed at overcoming threats in a competitive marketplace.

Literature reviews have found strong relationships between entrepreneurial orientation and perceived performance of organisations. Researchers concur that entrepreneurial orientation can be conceptualised as a multi-dimensional construct. Entrepreneurial orientation will be indicated when many dimensions are present while measuring an organisation. Entrepreneurial orientation can be defined as the stance an organisation takes with regards to the five dimensions, namely; *Innovativeness*, *Risk-taking*, *Pro-activeness*, *Autonomy* and *Competitive aggressiveness*, in order to achieve the perceived performance.

The structured questionnaire used in this study to assess entrepreneurial orientation, has been developed by Lotz and Van der Merwe (2013:15). The questionnaire centres on the constructs *Innovativeness*, *Risk-taking*, *Pro-activeness*, *Autonomy*, and *Competitive aggressiveness*, as supported by the literature and used as independent variables influencing the dependent variables of perceived success factors of maintenance divisions in a South African steel manufacturer. The dependent variables of perceived business success are indicated as *Business Growth* and *Business Development and Improvement*.

Chapter 3 analyses the establishment and evolution to the present day of the organisation, as well as its operational structure, and the demographical profile of its workforce. The perceived success factors within the different maintenance divisions are also investigated so as to clarify the dependant variables in this study.

CHAPTER 3

AN OVERVIEW OF ARCELORMITTAL SOUTH AFRICA

3.1 Introduction

The World Steel Association, which represents steelmakers in 62 countries, reported in 2012 that apparent steel consumption increased only 1.2% to 1 413 million tonnes in the year. South Africa is the major producer of crude steel in Africa, accounting for more than half of the continent's production and for about 1% of the world's total steel production. ArcelorMittal South Africa is the country's largest steel manufacturer (ArcelorMittal, 2014).

As indicated in Annexure B, "History of the South African primary steel industry," legislation that effectively lead to the founding of the South African Iron and Steel Industrial Corporation – Iscor, was tabled in parliament in 1927, following a favourable report in 1924 by a German company, Gutehoffnungshütte, to highlight the potential of the South African steel industry. This report was pioneered by Mr. Delfos, who then started to canvas Government support for the expansion of the local steel industry (SAISI, 2012).

Today ArcelorMittal South Africa has the capacity to produce 6.5 million tonnes of liquid low-carbon steel in flat and profiled form per year and as such constitutes the largest capacity producer of this commodity on the African continent (ArcelorMittal, 2014).

The organisation's vision is to be the preferred supplier of steel solutions for the development of sub-Saharan Africa. The mainstream of the organisation's revenue is generated from sales of flat steel (3.229 million tonnes) to sub-Saharan African markets, while profiled products (1.867 million tonnes) is consumed in the South African industry. Coking coal is sold in the same markets and accounts for the remainder of income. The organisation employs around 7600 employees in all its South African operations (ArcelorMittal, 2014).

ArcelorMittal South Africa forms part of the ArcelorMittal Group, a rightly global organisation and the world's largest steel manufacturer, with 330 000 employees and offices in 60 countries (ArcelorMittal, 2014). The South African operation has four major steel manufacturing sites in South Africa. From Figure 1.2 in Chapter 1, it can be seen that two sites (Vanderbijlpark Works and Vereeniging Works) are located close to one another in central South Africa, with another two sites, being Newcastle Works in Kwa-Zulu Natal and Saldanha Works in the Western Cape.

In this chapter, the vision of ArcelorMittal South Africa to become the preferred steel solutions supplier for the development of sub-Saharan Africa is discussed. Furthermore, the workings and structure of the Vanderbijlpark Works of ArcelorMittal South Africa, with specific reference to how the maintenance organisation supports the flat steel production operations, is discussed.

The causal factors to this study are also identified and discussed.

3.2 Overview of the organisation

The four ArcelorMittal South Africa sites are utilising primary processes to manufacture steel. Saldanha's Corex and Midrex continuous process produces 1.25 million tonnes of hot rolled coil per annum. The Newcastle single blast furnace, one induction furnace and two basic oxygen furnaces, produces 1.40 million tonnes of wire rod, profiles, billets, rebar and other products per annum. Vereeniging operates one electric arc furnace at 0.30 million tonnes seamless tubes, profiles and forged steel products per annum, while Vanderbijlpark's two blast furnaces, and three basic oxygen furnaces, produce 2.30 million tonnes of slabs, plates, hot rolled coil, cold rolled coil, galvanised coil, tinplated coil and coloured coil per annum (ArcelorMittal, 2014).

All the plants, with the exception of Vereeniging, have the capability to convert raw iron ore into steel. Furthermore, scrap steel as a supplementary source of steel, is utilised at both Vanderbijlpark and Vereeniging. The Vanderbijlpark and Saldanha plants are delivering product in coiled form and is thus referred to as flat steel producers, while Newcastle and Vereeniging products are pipes, bars and other

complex forms and are referred to as producers of profiled steel sections. All information in this section and the following sections was sourced from ArcelorMittal (2014).

3.3 Vanderbijlpark Works of ArcelorMittal South Africa

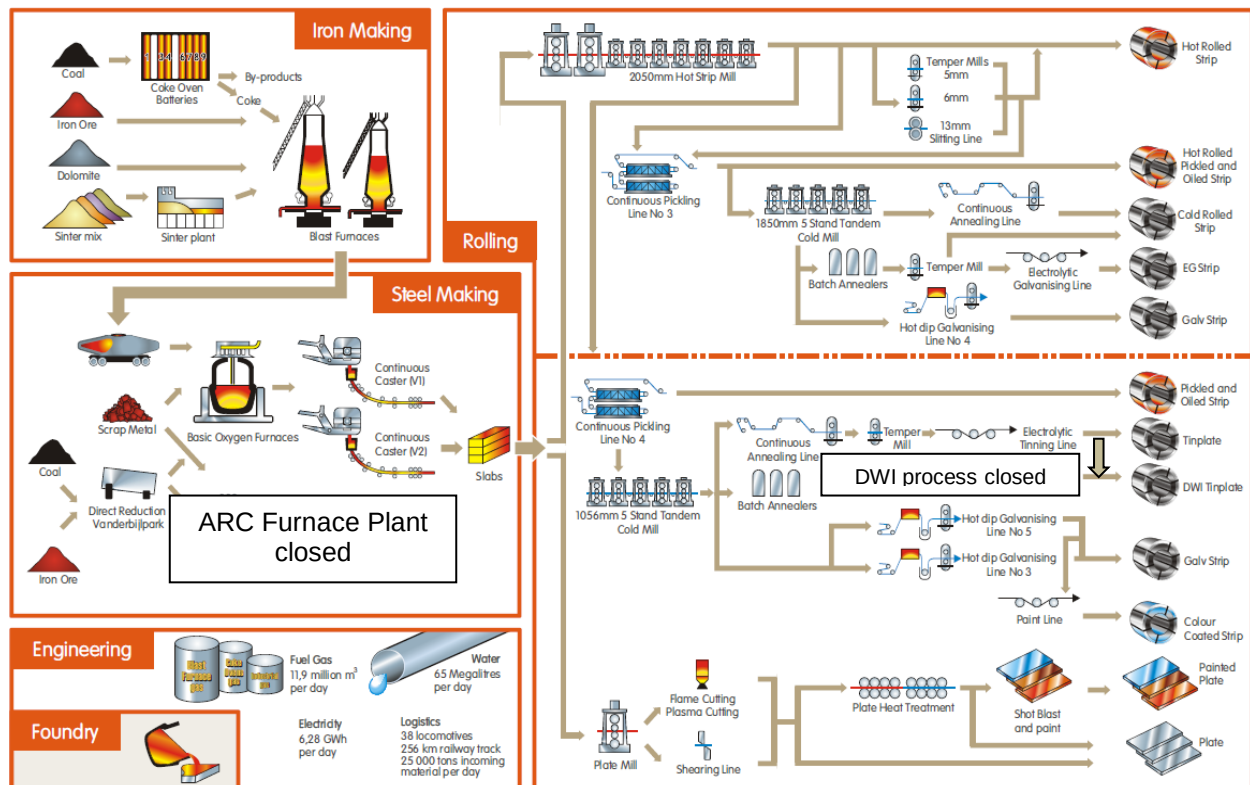
The following section serves to describe the business operations and human resource structures of the organisation covered in this study.

3.3.1 Operational description of the Vanderbijlpark Works

ArcelorMittal South Africa, Vanderbijlpark plant, located south of Johannesburg in the Gauteng Province, is regarded Africa's largest inland steel mills and is the largest supplier of flat steel products in sub-Saharan Africa. The plant's capacity was reduced from 3.6 million tonnes per annum to 2.3 million tonnes per annum after the closure of the electric arc furnaces, due to environmental pollution regulations that could not be conformed to.

The process flow of the Vanderbijlpark plant is presented in Figure 3.1. The ArcelorMittal South Africa, Vanderbijlpark plant's steel products are manufactured in an integrated process where raw materials such as iron ore, coke and dolomite are charged to blast furnaces where they are converted into liquid iron. The liquid iron is refined in basic oxygen furnaces to produce liquid steel. The liquid steel is cast into slabs, which are then re-heated and hot rolled into heavy plate in a plate mill, or into coils in a hot strip mill. The coils are either sold as hot rolled strip or processed further through integrated cold mill processes into cold rolled and coated products, such as hot dip galvanized, electro galvanised, pre-painted roofing and domestic appliance and tinplate sheets.

Figure 3.1 Process flows of Vanderbijlpark Works



Source: ArcelorMittal internal documents

All secondary processes have the common property that they receive steel items, slabs, plates or coils in cold solidified form and convert them into a final product. In Figure 3.1 all the alternative processes in the Rolling department that are utilised in order to produce various end-products are displayed. The general rolling processes employs an initial step to reduce the thickness of the steel, either through hot rolling or cold rolling, followed by various processes aimed at processing the product to the correct mechanical properties and coating the finished product. The Engineering division supplies a general maintenance support through dedicated predictive maintenance specialists and a tribology laboratory for lubrication condition monitoring. The division also supply centralised maintenance labour for shutdown purposes. Figure 3.1 shows how the three departments are linked to form the organisation.

The rolling department production units consist of the Hot Rolling and Cold Rolling divisions. Cold Rolling division consists of Cold Rolling North process units and Cold

Rolling South process units. All processing units in the ArcelorMittal South Africa Vanderbijlpark plant are supported by a dedicated maintenance team.

3.3.2 Organisational structure of Vanderbijlpark Works

ArcelorMittal South Africa Vanderbijlpark Works currently budget to employ 4 650 employees. The Vanderbijlpark plant high level organisational structure can be seen in Figure 3.2.

Figure 3.2: Vanderbijlpark plant high level organisational structure



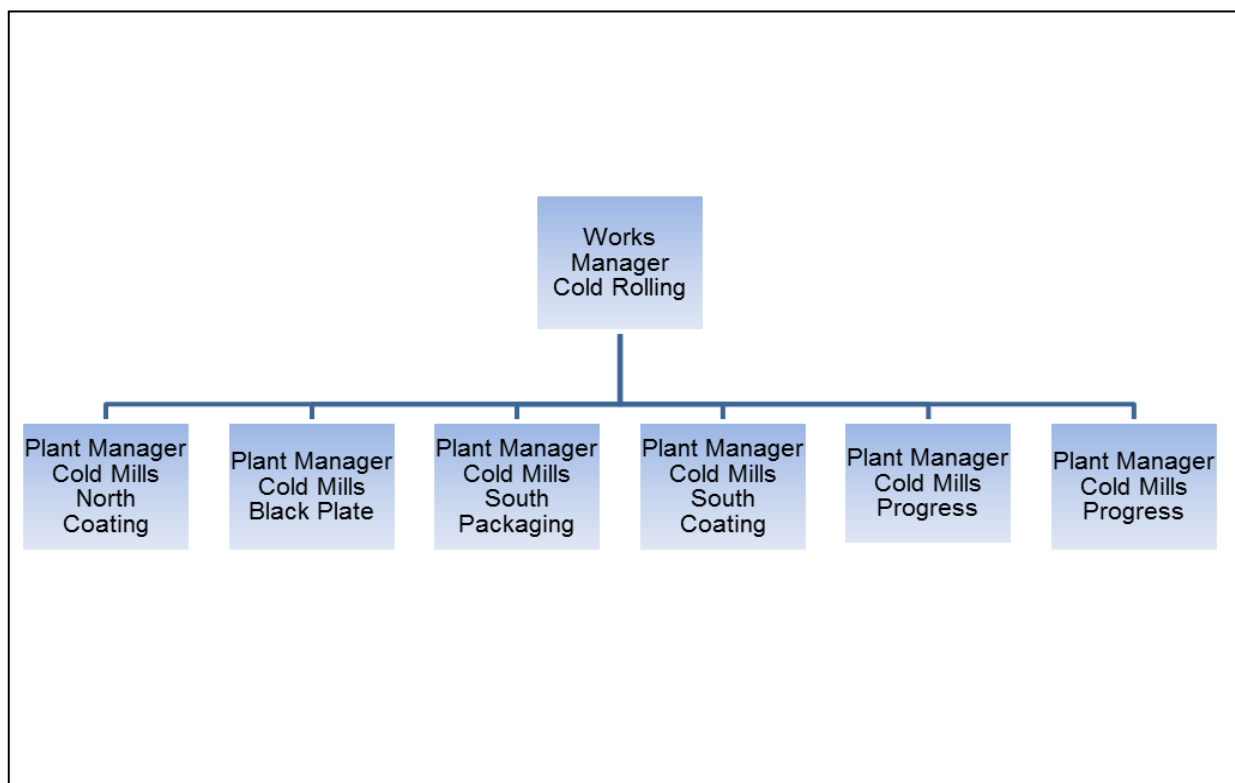
Source: ArcelorMittal internal documents

There are eleven Works Managers reporting to the General Manager, ArcelorMittal, Vanderbijlpark. The Works Managers for Iron Making, Steel Making and Foundry are responsible for the primary processes where raw material is converted into steel. The other Works Managers are responsible for the production lines where final saleable products are processed. This study focuses on the Cold Rolling Works and the Works Manager indicated in red in Figure 3.2.

3.3.3 Cold Rolling plants, Vanderbijlpark Works

The Cold Rolling Works is divided into two geographically separate works, being North Works and South Works. The Cold Rolling Works is divided into four different plants and two supporting organisations, each with a Plant Manager as indicated in Figure 3.3.

Figure 3.3: Cold Rolling organisational structure

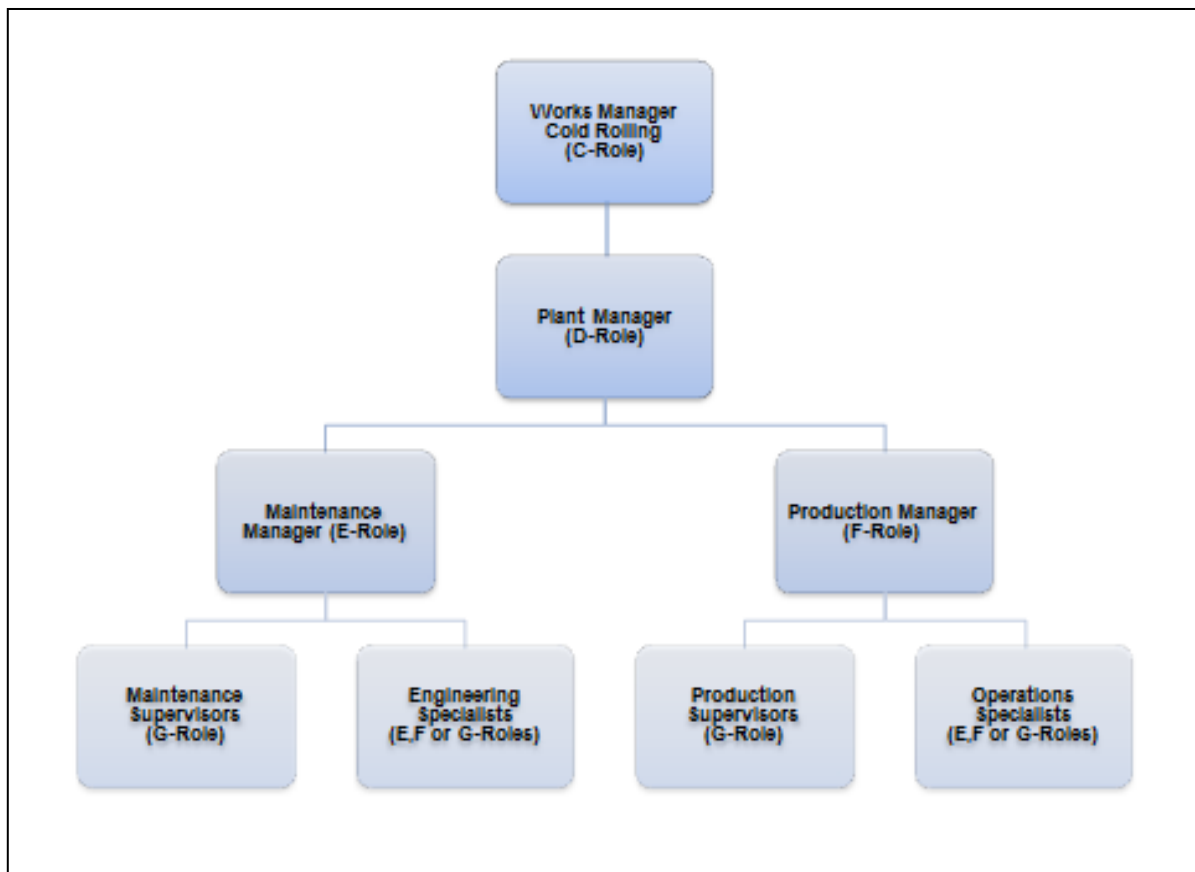


Source: ArcelorMittal internal documents

The Cold Rolling organisation currently has a budget for 918 employees and carries a 6% vacancy rate. The vacancies are mostly carried in higher positions for engineers, technicians and management.

The Plant Managers are supported by Production- and Maintenance Managers who are in turn responsible for people Supervision as indicated in Figure 3.4.

Figure 3.4: Generic Plant organisation

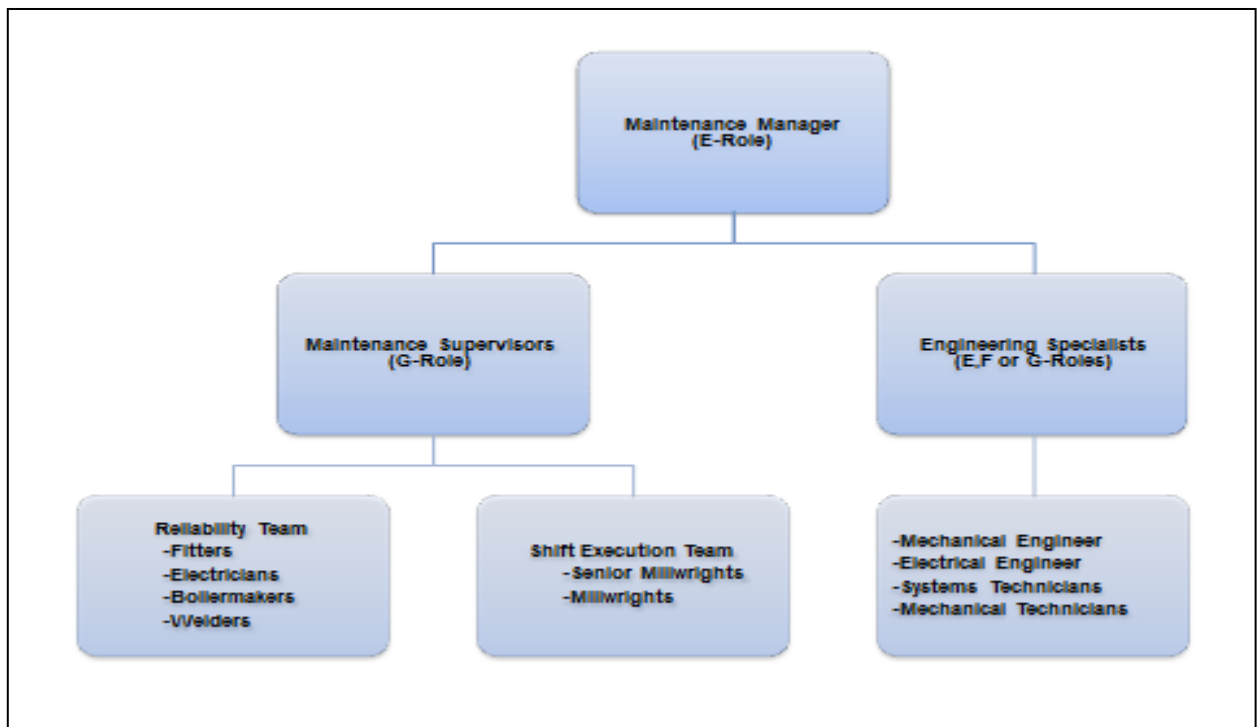


Source: ArcelorMittal internal documents

For the purpose of this study the Maintenance Manager and subordinate structures are discussed further and displayed in Figure 3.5.

The Maintenance division takes responsibility for asset reliability activities and on the spot repairs. Asset reliability activities include inspections for work identification, scheduling, planning and staging of spares and tasks for planned maintenance shutdowns. The execution teams are rotating shift workers who are directly involved with operations on a continuous basis and are highly skilled Millwrights who can perform mechanical and electrical repairs on a breakdown. The Engineering specialists are responsible for continuous improvement projects, root cause analysis teams, planning and execution of capital expense projects and running support for the maintenance teams.

Figure 3.5: Generic Maintenance division organisation



Source: ArcelorMittal internal documents

The Maintenance Managers are usually Engineers or Technicians, while Maintenance Supervisors are normally Artisans or Technicians from any discipline. The employment grading of Supervisors is G-Role while the Artisans are H-grade for seniors and I-grade for the rest.

The employment equity demographics for ArcelorMittal, Vanderbijlpark Works, are driven to match the national demography as displayed in Table 3.1. The overall organisational demography was used to draw correlations with the study population.

Table 3.1: Employment equity ratios for Vanderbijlpark Works

Vanderbijl- park Works		Female				Male				Foreign	Grand Total	
	Grading	Black	Coloured	Indian	White	Black	Coloured	Indian	White		Total	EE %
Actual	A-B	0	0	0	0	0	0	0	0	1	1	0%
% Actual		0%	0%	0%	0%	0%	0%	0%	0%	100%		
Actual	C-D	0	0	0	0	2	0	2	30	0	34	6%
% Actual		0%	0%	0%	0%	6%	0%	6%	88%	0%		
Actual	E-F	6	0	4	24	53	4	16	175	0	282	21%
% Actual		2%	0%	1%	9%	19%	1%	6%	62%	0%		
Actual	G	14	0	0	19	179	3	5	327	0	547	35%
% Actual		3%	0%	0%	3%	33%	1%	1%	60%	0		
Actual	H-I	59	1	0	63	988	14	8	1026	0	2159	48%
% Actual		3%	0%	0%	3%	46%	1%	0%	48%	0		
Actual	J-K	112	1	0	62	1142	3	0	144	0	1464	86%
% Actual		8%	0%	0%	4%	78%	0%	0%	10%	0		
Total Employees		191	2	4	168	2364	24	31	1702	1	4487	57%

Source: ArcelorMittal internal documents

The above table shows that 6% of Artisans (H and I) grading are female with an overall 49% EE ratio. The G- Role level is male dominant (94%), while the EE ratio is 36% non-white. The overall EE ratio for Vanderbijlpark Works is 57%.

All information in this chapter was sourced from ArcelorMittal (2014), as well as unpublished internal documents of the organisation.

3.4 Causal factors to the study

Historic failure to contain maintenance cost and ensuring asset availability has forced management to embark on a mission to improve the maintenance function by managing equipment failure through application of maintenance programs. An asset management vision was developed to manage and control Cold Rolling Plant assets and systems in a sustainable, co-ordinated and systematic manner. Fostering specific maintenance values to achieve and sustain the highest levels of equipment

reliability by doing the *right maintenance at the right time at the lowest effective cost* with no injuries and minimum impact on the environment.

Dhillon (2002:13) postulates further that the maintenance of engineering equipment has been a challenge since the Industrial Revolution. Although striking progress has been made, maintenance of equipment is still a challenge due to factors such as size, cost, complexity, and competition. Maintenance practices today are market driven, in particular for the manufacturing and process industry, as well as for service suppliers. Furthermore, effective asset management and maintenance practices will positively influence critical success factors, such as *safety, product quality, speed of innovation, price, profitability, and reliable delivery* (Dhillon, 2002:13).

Many authors namely, Coetzee (1998), Pehanich (1995), Maggard & Rhyne (1992) and Hartman (1992) amongst others, acknowledged the important role of maintenance in the modern manufacturing organisation, and that it is gaining importance as organisations adopt maintenance as a *profit-making* business element (Kutucuoglu, Hamali, Irani & Sharp, 2001:173), while Maggard and Rhyne (1992) related the importance of maintenance to the performance criteria for manufacturing organisations.

The Japanese authors, Hirano (1997) and Nakajima (1988), together with their western counterparts, Willmot (1994) and Hartman (1992), showed that organisations can improve their *competitiveness* through improved maintenance functions (Kutucuoglu, Hamali, Irani & Sharp, 2001:174), while Coetzee (1997) noted that maintenance cost is constantly rising, often without the related improving availability of production equipment.

By definition, maintenance is the act of preserving assets to its original operational state by employing materials, money and human resources, in order to produce financial gains (Arcelormittal, 2013:2-3). This definition supports the common distinction made between business performance measures (*Business Growth and Business Development and Improvement*), that include financial and non-financial measures (Rauch, Wiklund, Lumpkin & Frese, 2009:765).

It is therefore important to recognise that the entrepreneurial orientation constructs of *Autonomy*, *Innovativeness*, *Pro-activeness*, *Risk-taking* and *Competitive aggressiveness* in maintenance employees, can support the business success of ArcelorMittal, Vanderbijlpark through the execution of the asset reliability program.

3.5 Summary

ArcelorMittal South Africa is owned by the largest steel-producing group in the world, namely ArcelorMittal, and dominates the sub-Saharan Africa landscape in terms of the output of steel products. It has four different worksites in South Africa and utilises integrated processes to manufacture a cohort of primary and secondary steel products.

A brief overview of ArcelorMittal South Africa was presented, starting with its establishment in 1928 as a parastatal organisation; being privatised in 1989 to develop into the current ArcelorMittal South Africa today. This study was conducted at the Cold Rolling Works of the Vanderbijlpark worksite.

Very healthy market returns were exhibited during post privatisation and integration with the ArcelorMittal Group in the early part of the current century. The global economic crises in 2008 affected ArcelorMittal to the same extent as the general market.

The internal maintenance philosophy has experienced progressive development towards an asset reliability program equal to world best practices from a basic break-fix maintenance practice.

The conclusion is drawn that a number of entrepreneurial orientation traits such as *Innovativeness*, *Risk-taking* and *Pro-activeness*, can be adopted and developed to support the daily maintenance activities. It can also be concluded that effective and efficient maintenance measures will directly influence business success, by supporting the business to *grow* and ensure a competitive position through *business development* and *improvements*.

CHAPTER 4

DISCUSSION AND INTERPRETATION OF EMPIRICAL RESEARCH

4.1 INTRODUCTION

Based on an investigation into the attributes of ArcelorMittal, Vanderbijlpark's Cold Rolling Plants, as discussed in Chapter three, and the characteristics of entrepreneurial orientation and the perceived success factors as reviewed in Chapter two, a previously developed tool was utilised to test both the entrepreneurial orientation as well as the perceived business success of the organisation. The results of this study were used to draw conclusions and propose practical recommendations in order to enhance entrepreneurial behaviour and perceived business success in the specific divisions of the organisation.

A research tool in the form of a self-completion questionnaire constructed by Lotz (2009) and adapted for the purpose of this study was used. The questionnaire was distributed to 273 individuals in the maintenance division of the selected plants of which 174 usable responses (65%) were obtained. The constructs of the questionnaire were tested for reliability by calculating Cronbach's Alpha coefficients. Subsequently none of the constructs was disregarded, as all of them have calculated coefficients above the minimum acceptable value. Demographical data was analysed in isolation. Perceptions of respondents were analysed and presented as descriptive statistics, mean values ($\bar{x}$) and standard deviations (s). The practical significance and effect of the variable gender were tested to identify measured perceptions, which seem to be significantly influenced by demographical factors. Multiple regression analysis between the entrepreneurial orientation constructs and the variables of perceived business success, were determined by the Statistical Consultation Services (SCS) of the North-West University, Potchefstroom campus, in order to gain a quantitative insight into views held by respondents. The questionnaire is presented in Annexure A.

4.2 DATA COLLECTION AND PROCESSING

This section aims to discuss the procedure that was followed to execute the empirical research.

4.2.1 Measuring instrument

The measuring instrument administered to respondents was presented in hardcopy format only. Prior to the study, necessary permission was obtained from management. The questionnaires were personally distributed to the different maintenance divisions. The participants were required to follow the instructions and complete the survey by selecting the appropriate options. The survey tested for the perceived presence of constructs of entrepreneurial orientation and perceptions regarding the perceived business success of the organisation.

The questionnaire consisted of three sections: Section A determined the entrepreneurial orientation of respondents within selected maintenance divisions, while Section B determined the perceived success of the organisation. Section C recorded demographical data of respondents.

Section A: Entrepreneurial orientation. This section consisted of 27 statements aimed to determine entrepreneurial orientation of respondents in the organisation. The statements tested the five variables of entrepreneurial orientation, namely *Autonomy*, *Innovativeness*, *Risk-taking*, *Pro-activeness* and *Competitive aggressiveness*. The respondents had to indicate to what extent they agreed or disagreed with the statements. The statements were measured on a 5 point Likert scale, which vary from 1 (strongly disagrees) to 5 (strongly agrees with the statement).

Section B: Perceived success of the organisation. This section consisted of 11 statements which aimed to measure the dependent variables of *Business growth* (four statements) and *Business development and improvement* (seven statements). This section's statements were also measured on a 5 point Likert scale (the same as in section A).

Section C: Demographic information. This section captured demographical information of the respondents. The age group, gender, race classification, job grading, highest academic qualification achieved and plant attached to in Cold Rolling, of each participant was determined.

Confidentiality was ensured to all respondents and this message was communicated to the respondents through the cover letter. The respondents' individual demographic information was handled anonymously and cannot be disclosed.

The completed hardcopies of the questionnaires were personally collected from the different divisions. The responses were captured in a Microsoft Excel spread sheet.

4.2.2 Study population

It was decided to target functional positions typically populated by skilled maintenance specialists as well as artisans. This decision was based on the target population who are exposed to asset maintenance, as observed from an analysis of the organisation's human resource database, referred to in Table 1.1 in Chapter 1. This data encompassed all maintenance artisan levels as well as most specialised technical positions in the Cold Rolling plants of ArcelorMittal Vanderbijipark. In total, 267 questionnaires were administered to the total population of employees functioning in the maintenance divisions of the Cold Rolling plants of the Vanderbijipark Works of ArcelorMittal South Africa.

4.2.3 Responses

The questionnaire was available only in hard copy format that consisted of the established questionnaire, attached to a letter addressed to the respondents, explaining the background and purpose of the study.

Data was gathered with the assistance of the maintenance managers and supervisors at the different plants who assisted all individuals with the completion of the questionnaire. Preceding the survey process, communication was sent out to all Heads of Departments, Plant Managers and Maintenance Managers, explaining the

purpose of the survey, as well as the confidentiality surrounding the survey. This communication was intended to improve the response rate.

The numbers of employees working at the different maintenance divisions, based on grading are indicated in Table 4.1. A total of 267 questionnaires were distributed of which 174 were returned (65%). Two respondents did not complete their demographical data. The data was captured in a spreadsheet and handed to the Statistical Consultation Services of the North-West University for processing. Data stemming from these responses forms the foundation of the analysis presented in this chapter.

Table 4.1: Distribution of responses based on job grading

Job Grading	CMN Coating	CMN Black plate	CMS Black plate	CMS Coating	CMS Packagi ng	Total populat ion	Actual respons es	Respon se rate
Maintenance Operator	1	1	2	1	2	7	7	100%
Fitters	13	10	8	5	11	47	33	70%
Electricians	8	5	2	2	4	21	18	86%
Plater/Welder	3	2	2	2	4	13	10	77%
Millwrights	18	12	10	10	18	68	30	44%
Instrument mechanic	4	3	2	2	4	15	9	60%
Technicians	13	8	6	7	8	42	20	48%
Engineers	3	2	0	0	2	7	5	71%
Superintendent	7	2	3	3	4	19	10	53%
Planners	5	0	4	5	4	18	12	67%
Other	1	1	1	1	1	5	14	280%
Manager	1	1	1	1	1	5	4	80%
Total population	77	47	41	39	63	267	172	64%
Total responses	37	37	35	29	36	174		
Response rate	48%	79%	85%	74%	57%	65%		

Source: Arcelormittal internal HR documents

A total response rate of 65% was achieved, with the two Black Plate plants, with 79% and 85% respectively, and Coating in Cold Mills South with 74%, achieving the best responses. In the Job Grading category, Millwrights with 44% and Technicians

with 48% returned the lowest responses. This could be explained by the rotating shifts worked by Millwrights, which made distribution of the questionnaires difficult. A high vacancy rate resulted in a low response rate amongst Technicians. The Maintenance Operators (100%) were all supported by their Supervisors to complete the questionnaire, due their literacy level. The influence of translation and interpretation by Supervisors was not taken in consideration and the data was accepted as given. All the other categories, except for Superintendents (53%), returned response ratios above average. The response rate for the category, other, was unrealistic because it included responses from long-term maintenance contractors on site, who were not part of the permanent employee data. These responses were however included because these contractors work under supervision of ArcelorMittal managers.

4.3 DEMOGRAPHICAL INFORMATION OF RESPONDENTS

Section C of the questionnaire captured demographic information of respondents, where participants had to indicate their age group, gender, race classification, job grading, highest academic qualification obtained and plant attached to in Cold Rolling.

The frequency and percentage distribution of the demographic information are discussed in the following sections.

4.3.1 Age group of respondents

- Purpose of the question

The purpose of question C01 in section C of the questionnaire (refer to Annexure A) was to determine the age group classifications of the respondents, according to the five predetermined age groups. The respondents were requested to indicate their age group by selecting a group: age 29 years or younger, age 30 to 39 years, age 40 to 49 years, age 50 to 59 years or age 60 years and older. Table 4.2 indicates the frequency distribution per age group.

- Results obtained

The results for age group of respondents are displayed in Table 4.2.

Table 4.2: Age groups of respondents

Age group	Frequency	Percentage
≤ 29	45	25.9%
30 – 39	43	24.7%
40 – 49	34	19.5%
50 – 59	42	24.1%
60 +	8	4.6%
Not indicated	2	1.1%
Total	174	100.00%

- Analysis of the data

Age distribution of the respondents varied from younger than 29 years up to 63 years, the compulsory pension age. There were eight respondents (4.6%) in the age group 60 years and older. The majority of respondents were in the age group younger than 29 years, with 45 respondents which represent 25.9% of the responses. The second and third largest age groups were 30 to 39 years and 50 to 59 years, representing 24.7% and 24.1% of the total responses respectively. The age group 40 to 49 years represented 19.5% of total responses. Two respondents did not indicate their age group.

4.3.2 Gender of respondents

- Purpose of the question

The purpose of question C02 in section C of the questionnaire (refer to Annexure A) was to determine the gender classification of the respondents. This data was also required to compare the differences in means between the demographic variable

gender (male or female), the entrepreneurial orientation variables, and the perceived success of the organisation variables.

- Results obtained

Table 4.3 indicates the frequency distribution of the gender of respondents.

Table 4.3: Gender of respondents

Gender	Frequency	Percentage
Male	152	87.4%
Female	20	11.5%
Not indicated	2	1.1%
Total	174	100.00%

- Analysis of the data

The majority of respondents were male (152), representing 87.4% of the total responses. There were 20 female respondents, representing 11.5% of the total responses. Two respondents did not indicate their gender.

4.3.3 Racial group of respondents

- Purpose of the question

The purpose of question C03 in section C of the questionnaire (refer to Annexure A) was to determine the race of the respondents as classified according to the South African racial group classification, namely Black, White, Indian or Coloured. This data were also required to compare the differences in means between the demographic variable race (Whites and Non-whites) and the entrepreneurial orientation variables, the entrepreneurial climate variables and the perceived success of the organisation variables.

- Results obtained

Table 4.4 indicates the frequency distribution of race.

Table 4.4: Race classification

Race Classification	Frequency	Percentage
Black	77	44.3%
White	93	53.4%
Indian	1	0.6%
Coloured	1	0.6%
Not indicated	2	1.1%
Total	174	100.00%

- Analysis of the data

The largest number of respondents was White, with a total of 93 replies, representing 53.4% of the total responses. There were 77 Black respondents, representing 44.3% of total responses. There were only one Indian and one Coloured respondent. Two respondents did not indicate their race.

4.3.4 Job grading distribution of respondents

- Purpose of the question

The purpose of question C04 in section C of the questionnaire (refer to Annexure A) was to determine the job grading of the respondents according to 12 predetermined gradings.

- Results obtained

Table 4.5 indicates the frequency distribution based on job grading of respondents.

Table 4.5: Job grading of respondents

Job grading	Frequency	Percentage
Maintenance operator	7	4.0%
Fitter	33	19.0%
Electrician	18	10.3%
Plater/Welder	10	5.7%
Millwright	30	17.2%
Instrument Mechanic	9	5.2%
Technician	20	11.5%
Engineer	5	2.9%
Superintendent	10	5.7%
Planner	12	6.9%
Contractor/Other	14	8.0%
Manager	4	2.3%
Not indicated	2	1.1%
Total	174	100.00%

- Analysis of the data

The largest number of respondents was from the Fitter grading (33), representing 19.0% of the total responses. The responses received from Millwrights (30) and Electricians (18), represented 17.2% and 10.3% of total responses respectively. The lowest number of responses came from Engineers (5) and Managers (4), namely 2.9% and 2.3% respectively. Two respondents did not indicate their job grading.

4.3.5 Highest academic qualification of respondents

- Purpose of the question

The purpose of question C05 in section C of the questionnaire (refer to Annexure A) was to determine the highest academic qualifications of the respondents, by indicating their highest academic qualification from a list of six predefined groups in the questionnaire.

- Results obtained

Table 4.6 indicates the frequency distribution of the highest academic qualification obtained by respondents.

Table 4.6: Highest academic qualification of respondents

Highest education	Frequency	Percentage
Lower than Grade 12	7	4.0%
Grade 12	23	13.2%
Certificate	101	58.0%
Diploma	33	19.0%
Degree	6	3.4%
Post graduate degree	2	1.1%
Not indicated	2	1.1%
Total	174	100.00%

- Analysis of the data

A total of 101 of the respondents obtained a Certificate, representing 58% of the total respondents. The second largest number of respondents (33) obtained a Diploma, representing 19.0% of the total respondents. A Degree (8) was obtained by 4.5% of the total respondents, while 4% of the respondents did not obtain grade 12. Two respondents did not indicate their highest academic qualification. A total of 165 of the respondents, representing 94.9%, obtained an academic qualification of grade 12 or higher.

4.3.6 Functional department of respondents

- Purpose of the question

The purpose of the functional department classification of the questionnaire was to determine in which of the divisions the respondents were working. The Cold Rolling Department is divided into five different plants, namely Cold Rolling North:- Coating or Black plate and Cold Rolling South:- Black plate, Packaging, and Coating.

- Results obtained

Table 4.7 below represents the number of respondents per plant.

Table 4.7: Plants where the respondents are working

Division	Frequency	Percentage
Cold Mills North Black Plate	37	21.3%
Cold Mills North Coating	37	21.3%
Cold Mills South Black Plate	35	20.1%
Cold Mills South Coating	29	16.7%
Cold Mills South Packaging	36	20.7%
Total	174	100.00%

- Analysis of the data

Responses were equally spread between the five Cold Mills plants. The Cold Mills North plants contributed 42.6% of the total responses. Cold Mills South, Coating plant, represented the smallest number of responses and contributed only 16.7%.

4.4 THE MEASURING INSTRUMENT

This section discusses the findings concerning the measuring instrument used to measure the entrepreneurial orientation and perceived business success of maintenance divisions.

4.4.1 Reliability of the measurement instrument using the Cronbach's Alpha coefficient

Internal consistency (reliability) can be determined by means of coefficient Alpha by computing the average of all possible split-half reliabilities for the multiple item scale (Zikmund & Babin, 2007:322). According to Struwig and Stead (2004:132), the Cronbach's Alpha coefficient can be calculated to determine the consistency between different items measuring the variables related to entrepreneurial orientation and perceived success.

The calculated Cronbach's Alpha coefficient value of the results can vary between (0), for no reliability and (1), for maximum reliability (Kent, 2007:142). A larger coefficient value relates to higher internal consistency and predicts a more reliable result (Struwig & Stead, 2004:133). Nunnally & Bernstein (1994:265) propose that Cronbach's Alpha coefficient should be equal or greater than 0.7 for good reliability. Although Field (2005:668) states that when attributes in psychological constructs, rather than abilities are tested, an Alpha coefficient lower than 0.7 can still be acceptable.

The Cronbach's Alpha coefficients of the variables of entrepreneurial orientation and perceived success were calculated from responses, and presented in Table 4.8.

Table 4.8: Cronbach's Alpha coefficients

Variables	Cronbach's Alpha coefficient
Entrepreneurial orientation	
Autonomy	0.531
Innovativeness	0.864
Risk-taking	0.707
Pro-activeness	0.817
Competitive aggressiveness	0.799
Perceived business success	
Business growth	0.716
Business development and improvement	0.867

From the data presented in Table 4.8, it can be seen that three of the Cronbach's Alpha coefficients are higher than 0.8, which is even higher than the recommended 0.7, as presented by Nunnally and Bernstein (1994:265). *Autonomy* (0.531) is the only variable fairly below the 0.7 mark, and for the purpose of this study this variable has been included as motivated by (Field, 2005:688).

4.5 ASSESSMENT OF THE ENTREPRENEURIAL ORIENTATION

This section discusses the findings concerning results relating to entrepreneurial orientation.

The entrepreneurial orientation section (A), consists of 27 statements measuring the five construct variables of entrepreneurial orientation. These variables are *Autonomy*, *Innovativeness*, *Risk-taking*, *Pro-activeness* and *Competitive aggressiveness*. The respondents were required to indicate on a five point Likert scale to what degree they disagree or agree with the statements. On the Likert scale, the values vary from 1 where the respondent strongly disagrees, up to 5 where the respondent strongly agrees, with a specific statement.

The mean values of all variables have been calculated for all of the respondents. The mean value indicates to what extent the sample group of respondents have perceived the strongest agreement to the presence thereof in their respective divisions. A high mean value for the variable, predicts strong agreement from respondents with the specific variable.

The standard deviation of variables has also been calculated to indicate the spread of responses. A smaller standard deviation is predicted when a large number of respondents have the same consistent perspective of a variable. When the standard deviation is larger, it indicates that the responses are inconsistent.

In the following sections the results of the individual statements are discussed -first per variable, and thereafter the combined results is presented and discussed.

4.5.1 Assessment of the combined results

While the individual statements of the independent variables were discussed in the previous section, the combined results for the five constructs or independent variables of entrepreneurial orientation are listed in Table 4.9.

Table 4.9: Results of the entrepreneurial orientation constructs

Variable	n	$\bar{x}$	s
Autonomy	864	3.625	0.968
Innovativeness	1559	3.393	0.988
Risk-taking	863	3.319	0.945
Pro-activeness	688	3.301	0.976
Competitive aggressiveness	690	3.394	0.871
Total		3.409	0.964

The value of 3 on the 5 point Likert scale indicates the neutral opinion. The average mean of all the independent variables of entrepreneurial orientation is $\bar{x} = 3.409$, indicating that there is in general a positive perception towards entrepreneurial orientation in the maintenance divisions of the Cold Rolling plant. There is however space for improvement.

The strongest agreement is with *Autonomy* ($\bar{x} = 3.625$). *Competitive aggressiveness* ($\bar{x} = 3.394$), *Innovativeness* ($\bar{x} = 3.393$), *Pro-activeness* ($\bar{x} = 3.301$) and *Risk-taking* ($\bar{x} = 3.319$), followed with results lower than the average mean ($\bar{x} = 3.409$).

The lowest standard deviation is found in *Competitive aggressiveness* ($S = 0.871$), followed by *Risk-taking* ($S = 0.945$), *Autonomy* ($S = 0.968$), *Pro-activeness* ($S = 0.976$) and *Innovativeness* ($S = 0.988$). The overall entrepreneurial orientation standard deviation (S) is 0.964.

4.5.2 Assessment of individual variables measuring entrepreneurial orientation

The descriptive statistics; mean and standard deviation, were calculated for each statement of the questionnaire and were presented per construct variable. The statements were sorted by mean values, ranging from the largest value to the smallest in order to gain perspective on the data.

There were a total of 174 responses to the survey and some respondents did not complete all the questions. No questionnaire was rejected and the sample size for all

the statistical calculations was reported for the respondents who replied per question.

4.5.2.1 Autonomy

The responses to the variable *Autonomy* are summarised in Table 4.10, with statements A1 to A5 sorted from the largest to the smallest mean value obtained.

Table 4.10: Results of Autonomy

	Statement	n	$\bar{x}$	s
A1	I have enough autonomy in my job without continual supervision to do my work.	173	4.150	0.581
A2	Our business allows me to be creative and try different methods to do my job.	174	3.885	0.796
A4	Employees in our business are encouraged to manage their own work and have flexibility to resolve problems.	174	3.759	0.832
A5	I seldom have to follow the same work methods or steps while performing my major tasks from day to day.	170	3.418	0.989
A3	Employees in our business are allowed to make decisions without going through elaborate justification and approval procedures.	173	2.908	1.069

Statement A1 ($\bar{x} = 4.150$) reports the highest average score for this variable, while statement A3 ($\bar{x} = 2.908$) has reported a slight disagreement highlighting a feeling that the employees have to go through elaborate approval procedures to get their work done.

4.5.2.2 Innovativeness

Responses to *Innovativeness* are summarised in Table 4.11, which consists of statements I1 to I9, sorted from the largest to the smallest mean values.

Table 4.11: Results of innovativeness

	Statement	n	$\bar{x}$	s
I8	We have a widely held belief that innovation is an absolute necessity for the business's future.	173	3.734	0.848
I7	Our business places a strong emphasis on continuous improvement in procedures/products/equipment.	173	3.688	0.818
I1	Our business regularly introduces new procedures/products/equipment.	174	3.374	1.098
I5	Over the past few years, changes in our processes, services and product lines have been quite dramatic.	174	3.322	1.037
I9	Our leaders seek to maximise value from opportunities without constraint to existing models, structures or resources.	172	3.320	0.922
I2	Our business places a strong emphasis on new and innovative procedures/products/equipment.	174	3.305	0.988
I4	Our business is continually pursuing new opportunities.	173	3.295	1.034
I6	In our business there is a strong relationship between the number of new ideas generated and the number of new ideas successfully implemented.	172	3.267	0.904
I3	Our business has increased the number of new procedures/equipment during the past two years.	174	3.236	1.084

The respondents show general agreement to all the statements measuring *Innovativeness*. There is a relatively strong feeling that the organisation has a widely held belief that innovation is an absolute necessity for the business's future and that the business places a strong emphasis on continuous improvement in procedures, products and equipment, as indicated through statements I8 and I7 which have scored respective mean values of $\bar{x} = 3.734$ and 3.688, with standard deviations of 0.848 and 0.818. On average the respondents agree with statements I1 ($\bar{x} = 3.374$), I5 ($\bar{x} = 3.322$), I7 ($\bar{x} = 3.342$), I9 ($\bar{x} = 3.320$), I2 ($\bar{x} = 3.305$), I4 ($\bar{x} = 3.295$) and I6 ($\bar{x} = 3.267$). The respondents seem to be in less agreement about whether the business has increased the number of new procedures or equipment during the past two years, as indicated by statement I3 ($\bar{x} = 3.236$ and $s = 1.048$), which have scored the closest to the neutral score of three.

4.5.2.3 Risk-taking

Responses to the independent variable *Risk-taking* are summarised in Table 4.12.

Table 4.12: Results of Risk-taking

	Statement	n	$\bar{x}$	s
R3	Owing to the environment, our business believes that bold, wide-ranging acts are necessary to achieve objectives.	172	3.541	0.874
R1	When confronted with uncertain decisions, our business typically adopts a bold posture in order to maximise the probability of exploiting opportunities.	173	3.416	0.807
R2	In general, our business has a strong inclination towards high-risk projects.	173	3.335	0.904
R4	Employees are often encouraged to take calculated risks concerning new ideas.	173	3.185	1.040
R5	The term “risk-taker” is considered a positive attribute for employees in our business.	172	3.116	1.025

The highest agreement is with statement R3 ($\bar{x} = 3.541$ and $s = 0.874$). It therefore seems that the respondents believe that bold and wide-ranging acts are necessary to achieve the business’ objectives, while still considering the impact to the environment. There is also positive agreement with statement R1 ($\bar{x} = 3.416$) and R2 ($\bar{x} = 3.335$). In contrast with the previous statements, the respondents seem to show disagreement in statements R4 ($\bar{x} = 3.185$) and R5 ($\bar{x} = 3.116$). This is an indication that the term “risk-taker” is considered a negative attribute in the organisation and that employees are not encouraged to take calculated risks concerning new ideas.

4.5.2.4 Pro-activeness

Responses to the *Pro-activeness* construct is summarised in the Table 4.13, with four statements, from P1 to P4 sorted from the largest to the smallest mean value.

Table 4.13: Results of Pro-activeness

	Statement	n	$\bar{x}$	s
P4	Our business continuously monitors trends and identifies future needs of plants.	172	3.541	0.981
P3	Our business continuously seeks out new procedures/products/equipment.	172	3.320	0.941
P2	Our business typically initiates actions which others respond to.	172	3.302	0.912
P1	Our business is very often the first to introduce new procedures/products/equipment.	172	3.041	1.011

The mean values of the statements varies from a strong agreement with statement P4 ($\bar{x} = 3.541$) down to a low agreement with statement P1 ($\bar{x} = 3.041$). It seems that

there is a relative strong agreement that the organisation is seldom first in the market to introduce new procedures, products or equipment. It seems that there are a relative positive agreement with statements P3 ($\bar{x} = 3.320$) and P2 ($\bar{x} = 3.302$) as well.

4.5.2.5 Competitive aggressiveness

Responses to the independent variable *Competitive aggressiveness* is summarised in the Table 4.14, with four statements from C1 to C4 sorted from the largest to the smallest mean value.

Table 4.14: Results of Competitive aggressiveness

	Statement	n	$\bar{x}$	s
C4	Our business knows when it is in danger of acting overly aggressively (this could lead to erosion of our division's reputation and damage plant performance).	173	3.497	0.846
C3	Our business effectively assumes an aggressive posture to combat negative trends that may threaten our survival or competitive position.	173	3.434	0.871
C2	Our business is very aggressive and intensely competitive.	173	3.399	0.938
C1	In dealing with competitors our business typically adopts a very competitive “undo-the-competitor” posture.	171	3.246	0.811

There is general agreement from the respondents that the organisation is competitively aggressive with statement C4, which have the highest mean value of $\bar{x} = 3.497$ and a standard deviation of 0.846. This is followed by statements C3 which have a mean values of $\bar{x} = 3.434$ and C2 ($\bar{x} = 3.399$). The respondents agree the least with statement C1, namely that the organisation has a typical posture to act very competitively and to “undo-the-competitor”, with a mean value of $\bar{x} = 3.246$ and a standard deviation of 0.811.

The results of perceived success in the organisation are discussed in the following section.

4.6 ASSESSMENT OF PERCEIVED SUCCESS

Section B of the questionnaire consisted of 11 statements measuring the two dependable variables of perceived business success, *Business growth* and *Business development and improvement*. The respondents were expected to indicate their opinion on a five point Likert scale.

4.6.1 Assessment of combined results

The specific items were discussed in the previous section while the combined results from the two variables of perceived success are presented in Table 4.15.

Table 4.15: Results of perceived success

Variable	n	$\bar{x}$	s
Business growth	688	3.003	0.968
Business development	1209	3.049	1.076
Total		3.032	1.038

The average mean of all the dependent variables of perceived success is $\bar{x} = 3.032$, indicating that the organisation is experiencing an above average level of perceived success at present. The average mean of perceived success is lower than that for entrepreneurial orientation (3.409), indicating that there is still room to improve the perceived success of the organisation.

The strongest agreement is with *Business development and improvement* ($\bar{x} = 3.049$) followed by *Business growth* ($\bar{x} = 3.003$). The standard deviation for *Business development and improvement* is ($s = 1.076$), and that for *Business growth* ($s = 0.968$). The standard deviation for both of the two variables is high, which indicate that there is not much consensus regarding these aspects throughout the organisation.

4.6.1.1 Business growth

The responses to perceived success - *Business growth*- are summarised in Table 4.16, with four statements B.A8 to B.A11 sorted from the largest to the smallest mean value.

Table 4.16: Results of Business growth

	Statement	n	$\bar{x}$	s
B.A8	The competitive position of our business has improved over the past few years.	172	3.128	0.876
B.A11	Our business has experienced growth in turnover over the past few years.	173	3.000	0.994
B.A9	Our business has experienced growth in market share over the past few years.	173	2.983	0.967
B.A10	Our business has experienced growth in profits over the past few years.	173	2.902	1.021
Total			3.003	0.968

There are mixed agreement to the statements measuring the variable, *Business growth*. The respondents agree that the competitive position of the business has improved over the past few years with statement B.A8 having a mean value of 3.128 and a standard deviation of 0.876. This is followed by statement B.A11 with a mean value of $\bar{x} = 3.000$. Respondents are of the opinion that the business has lost market share with statement B.A9 ($\bar{x} = 2.983$). The lowest agreement is with statement B.A10, which has a mean value of 2.902 and a standard deviation of 1.021.

The overall mean of the dependent variable, *Business growth*, is $\bar{x} = 3.003$, with a standard deviation of $s = 0.968$.

4.6.1.2 Business development and improvement

The responses to perceived success - *Business development and improvement* - are summarised in Table 4.17 with seven statements from B.A1 to B.A7 sorted from the largest to the smallest mean value.

Table 4.17: Results of business development and improvement

	Statement	n	$\bar{x}$	s
B.A 4	Our employees are highly committed to our business.	173	3.312	1.003
B.A 7	The effectiveness (doing the right things) of our business has improved over the past few years.	172	3.291	0.978
B.A 6	The efficiency (doing things right) of our business has improved over the past few years.	173	3.289	0.945
B.A 2	The image (stature) of our business, relative to our competitors, has grown over the past few years.	173	3.104	0.934
B.A 5	In our business, employees are viewed as the most valuable asset of the business.	173	3.000	1.110
B.A 3	The morale (job satisfaction) of our employees has improved over the past few years.	171	2.766	1.097
B.A 1	During difficult economic periods, investments in research and development/innovative projects continue and no financial cuts are made.	171	2.573	1.217
Total			3.049	1.076

The overall mean of *Business development and improvement* is 3.049 with a standard deviation of 1.076. In this perceived success variable the strongest agreement is with statement A4 ($\bar{x}$ = 3.312 and s = 1.003), stating that our employees are highly committed to our business. Statements A7 ($\bar{x}$ = 3.291), A6 ($\bar{x}$ = 3.289) and A2 ($\bar{x}$ = 3.104) have returned mean values above the overall mean. Statement A5, views employees as the most valuable asset of the business and yielded 3.000, an indecisive value, while A3 ($\bar{x}$ = 2.766) and A1 ($\bar{x}$ = 2.573) have returned disagreeing opinions.

4.7 RELATIONSHIP BETWEEN GENDER AND ENTREPRENEURIAL ORIENTATION INCLUDING PERCEIVED BUSINESS SUCCESS OF THE ORGANISATION

An independent *t*-test on the difference in the means of variables was utilised to test for statistical significance (*p*-values) and practical significance (*d*-values) between

the expressed opinions of gender and the different construct variables measuring entrepreneurial orientation and perceived business success. The simple conservative approach was used for the purpose of this study where the *t*-test does not assume equal variances (Elliott & Woodward, 2007:59).

Ellis and Steyn (2003:51) state that statistical significance tests show the trend to yield small *p*-values (indication of significance) as the proportions of the data set increases, while the effect size is independent of sample size and measures practical significance. A small *p*-value, for example smaller than 0.05, will therefore be accepted to indicate statistical significance. Cohen's guidelines will be utilised to interpret practical significance (*d*), as follows: small effect (*d* = 0.2), medium effect (*d* = 0.5) and large effect (*d* = 0.8). Since the effect size is the result of a difference having a large effect, the results with medium effects can be regarded as visible effects, and results where *d* > 0.8 as practically significant (Field, 2005:32; Ellis & Steyn, 2003:51-53; Thompson, 2001:80-93).

The relationship between genders, the five independent variables of entrepreneurial orientation and the two dependent variables of perceived business success were measured in this study.

4.7.1 Practical significance

In total 151 male respondents and 20 female respondents participated in the study. Three respondents did not indicate their gender. The data is clearly skew towards males. Table 4.18 indicates the relationship between the different independent variables of entrepreneurial orientation, combined with the dependent variables of perceived business success and the demographic variable of gender (male or female). The number of participants (*n*), mean values ($\bar{x}$), and standard deviation (*s*) of the different variables, have been calculated separately for males and females to indicate whether there is a difference in opinion based on gender.

Table 4.18: Significance test results for gender

Variable	Male			Female			Comparison	
	n	$\bar{x}$	s	n	$\bar{x}$	s	p	d
Autonomy	151	3.597	0.515	20	3.757	0.413	0.126	0.31
Innovativeness	151	3.359	0.684	20	3.761	0.352	0.000	0.59
Risk-taking	151	3.273	0.653	20	3.650	0.355	0.000	0.58
Pro-activeness	151	3.253	0.783	20	3.712	0.586	0.004	0.59
Competitive aggressiveness	151	3.361	0.681	20	3.800	0.470	0.001	0.64
Business Growth	151	2.916	0.787	20	3.250	0.649	0.045	0.42
Business Development and Improvement	151	3.071	0.758	20	3.257	0.524	0.170	0.25

Comparing the p -values of the demographical variable of gender has yielded p -values smaller than 0.05 for *Innovativeness* ($p = 0.000$), *Risk-taking* ($p = 0.000$), *Pro-activeness* ($p = 0.004$), *Competitive aggressiveness* ($p = 0.001$) and *Business growth* ($p = 0.045$). Therefore depending on the p -value test results, there is statistical significance in the opinions related to the gender of the participants.

The practical significance d -values reveal a small effect between measurements of gender with regard to the variables *Autonomy* ($d = 0.31$), *Business growth* ($d = 0.42$) and *Business development and improvement* ($d = 0.25$), with the d -value < 0.5 . The other variables measure medium to large effects on practical significance.

Females consistently expressed higher mean values for all the variables for entrepreneurial orientation and the perceived success of the business. Although a high level of statistical significance was proved to exist for the gender variable, practical significance between the opinions of males versus females in this specific population proved to be general medium to high.

4.8 MULTIPLE REGRESSIONS ANALYSIS

Multiple regression analysis was done to determine the influence that independent variables of entrepreneurial orientation have on the dependent variables of perceived business success. In other words, does the perceived business success increase when perceptions on entrepreneurial orientation increase? Factor scores for

individual participants were computed as the average of all items contributing to the related factors. Perceived *Business growth* and perceived *Business development and improvement* are the two dependent variables of perceived business success. The results of the multiple regression analysis are presented in two separate regression models in the following tables.

The following Table (4.19) presents the results of the multiple regression analysis on the dependent variable of perceived *Business growth*.

Table 4.19: Multiple regression results: Impact of entrepreneurial orientation on Business growth

Model	Unstandardised coefficients		Standardised coefficients	t-value	p-level
	B	Std. Error	Beta		
(Constant)	-0.14	0.40		-0.36	0.72
Autonomy	0.13	0.12	0.05	0.54	0.59
Innovativeness *	0.13	0.14	0.26	2.86	0.01
Risk-taking *	-0.15	0.14	0.15	2.12	0.04
Pro-activeness	0.18	0.13	0.02	0.22	0.82
Competitive aggressiveness *	0.40	0.13	0.30	3.66	0.00

$R^2 = 0.374$ (* $p < 0.05$)

The analysis indicated that a significant percentage (37.4%) of the variation in *Business growth* was explained by the independent variables of entrepreneurial orientation. The multiple regression analysis further indicated a significant positive relationship between the independent variables, *Competitive aggressiveness* ($p = 0.00$) as well as *Innovativeness* ($p = 0.01$), and the dependent variable, *Business growth*. *Risk-taking* with a significant relationship ($p = 0.04$), proved to be inconsistent with recent research done in South Africa. The regression model revealed no relationship between the independent variables, *Pro-activeness* ($p = 0.82$) as well as *Autonomy* ($p = 0.59$) and the dependent variable *Business growth*.

Table 4.20 presents the results of the multiple regression analysis on the dependent variable of perceived *Business development and improvement*.

Table 4.20: Multiple regression results: Impact of entrepreneurial orientation on Business development and improvement

Model	Unstandardised coefficients		Standardised coefficients	t-value	p-level
	B	Std. Error	Beta		
(Constant)	0.16	0.38		0.41	0.68
Autonomy	0.10	0.10	0.74	1.00	0.32
Innovativeness *	0.25	0.10	0.23	2.57	0.01
Risk-taking *	0.20	0.09	0.17	2.37	0.02
Pro-activeness	0.02	0.09	0.02	0.19	0.85
Competitive aggressiveness *	0.29	0.09	0.27	3.10	0.00

$R^2 = 0.343$ (* $p < 0.05$)

The regression analysis revealed that a significant percentage (34.3%) of the variation in *Business development and improvement* was explained by the independent variables of entrepreneurial orientation. The data analysis further revealed significant positive relationships between the independent variables of *Innovativeness* ($p = 0.01$), *Risk-taking* ($p = 0.02$), as well as *Competitive aggressiveness* ($p = 0.00$) and the dependable variable *Business development and improvement*. The regression model revealed no significant relationship between the independent variables *Pro-activeness* ($p = 0.85$), as well as *Autonomy* ($p = 0.32$) and the dependent variable *Business development and improvement*.

The independent variables *Competitive aggressiveness*, *Risk-taking* and *Innovativeness*, was found to have a significantly positive relationship to the dependent variables of perceived *Business growth and Business development and improvement*. *Risk-taking* proved to be inconsistent with recent research done in South Africa. The independent variables, *Pro-activeness* and *Autonomy*, proved to have no significant relationship to the dependent variables of perceived business success.

4.9 ASSESSMENT OF ACTUAL RESULTS

A method to use secondary data, such as the financial statements of an organisation was developed by Miller and Le Breton-Miller (2011:1052) using the constructs, *Innovation*, *Pro-activeness* and *Risk-taking* to measure entrepreneurial orientation,

while Aktan and Bulut, (2008:70) proposed that financial performance of an organisation be measured firstly by past performance factors such as profit, return on investment and return on equity, and secondly by market based measures from stock market values, economic value added and market value added.

This method utilise an organisation's research and development to sales ratio to assess *Innovativeness*, while *Pro-activeness* is measured by the percentage of profits reinvested in the organisation each year and compared to competitors in the same industry. The volatility of the organisation's share price, excluding industry or economic fluctuations, measures *Risk-taking*.

Although this study did not set out to formally utilise these assessment methods, a broad overview of previous financial and market performance was given to correlate actual performance with the perceived business performance.

4.9.1 Business performance

Following the questions from section B of the questionnaire about perceived business performance, the actual financial figures and management statements from the integrated annual report of the organisation are presented in Table 4.21.

Table 4.21: Business performance comparison for 2013

Measurements	Perceived success	Actual success
Financial factors	$\bar{x}$	
Competitive position	3.13	Positive due to focus to fill the mills
Market share	2.98	Decreased due to steel making department fire
Nett Profit	2.90	28.2 % decrease in loss position
Revenue	3.00	1.4 % small decrease due production interruption
Non-Financial factors	$\bar{x}$	
Re-Investment	2.57	No re-investment in the target area
People	3.03	Some performance bonus payments
Business image	3.10	Share price stabilised
Efficiency	3.29	Improved asset reliability indicators
Effectivity	3.29	Successful implementation of Asset reliability program

Although no statistical verification of correlation has been performed, there seems to be visible correlation between the perceived opinions of the target population and the actual business performance recorded. The flat steel products division including the Vanderbijlpark and Saldanha steel manufacturing plants have turned from a *Nett operating profit* loss of R1560 million in 2012, to a smaller negative *Nett operating profit* of R1120 million in 2013. *Revenue* has decreased from R20 911 million in 2012 to R20 697 in 2013. *Capital re-investment* has increased by 40.5%.

ArcelorMittal South Africa's overall *market share* for 2013 dropped to 58% from 64% in 2012. The decrease of 10% in *market share* of flat steel products (62% in 2013 compared to 72% in 2012), was mainly due to the market reaction after the fire at Vanderbijlpark steel making plant that stopped production for about six weeks.

The management board reported that the organisation continued with *product development* and *improvement products* to meet evolving market requirements. New profiles were developed at the Vereeniging Works for the agricultural industry, while Newcastle Works focused on increasing the mining steel bar and wire rod product ranges. Further, new product developments undertaken at Vanderbijlpark Works during the year, included the development of higher strength hot rolled material in thicker gauges for wheels and chassis manufactured in the automotive industry, and automotive structural material in cold rolled and electro galvanised steel. Continued development of new products for the light frame steel building and construction industry included thicker gauge galvanised material. A new organic coated roofing product was introduced for use in coastal areas. Product development at Saldanha Works focused on developing higher strength thin gauge material, which could not be produced at Vanderbijlpark Works.

Although no official perception from senior management was expressed about people *morale* or *job satisfaction*, the health and safety of employees and contractors were viewed as of paramount importance. This is reflected in the values statement of the organisation, the vision of producing safe, sustainable steel and the Journey to Zero harm safety program. Therefore safety performance is directly linked to the cash bonuses of all employees, from executive level to the shop floor.

The cost competitiveness in international steel markets has been impacted negative, as a result of declined EBITDA margin, induced by the weak market conditions and higher input costs. The global commodity steel pricing curve dictated the steel prices at which products were sold to the domestic customers, therefore the organisation did not have the option of passing on these rising costs to the market. However, if the company wants to remain *competitive*, it has to make a profit.

4.10 SUMMARY

A questionnaire constructed by Lotz (2009) and adapted for the purpose of this study, was used to conduct an empirical study to investigate the construct variables of entrepreneurial orientation, as well as the two dependent variables of perceived success in the organisation. The questionnaire consisted of three sections, Section A assessed entrepreneurial orientation, Section B measured perceived success in the organisation, and Section C gathered demographic data.

The target population of this study was the maintenance divisions of Cold Rolling plants of the Vanderbijipark Works of ArcelorMittal South Africa. The entire population consisted of 267 employees. The questionnaire was distributed to the population group in printed format and delivered by hand. A total response rate of 65% was achieved.

Cronbach's Alpha coefficients were calculated to test the internal consistency and reliability of the responses. One variable had a Cronbach's Alpha coefficient lower than 0.7 but higher than 0.5, while three variables measured above 0.8, therefore all the variables were included in the study.

Demographic information of the respondents were analysed to highlight tendencies and frequencies within the different categories of the target population. The results showed that the sample population was dominated by White males who are younger than 40 years of age. The majority of participants acquired a post Grade 12 qualification, while 57.4% of respondents were from the collective job categories of artisans.

The calculated mean values and standard deviations of all individual statements were presented as separate constructs of entrepreneurial orientation. Combined results of the different variables of entrepreneurial orientation and perceived business success were then discussed. The average mean calculated for entrepreneurial orientation was 3.409, which can be interpreted as above average. The individual variables *Autonomy* with a mean value ($\bar{x} = 3.625$), *Innovativeness* ($\bar{x} = 3.393$), *Risk-taking* ($\bar{x} = 3.319$), *Pro-activeness* ($\bar{x} = 3.301$) and *Competitive aggressiveness* ($\bar{x} = 3.394$) respectively, were also rated to be positive.

The average mean calculated for perceived business success was $\bar{x} = 3.032$ with the variable *Business development and improvement*, producing the largest mean value of $\bar{x} = 3.049$ and a standard deviation of 1.076, followed by *Business growth* with a mean value of $\bar{x} = 3.003$ and a standard deviation of 0.968.

The practical significance tests revealed that females consistently expressed higher mean values for all the variables for entrepreneurial orientation and the perceived success of the business. A high level of statistical significance was proved to exist for the gender variable, while practical significance between the opinions of males versus females in this specific population proved to be medium to high.

The multiple regression analysis indicated that 37.4% of the variance of perceived success, *Business growth*, is explained by the independent variables of entrepreneurial orientation. The second multiple regressions revealed that 34.3% of the variance of perceived success, *Business development and improvement*, was explained by entrepreneurial orientation, and that independent variables *Innovativeness*, *Risk-taking* and *Competitive aggressiveness* had a strong positive relationship to the dependent variable business development and improvement. The inclusion of *Risk-taking* was accepted to be inconsistent with results from recent research in South African industries.

An assessment of the actual business performance results was included in this section and revealed a visible correlation with the perceptions regarding business performance.

The next chapter focuses on conclusions from the findings in this chapter and recommendations are made on how to drive entrepreneurial orientation in order to obtain higher perceived business success in the organisation.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The purpose of this chapter is to discuss implications of entrepreneurial orientation in the maintenance divisions of ArcelorMittal South Africa, Vanderbijlpark Works. Conclusions are drawn based on the findings of the analysis of data as presented in the previous chapter. Practical recommendations to improve entrepreneurial orientation in the organisation are discussed with the aim to increase perceived business success in the organisation.

This chapter consists of a number of main sections. The first two sections focus on conclusions drawn from the empirical study, followed by a section where recommendations are presented. A section formulating a business improvement action plan is included to provide clarity regarding the focal points of the selected strategy.

Lastly, the success of the study is evaluated in terms of the primary and secondary objectives proposed in Chapter 1. The chapter concludes with suggestions for future research.

5.2 CONCLUSIONS

Conclusions are drawn based on data from the empirical study presented in Chapter 4. Firstly, conclusions are discussed related to the demographic information of the respondents, followed by an assessment of the Cronbach's Alpha coefficients evaluating the reliability of the questionnaire.

Secondly, the different construct variables of entrepreneurial orientation and perceived business success are assessed and conclusions regarding the combined results are made. The relationships between gender, entrepreneurial orientation and perceived business success are discussed.

5.2.1 Demographic information

Section C of the questionnaire consisted of demographic information where the respondents were requested to indicate their age group, gender, race, highest academic qualification and the job grading within the maintenance division. The completed questionnaires were classified according to the functional division from where they were returned. From the demographic information, the following conclusions were drawn:

The majority of respondents (50.6%) were younger than 40 years of age, indicating a relative young maintenance corps. Furthermore, the results also indicated that only 28.7% of employees were between fifty years and sixty-three. The organisation seemed to have redressed an ageing maintenance workforce situation successfully, with the implementation of an apprentice school, influx of young technical trainees and bursary holders.

Maintenance divisions were characterised by a strong male employee corps with 87.4% of the respondents being males. Whilst the skewed gender distribution had to be bewailed, it was unsurprising in light of the labour-intensive robust environment of the steel manufacturing industry.

White employees represented the majority of respondents (53.4%) followed by 44.3% Blacks. Taking into consideration the previous finding on gender it became clear that the maintenance divisions in the steel manufacturing industry was no longer dominated by White males.

The majority of respondents (58%) indicated that they had achieved a certificated qualification. This was the group that represented artisans such as Fitters, Electricians, Welders and Millwrights. Qualifications lower than matric were only indicated by 4% of the respondents.

The majority of respondents (65.4%) came from the artisan group, who were actively involved in execution of maintenance tasks. Management and Supervisors represented 8%, whilst technical experts were the compliment of respondents.

The responses from the five different plants in Cold Rolling were spread more or less equally.

Thus, the majority of respondents were skilled artisans applying knowledge obtained through post-matric technical education. The sample group appeared to be relatively young and predominantly males.

5.2.2 Reliability of the questionnaire

Cronbach's Alpha coefficients were calculated to determine the internal consistency (reliability) of the questionnaire.

Reliability of the variables was very good and obtained Cronbach's Alpha coefficients between 0.707 (*Risk-taking*) and 0.864 (*Innovativeness*). Only one variable, *Autonomy* (0.531), had a Cronbach's Alpha coefficient lower than 0.7. The statements in the questionnaire were testing different attributes from employees, and therefore an Alpha coefficient lower than 0.7 can still be acceptable (Field, 2005:668).

High results of the Cronbach's Alpha coefficients suggested that the empirical research instrument (questionnaire) used to measure entrepreneurial orientation predicted reliable results.

5.2.3 Assessment of entrepreneurial orientation

Section A of the questionnaire measured entrepreneurial orientation in maintenance divisions of the Cold Rolling plants of a steel manufacturing organisation. Twenty seven statements were presented to respondents, measuring the five different constructs of entrepreneurial orientation.

Replies from the respondents were measured on a five point Likert scale, with 1 indicating strong disagreement with the statement, 3 indicates uncertainty and 5 representing strong agreement with a statement. It could therefore be assumed that a score lower than 3 indicates that there were some sort of disagreement with the

statement, while a score greater than 3 indicated that the respondents agreed with the statement. The closer the values were to the extremes (1 or 5), the stronger the disagreement or agreement was, presuming that 3 will be the neutral point.

Thus, conclusions are drawn from the different individual constructs of entrepreneurial orientation and perceived business success, followed by concluding discussions of the combined variables.

5.2.3.1 Autonomy

The variable *Autonomy* has obtained the highest mean value ($\bar{x} = 3.625$). This indicates that *Autonomy* has a strong effect on entrepreneurial orientation in this specific business population. This argument is supported by the responses to statement A1 ($\bar{x} = 4.150$), which suggests that most of the respondents have enough *Autonomy* in their jobs, without continual supervision.

The overall response to the construct *Autonomy*, is contradicted by the responses to statement A3, where the influence which justification and approval procedures have on decision-making abilities of the employees has been judged with a slightly negative mean value of ($\bar{x} = 2.908$). This response indicated that the justification and approval procedures have a negative influence on *Autonomy* as experienced by the employees. This might be a stumbling block for the development of entrepreneurial orientation in the organisation as most maintenance procedures are prescribed by legal regulations.

As *Autonomy* has the highest rating for entrepreneurial orientation, this variable can be crafted by management to have a significant influence on increasing entrepreneurial behaviour in this organisation.

5.2.3.2 Innovativeness

The variable, *Innovativeness* has the second highest rating and obtained a mean value of ($\bar{x} = 3.393$). Statements I8 ($\bar{x} = 3.734$) and I7 ($\bar{x} = 3.688$) indicate that there is a strong emphasis on continuous improvement of products, procedures and equipment, and that innovation is an absolute necessity for the future competitive position of the organisation.

Statement I3 ($\bar{x} = 3.236$) stating that the organisation has increased the number of new products or equipment during the past two years, has obtained the lowest mean value. This value is a true reflection of the depression in the local steel market over the past few years (ArcelorMittal, South Africa, 2014). Although *Innovativeness* has obtained the second highest mean value, there is still ample room for improvement. In today's dynamic environment where customer needs, product or service technologies and competitive forces often change unpredictably, innovation has become a prerequisite to deal with the continuous change and uncertainty (Kropp, Lindsay & Shoham, 2008:104).

Innovativeness in maintenance terms tends to be the energy for high efficiencies that leads to low manufacturing costs. Dhillon (2002:13) stated that effective asset management and maintenance practices will positively influence critical success factors such as *safety, product quality, speed of innovation, price, profitability, and reliable delivery*.

5.2.3.3 Risk-taking

The construct variable *Risk-taking*, has obtained a mean value of 3.319, the fourth highest mean value. This indicates that the organisation is lenient on taking risks and that most of the participants' opinions are in agreement about *Risk-taking*. The respondents have agreed that the organisation needs to act boldly to achieve its objectives by rating statement R3 with a mean value of 3.608, against the term "risk-taker" to be considered a negative attribute in statement R5 with the lowest mean value of 3.116.

Factors such as globalisation, deregulation, technological and social change, and information technology are forcing organisations to anticipate rapid and unexpected change, which has long been the central theme of entrepreneurship (Shane, Locke & Collins, 2003:264). Training can therefore be given to employees to educate them on methodologies to address certain types of risks. Corporate entrepreneurs rather try to define the risk they have to take, minimise it as much as possible and manage it (Spinelli & Adams, 2012:41). Maintenance employees can therefore be expected to have strong opinions about *Risk-taking*.

5.2.3.4 Pro-activeness

The variable *Pro-activeness* has scored a mean value of 3.301, and is ranked lowest by the respondents. Respondents have reacted in agreement about statement P4 ($\bar{x} = 3.541$), that the organisation continuously monitor trends and identifies future needs of plants, while responding neutrally to statement P1 ($\bar{x} = 3.041$), by agreeing that the organisation is seldom first to introduce new products, services or processes.

Lumpkin and Dess (1996:146) suggest that *Pro-activeness* refers to processes aimed at anticipating and acting on future needs of consumers, by acting ahead of the competition. Some of the activities that are thus associated with *Pro-activeness* include the identification of new opportunities and continuous monitoring of market trends and new venture team formation (Kropp *et al.*, 2008:104).

Organisations can improve their competitiveness through improved maintenance functions (Kutucuoglu, Hamali, Irani & Sharp, 2001:174). *Pro-activeness* in the maintenance divisions of a steel manufacturing organisation is an important aspect of asset maintenance as it aims to prevent costly outages. Focused attention should be given to escalate *Pro-activeness* in the organisation.

5.2.3.5 Competitive aggressiveness

The average mean value of *Competitive aggressiveness* is 3.394. The mean values of the different statements which have measured *Competitive aggressiveness*, vary from 3.246 to 3.497, which indicate a general positive agreement with the statements.

Competitive aggressiveness, as a dimension of an entrepreneurial orientation, refers to an organisation's inclination to directly challenge its competitors with the intention (Lumpkin & Dess, 1996:148) to compete for a market position (Chang, Lin, Chang & Chen, 2007:1000). Lumpkin and Dess (2001:441) state that *Competitive aggressiveness* could be fundamental in maintaining a certain market position, but does not directly influence the success of the organisation.

Responses indicate a general strong stance taken against competitors, which can be utilised to gain market share.

5.2.3.6 Overall entrepreneurial orientation

The mean value of entrepreneurial orientation is 3.409, which suggests that respondents are of the opinion that entrepreneurial orientation is present in the maintenance divisions of the organisation. Only one of the items which have measured the different construct variables has obtained a mean value of lower than neutral, which indicates a reasonable level of agreement with the constructs of entrepreneurial orientation. Considering the mean values it seems that there is a reasonable prominent presence of entrepreneurial orientation present in the organisation.

All of the mean values are between 3.394 and 3.625, which is close to the agree value of 4 on the Likert scale.

Autonomy, *Competitive aggressiveness* and *Innovativeness* are the strongest construct variables, and can be used as a basis to improve overall entrepreneurial orientation in the organisation. *Pro-activeness* and *Risk-taking* pose the highest

potential for improvement, as their rankings are the lowest and can improve the most.

5.2.4 Assessment of perceived business success

Section B of the questionnaire measured perceived business success in the maintenance divisions of Cold Rolling plants of a South African steel manufacturer. Eleven statements were presented to the respondents in order to measure the different variables of perceived business success. These statements were also measured on a 5 point Likert scale.

In this section, conclusions were drawn from the different constructs of perceived business success, followed by concluding discussions of the combined variables.

5.2.4.1 Business growth

Business growth is one of two construct variables implemented to measure perceived business success of an organisation. *Business growth* as a variable, has obtained the lowest mean value of 3.003. There are mixed agreement to the statements measuring the variable, *Business growth*. The statements being used to measure *Business growth* are inconsistent, with mean values varying from 2.902 to 3.128. In general it can be accepted that the organisation is experiencing fairly neutral perceptions on *Business growth*.

This indicate that *Business growth* is a well-established performance indicator and the organisation is pursuing most of its performance objectives.

5.2.4.2 Business development and improvement

The variable *Business development and improvement* has obtained the highest mean value ($\bar{x} = 3.049$). There is significant variation in the results of statements measuring *Business development and improvement*, with mean values varying from 2.573 to 3.312.

Statements B.A1 stating that during difficult economic periods, investments in research and development and innovative projects continue, and no financial cuts are made, and B.A3, stating that the morale (job satisfaction) of our employees has improved over the past few years, have obtained the lowest mean values of 2.573 and 2.766 respectively. The mean values of these statements are lower than the neutral value. This is an important aspect which needs to be corrected in order to ensure commitment from employees towards the goals of the organisation.

5.2.4.3 Overall perceived success

Although *Business development and improvement* is ranked the highest the internal mean values varies with a large $\Delta\bar{x} = 0.739$. The difference in mean values between *Business development and improvement* and *Business growth*, is small $\Delta\bar{x} = 0.046$.

The organisation has systems in place to ensure good financial practices and key performance measures and is currently launching an investigation in the prevalent corporate culture. However, if the organisation is to remain competitive, it must make a profit. Through the past three years much effort has been invested in identifying opportunities for internal efficiency improvement that will effectively improve the cost position and thus drive profitability upwards. These actions include new product developments, employee safety drive and asset productivity, and efficiency improvements.

5.2.5 Relationship between gender and entrepreneurial orientation and perceived business success of the organisation

In this study the relationship between the gender of the participants was measured against the construct variables of entrepreneurial orientation and perceived business success. In total, 151 male respondents and 20 female respondents participated in the study. The skewness of the data towards male respondents could cause misinterpretation.

Statistical significance tests for the variable of gender, yield p -values for *Innovativeness* ($p = 0.000$), *Risk-taking* ($p = 0.000$), *Pro-activeness* ($p = 0.004$), *Competitive aggressiveness* ($p = 0.001$) and *Business growth* ($p = 0.045$); all smaller than 0.05. Therefore, depending on the p -value there is statistical significance in the opinions related to the gender of the participants. This means that the females who have returned higher mean scores for all the construct variables measuring entrepreneurial orientation may have a statistical influence on perceived business success.

Practical significance tests reveal a small effect between measurements of gender with regard to the variables *Autonomy* ($d = 0.31$), *Business growth* ($d = 0.42$) and *Business development and improvement* ($d = 0.25$), with the d -value < 0.5 . Females have consistently expressed higher mean values for all the variables for entrepreneurial orientation, which means that females in practice have a significant influence on the perceived success of the business. This study population has included only 20 females out of 174 respondents, and might therefore not be able to exert a positive influence upon the organisation.

5.2.6 Multiple regressions analysis

Multiple regression analysis was performed to determine the relationship between the five independent variables of entrepreneurial orientation, and the two dependent variables of perceived business success. The analysis indicated that a significant percentage (37.4%) of the variation in *Business growth*, and (34.3%) of the variation in *Business development and improvement* was explained by the independent variables of entrepreneurial orientation.

The multiple regression analysis further indicated a significant positive relationship between the independent variables *Competitive aggressiveness* ($p = 0.00$), *Risk-taking* ($p = 0.04$) as well as *Innovativeness* ($p = 0.01$) and the dependent variable *Business growth*, while significant positive relationships between the independent variables of *Innovativeness* ($p = 0.0109$), *Risk-taking* ($p = 0.0190$), as well as *Competitive aggressiveness* ($p = 0.0023$), and the dependable variable *Business development and improvement*, were observed. It can therefore be concluded that

the independent variables *Innovativeness*, *Risk-taking* and *Competitive aggressiveness*, have a significant positive relationship with perceived business success.

The variables, *Pro-activeness* as well as *Autonomy*, attested to have lesser to no significant relationship with perceived business success in the assessed steel manufacturing organisation.

It can thus be concluded that entrepreneurial orientation traits have a positive relationship with business success. This means that any increase in entrepreneurial orientation constructs, such as *Innovativeness* and *Competitive aggressiveness*, will influence the success of the organisation positively.

5.3 RECOMMENDATIONS

Whilst the domain of this study comprised the maintenance divisions of Cold Rolling plants of the Vanderbijlpark site of ArcelorMittal South Africa, recommendations aim to provide guidelines for rolling out entrepreneurial orientation to the entire Vanderbijlpark Works.

5.3.1 Entrepreneurial orientation

The guidelines set by Morris *et al.* (2008:50) that present entrepreneurship as an overall orientation within an organisation, are presented in a framework of corporate entrepreneurship. This framework indicates that an organisation's performance is directly and positively influenced by entrepreneurial orientation and will thus be used as an action plan in this recommendation.

This framework indicates that entrepreneurial orientation is interrelated to the vision and mission of the organisation, the strategies and objectives, organisational structures, operations and the overall organisational culture. The overall theme of this framework is a reinforcement of individual creativity, product and process innovation, and on-going managerial development within organisations.

Ensure management commitment

Commitment will only be attained from top management if unquestionable advantages of entrepreneurial orientation can be shown. In the major developing economies, researchers have empirically demonstrated that firms where management has shown strong entrepreneurial traits, have achieved very rapid growth, and injected a high energy stimulus into the national economy of e.g. China (Zhang, Yang & Ma, 2008:676). These advantages must be demonstrated by communicating the current economic state of the organisation, taking into account shortcomings in terms of international best practices and the fact that the prevailing strategic plan lacks commitment to drive the organisation into a strong competitive position.

Recommendations to improve entrepreneurial orientation

Previous researchers have recommended that seminars should be held where employees from the lowest job grading up to the top management, participate. These seminars have evolved into monthly communication platforms where employees from job grading (G to C), technical experts, supervision and management, are informed about the present state of the business. This existing platform should be utilised to get agreement from all employees on aspects regarding the roll-out of the intrapreneurial strategy and guidelines on how the process should function. The existing rotating shift forum structure should be utilised to communicate the initial action plan and progressive roll-out of educational information regarding the elements of the proposed framework.

Emphasis should be placed on communicating a need for change and a clear focus on the proposed end-state (business success). An analysis of current shortcomings and barriers to entrepreneurial orientation constructs must be presented. Involvement must be sought from all stakeholders on strategies to achieve the stated milestones. Impassable barriers to entrepreneurial orientation (for various reasons) must be managed to seek possible outcomes. Supervisors must focus on driving discussion through behaviour based care principles towards achieving results, and

as many as possible employees must become committed to the outcomes of the discussion.

Based on measurements of *Business development and improvement* (Table 4.16) in this study have indicated declining job satisfaction and a perceived lack of employee value perception in the organisation, while apathy and resistance to change can be expected to be present to a substantial degree. Supervisors must realise that many employees will require compelling reasons to believe that management is committed to elements of entrepreneurial orientation. The construct of entrepreneurial orientation and how it can influence the business success should be communicated in a clear and uncomplicated way to ensure that the employees observe the action plan as a positive strategic plan to improve the success of the organisation, and how it will ensure future benefits for all the stakeholders.

By applying the above-mentioned communication strategy, the magnitude of the undertaking can be effectively managed. The success of the communication process can be judged according to both the awareness and level of acceptance of the concept by the employees. Verification will be done by means of surveys and frequently held visible felt leadership (VFL) meetings at the workplace. If unacceptable results are obtained, interventions must be planned timeously prior to advancing to the next step.

Expectation clarification and resource allocation

Agreement reached during monthly communication sessions with upper level employees, must be distilled into accepted principles and procedures pertaining to the way in which entrepreneurial orientation strategy will be managed. Specific focus areas derived from the proposed entrepreneurial orientation framework must be identified by top management and directed to reinforce individual creativity, product and process innovation, and ongoing managerial development through business strategy.

The allocation of funds for human resources and other communication means must be approved and allocated up to departmental level, taking focus areas into account.

Technological leveraging

Employing electronic information technology to improve efficiency and flexibility of communication is not new in most companies and is certainly accepted practice in ArcelorMittal. However, efforts should be concentrated to specifically aid entrepreneurial orientation by providing at least the following aids:

- Streamlined approval processes for digital communication and automatic electronic routing of strategic announcements and management decisions towards supervisory levels, should aid in reducing bureaucracy to a minimum;
- An information wiki where individuals should have easy access to electronic information shared by universities, government agencies, trade organisations, customers and suppliers, should be set up on the existing intranet portal;
- A daily electronic flier containing the latest research findings regarding constructs of entrepreneurial orientation, business values, objectives, strategies and business performance results, must be circulated; and
- Supervisors must have electronic aids through which communication can be effectively transferred to the target groups.

A measure of effective assistance rendered by information technology systems would be that intrapreneurs waste less of their unrestricted time on preparatory paperwork or trying to source information and supervisors will have ample time to communicate efficiently.

Training

Selected employees need to undergo dedicated refresher training in intrapreneurship within the organisational education focus.

The following elements are proposed to form part of such a training program:

Introduction to intrapreneurship

- Applying *Autonomy* in the work place;
- Creative thinking and innovation;
- Risk management and risk factor analysis techniques;
- Understanding principles of statistical analysis to identify current trends;
- Basic marketing principles;
- Basic financial accounting; and
- Strategic management principles.

It is proposed that the intrapreneurship training program be presented as a certificate program which is supported by the ArcelorMittal online university. Participants will have to proof proficiency by passing a formal examination to verify the effectiveness of the training.

It was concluded from the study that entrepreneurial orientation constructs have a positive relation with the perceived business success of the organisation. It is thus recommended that a renewed strategic focus will have to be planned. The elements of this focus must include:

- A drive to increase the efficiency of operating assets, by implementing a specialised asset reliability program;
- Effective management of production programs to ensure maximum product output; and
- Developing new markets while existing market share is increased.

Robust structures and action plans are needed for the organisation to regain a competitive position in the global steel industry. It is therefore proposed that support be given from the upper management levels of the organisation. The outcome of this must result in an action plan with key drivers to address:

- Morale and commitment of employees by embarking on a management visibility drive to support employees in the execution of their daily tasks, which will result in a list of shortcomings generated through interaction between management and

employees. This will establish a culture of trust in senior management's commitment to "walk their talk";

- Product development through continual development and improvement of products and services. Current trends in global steel markets must be analysed to match the product range with existing customers; and
- Business competitive position by adopting the following proposed action plans:
 - i) Increase customer focus by implementing market segmentation, targeting and positioning;
 - ii) Eliminate excessive raw material costs by controlling price of iron ore from Thabazimbi iron ore mine and coal from Tshikondeni coal mine;
 - iii) Improve operational efficiencies by managing Blast furnace fuel rates, global yield and operational productivity;
 - iv) Improve supplier efficiencies by decentralising contract management operations;
 - v) Optimise the industrial footprint by utilisation of the full capacity of production units at Vanderbijlpark Works; and
 - vi) Improving energy efficiency by upgrading the existing gasholders and becoming an independent electrical power producer.

Recognition

It is not within the ambit of this study to propose the exact nature of rewards which should be offered, however, it is important that clear and strict rules regarding rewards should be developed, after considering all options. Literature propose that encouragement of constructs of entrepreneurial orientation from the bottom up will require special incentives and structures, specially designed to develop and build support for entrepreneurial initiatives (Lumpkin, Cogliser & Schneider, 2009:49).

Evaluation system

An evaluation system of key performance indicators must be established, which can be used as basis for an incentive system for all employees. An evaluation system must comprise at least the following elements:

- Market share in the sub-Saharan regions of Africa;
- Turnover growth realised;
- Nett profit growth;
- Efficiency of operations; and
- Growth in capital expenditure.

5.3.2 Summary of recommendations

It is eminent that the establishment of entrepreneurial orientation is a complicated and extended process. Current organisational business strategic misinterpretations need to be addressed first followed by the implementation of action steps to aid in fostering entrepreneurial orientation constructs in order to gain business success.

5.4 CRITICAL EVALUATION OF THE STUDY

The success of the study can be evaluated by assessing the extent to which the primary and secondary objectives listed in section 1.3 were met.

5.4.1 Primary objective

The primary objective of the research was to assess the impact of entrepreneurial orientation in maintenance divisions on the perceived success of a South African steel manufacturer. The primary objective was achieved by realising the secondary objectives and by presenting recommendations introduced in section 5.3.

5.4.2 Secondary objectives

The secondary objectives, which support the primary objectives, are listed below, together with an evaluation of whether they were met:

- To define entrepreneurship and intrapreneurship from literature;
Evaluation: Achieved in section 2.2 (Definition and impact of entrepreneurship).

- To define entrepreneurial orientation and identify the constructs measuring entrepreneurial orientation from a literature review;
Evaluation: Achieved in section 2.4.2 (Defining entrepreneurial orientation) and section 2.5 (Determinants of entrepreneurial orientation).
- To identify and comprehend the success factors of maintenance divisions in steel manufacturers from literature;
Evaluation: Achieved in section 2.7 (Determinants of success factors of maintenance divisions in a South African steel manufacturer).
- Describing ArcelorMittal South Africa and stating the causal factors for the study;
Evaluation: Achieved in section 3.2 (Overview of the organisation) and specifically section 3.4 (Causal factors of the study).
- To gain insight into the current state of a South African steel manufacturer;
Evaluation: Achieved in section 4.9 (Assessment of actual results).
- To assess the entrepreneurial orientation within a South African steel manufacturer through a questionnaire;
Evaluation: Achieved in section 4.5 (Assessment of the entrepreneurial orientation).
- Validate the reliability of the questionnaire measuring the entrepreneurial orientation by means of statistical analysis;
Evaluation: Achieved in section 4.4 (Measuring the entrepreneurial orientation).
- To assess the relationship between entrepreneurial orientation and the perceived success factors;
Evaluation: Achieved in section 4.8 (Multiple regression analysis).
- To assess the relationship between selected demographic factors and the constructs of entrepreneurial orientation and perceived success factors of maintenance divisions of a South African steel manufacturer; and
Evaluation: Achieved in section 4.7 (Relationship between selected demographic variable and entrepreneurial orientation, including perceived business success of the organisation).
- To use the results from the empirical research to draw conclusions and make recommendations on how to exploit entrepreneurial orientation to the benefit of the organisation.

Evaluation: Achieved in section 5.2 (Conclusions) and section 5.3 (Recommendations).

5.5 SUGGESTIONS FOR FURTHER RESEARCH

Lotz's questionnaire (2009) was used to assess entrepreneurial orientation and perceived success in maintenance divisions of a steel manufacturer. The questionnaire was only applied to the maintenance divisions of the Cold Rolling plants and not to the entire organisation.

Therefore the following areas of further research are proposed:

- Industry comparison: In view of the fact that the questionnaire has been used in other studies being conducted in a variety of South African organisations, a comparison can be drawn of results obtained from different industries with special reference to the influence *Risk-taking* has on business success.
- Questionnaire refinement: In this study, the construct, *Autonomy* recorded a Cronbach's Alpha coefficient of lower than (0.7). The assumption is that the respondents did not understand the statements correctly or merely the fact that it is the first part of the questionnaire. The questionnaire should be refined in order to increase the reliability of the questionnaire.
- Organisational performance comparison: Comparison between the effect of entrepreneurial orientation on perceived success and actual performance of organisations should be examined.

5.6 SUMMARY

The results of the empirical study were interpreted in this section and conclusions were drawn regarding perceptions on both the state of the entrepreneurial orientation and the perceived and actual success of the organisation.

Recommendations were made for the promotion of entrepreneurial orientation and business success focus on addressing identified organisational deficiencies through an action plan.

Finally, the objectives of the study were critically revisited in order to verify whether these were met and suggestions for further research were posted.

The inferences drawn from this study can be applied to the Cold Rolling plants of the ArcelorMittal, Vanderbijlpark Works only. Some correlation was picked up with a study on an agri-business.

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7. ANNEXURE A: Questionnaire

ENTREPRENEURIAL ORIENTATION IN MAINTENANCE DIVISIONS OF A SOUTH AFRICAN STEEL MANUFACTURER

Dear respondent.

Thank you for your time and participation in this survey.

Entrepreneurship within the organisation may enable business survival and competitiveness, and many businesses and researchers now recognise corporate entrepreneurship, and an entrepreneurial orientation as a critical success factor in organisations.

This survey aims to measure the entrepreneurial orientation within maintenance divisions, as well as the success factors currently prevalent in maintenance divisions within South African steel manufacturers. Your honest opinion regarding the various statements is valued.

The survey is divided into three sections:

Section A is the Entrepreneurial Orientation questionnaire.

Section B measures the Success Factors currently prevalent in the business.

Section C consists of Biographical information.

SECTION A

The purpose of this questionnaire is to determine the entrepreneurial orientation within maintenance divisions. Please read every statement thoroughly and decide how you feel about it, before making a selection. Please answer ALL the questions to ensure the reliability of this study.

Statement	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
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AUTONOMY

A1	I have enough autonomy in my job without continual supervision to do my work.	1	2	3	4	5
A2	Our business allows me to be creative and try different methods to do my job.	1	2	3	4	5
A3	Employees in our business are allowed to make decisions without going through elaborate justification and approval procedures.	1	2	3	4	5
A4	Employees in our business are encouraged to manage their own work and have flexibility to resolve problems.	1	2	3	4	5
A5	I seldom have to follow the same work methods or steps while performing my major tasks from day to day.	1	2	3	4	5

INNOVATIVENESS

I1	Our business regularly introduces new procedures/products/equipment.	1	2	3	4	5
I2	Our business places a strong emphasis on new and innovative procedures/products/equipment.	1	2	3	4	5
I3	Our business has increased the number of new procedures/equipment during the past two years.	1	2	3	4	5
I4	Our business is continually pursuing new opportunities.	1	2	3	4	5
I5	Over the past few years, changes in our processes, services and product lines have been quite dramatic.	1	2	3	4	5
I6	In our business there is a strong relationship between the number of new ideas generated and the number of new ideas successfully implemented.	1	2	3	4	5
I7	Our business places a strong emphasis on continuous improvement in procedures/products/equipment.	1	2	3	4	5

I8	We have a widely held belief that innovation is an absolute necessity for the business's future.	1	2	3	4	5
I9	Our leaders seek to maximise value from opportunities without constraint to existing models, structures or resources.	1	2	3	4	5

RISK-TAKING

R1	When confronted with uncertain decisions, our business typically adopts a bold posture in order to maximise the probability of exploiting opportunities.	1	2	3	4	5
R2	In general, our business has a strong inclination towards high-risk projects.	1	2	3	4	5
R3	Owing to the environment, our business believes that bold, wide-ranging acts are necessary to achieve objectives.	1	2	3	4	5
R4	Employees are often encouraged to take calculated risks concerning new ideas.(not on safety)	1	2	3	4	5
R5	The term "risk-taker" is considered a positive attribute for employees in our business.(excluded on safety)	1	2	3	4	5

PRO-ACTIVENESS

P1	Our business is very often the first to introduce new procedures/products/equipment.	1	2	3	4	5
P2	Our business typically initiates actions which others respond to.	1	2	3	4	5
P3	Our business continuously seeks out new procedures/products/equipment.	1	2	3	4	5
P4	Our business continuously monitors trends and identifies future needs of plants.	1	2	3	4	5

COMPETITIVE AGGRESSIVENESS

C1	In dealing with competitors our business typically adopts a very competitive "undo-the-competitor" posture.	1	2	3	4	5
C2	Our business is very aggressive and intensely competitive.	1	2	3	4	5
C3	Our business effectively assumes an aggressive posture to combat negative trends that may threaten our survival or competitive position.	1	2	3	4	5
C4	Our business knows when it is in danger of acting overly aggressively (this could lead to erosion of our division's reputation and damage plant performance).	1	2	3	4	5

SECTION B

This section consists of statements related to the perceived success of maintenance divisions. Please indicate the extent to which you agree or disagree with each statement.

PERCEIVED SUCCESS

	Statement	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
B.A1	During difficult economic periods, investments in research and development/innovative projects continue and no financial cuts are made.	1	2	3	4	5
B.A2	The image (stature) of our business, relative to our competitors, has grown over the past few years.	1	2	3	4	5
B.A3	The morale (job satisfaction) of our employees has improved over the past few years.	1	2	3	4	5
B.A4	Our employees are highly committed to our business.	1	2	3	4	5
B.A5	In our business, employees are viewed as the most valuable asset of the business.	1	2	3	4	5
B.A6	The efficiency (doing things right) of our business has improved over the past few years.	1	2	3	4	5
B.A7	The effectiveness (doing the right things) of our business has improved over the past few years.	1	2	3	4	5
B.A8	The competitive position of our business has improved over the past few years.	1	2	3	4	5
B.A9	Our business has experienced growth in market share over the past few years.	1	2	3	4	5
B.A10	Our business has experienced growth in profits over the past few years.	1	2	3	4	5
B.A11	Our business has experienced growth in turnover over the past few years.	1	2	3	4	5

SECTION C

The following information is required to assist with the statistical analysis of data for comparison among different interest groups. Responses will be treated confidentially. Your assistance in providing this important information will be highly appreciated.

Mark the appropriate response with an **X**.

C01

Indicate your age group

≤ 29	
30-39	
40-49	
50-59	
60+	

C04

Indicate your grading within the organisation

Maintenance Operator	
Fitter	
Electrician	
Plater/Welder	
Millwright	
Instrument Mechanic	
Technician	
Engineer	
Superintendent	
Planner	
Contractor	
Manager	

C02

Indicate your gender

Male	
Female	

C03

Indicate your race

Black	
White	
Indian	
Coloured	

C05

Indicate your highest academic qualification

Lower than matric	
Matric	
Certificate (N3 or N6)	
Diploma	
Degree	
Post-Graduate Degree	

THANK YOU FOR YOUR TIME IN COMPLETING THIS SURVEY

8. ANNEXURE B: Chronologic history of the South African primary steel industry

Selected salient events in the chronologic development of the South Africa's primary steel industry:

A prospectus of the South African Coal and Iron Company was published in 1882.

In 1901 Mr. Samuel Light Green produced the first pig iron from a rudimentary blast furnace in Pietermaritzburg according to European methods.

By 1909 the Transvaal government awarded a tender to Mr. H.H Wright for the erection of a furnace to transform railway scrap into steel.

In 1911 Mr. Wright and Mr. Sammy Marks established the Union Steel Corporation called USCO.

In 1913 USCO started production from a 10 ton open hearth furnace in Vereeniging which was later acquired by Iscor.

By 1916 Mr. C.F Delfos has been granted a license to mine iron ore near Pretoria West.

In 1918 Mr. Delfos constructed a blast furnace in Pretoria, which produced 4 000 tons of pig iron in three campaigns during the period up to 1921.

In 1918 Mr. Marks constructed a blast furnace at USCO, with the capacity to produce 700 tons of pig iron per day.

1919 saw the start of construction of a blast furnace at Newcastle and production started in 1926 as the Newcastle Iron and Steel Works. The Works were renamed Armcor Iron Works and was later acquired by Iscor.

In 1924 a German company, Gutehoffnungshütte, published a positive report on the potential of the South African steel industry. The report was pioneered by Mr. Delfos, who then started to canvas government support for the expansion of the local steel industry.

By 1924 SCAW Metals started operations in Johannesburg as a steel ceilings and aluminum window frames manufacturer. SCAW metals was moved to Germiston in 1939.
In 1927 legislation was tabled in parliament that effectively lead to the founding of the South African Iron and Steel Industrial Corporation – Iscor.
In 1929 Cape Gate Fence & Wire Works (Pty) Limited was founded in Parow, Western province by the Kaplan and Kushlick families as a wire netting manufacturer.
By 1934 the State-owned Iscor started production of steel in Pretoria.
In 1943 Iscor commissioned a heavy plate mill at Vanderbijlpark Works.
By 1947 Iscor expanded operations by establishing a green field integrated steel works and flat products mill in Vanderbijlpark. First phase was completed by 1953. Major expansions followed between 1964 and 1968 and during 1973 to 1977.
In 1957 Minerals Engineering of Colorado opened a plant in Witbank, which was designed to produce approximately 1.4 million kg of vanadium pentoxide annually.
In November 1959 Anglo American Corporation of South Africa acquired a two third majority share in Minerals Engineering and in August 1960 the company's name was changed to Transvaal Vanadium Company (Proprietary) Limited.
The Highveld Development Company Limited was established on 19 May 1960 to investigate the viability of processing titaniferous magnetite ore for the production of liquid pig iron and vanadium-bearing slag.
In 1962 Cape Gate (Pty) Limited was established by the Kaplan family with the acquisition of a small wire netting plant on 15 hectares of industrial land in Vanderbijlpark, Gauteng Province.
By 1963 RMB Alloys Ferrochrome Pilot Project was launched in Middelburg.

In November 1964 the Highveld Development Company embarked on a program to build an integrated iron and steel works near Witbank.
Southern Cross Steel Co (Pty) Ltd was established in 1964. In 1968, it became the Steel Division of Middelburg Steel and Alloys (Pty) Ltd and in 1990, MS&A Stainless (Pty) Ltd was established. Columbus Stainless (Pty) Ltd was formed in 1991 when the initial partners, Samancor and Highveld Steel, acquired the stainless steel facility of MS & A Stainless from the Barlow Group.
On 11 June 1965 the name of the Highveld Development Company Limited was changed to Highveld Steel and Vanadium Corporation Limited ("Highveld").
The Cape Town Iron and Steel Works (Pty) Ltd – (CISCO), was established in 1965.
Following the acquisition of the remaining shareholding of Transvaal Vanadium Company (Proprietary) Limited, this company became a division of Highveld, the largest vanadium producer in the world in August 1966.
In 1967 in Cape Gate (Pty) Ltd, the Sharon Wire Mill division was established to produce uncoated and galvanized wire, welded mesh, diamond mesh, barbed wire, field fence and other products.
In 1971 Iscor started erecting an integrated steel works and long products mill at Newcastle. The Blast furnace produced the first iron in 1976.
In 1973 Iscor took ownership of CISCO.
In 1975 in Cape Gate (Pty) Ltd, the Davsteel division was established, and rolling mills for the production of wire rod, re-bar and rounds were commissioned in Vanderbijlpark.

In 1976 Highveld Steel acquired a 65 % ownership of Transalloys (Proprietary) Limited. The remaining interest was acquired in 1985 and Transalloys from then operated as a division of Highveld, producing manganese alloys.

In 1978 Highveld Steel acquired the total issued share capital of Rand Carbide Limited, which was founded in 1918 in Germiston. The plant was moved to Witbank in 1926 and Rand Carbide since then operated as a division of Highveld, producing ferrosilicon and various carbonaceous products.

By 1980 in Cape Gate (Pty) Ltd, an EAF melt shop consisting of a 45 ton electric arc furnace, casting machine and associated plant for steel manufacturing was commissioned.

By 1981 in Cape Gate (Pty) Ltd, the Oren Wire division was established, to produce specialist wire products.

The Highveld Steel group acquired Rheem South Africa (Proprietary) Limited, a company involved mainly in the manufacture of drums, pails and crown closures, in 1985. It was operated as a division of Highveld until the various parts were re-sold partly effective from 1 January 2002 and the rest early 2003.

In 1988 the first commercial Corex unit in the world was commissioned at Iscor Pretoria.

Following the privatization, Iscor was listed on the Johannesburg Securities Exchange on 8 November 1989.

In 1991 the Highveld Steel group expanded its activities into stainless steel with the acquisition of the stainless steel operation of Middelburg Steel & Alloys (Proprietary) Limited in partnership with Samancor Limited resulting in the formation of the Columbus Joint Venture.

In 1991 Iscor gained full control of the USCO steel Works South of Johannesburg and renamed the facility to Iscor Vereeniging Works.
In 1993 Highveld and Samancor each sold a one-sixth share of the Columbus Joint Venture to the Industrial Development Corporation.
Highveld Steel acquired the vanadium producer, Transvaal Alloys (Proprietary) Limited, on 1 January 1994.
In 1994 Iscor Pretoria works was upgraded to produce stainless steel products.
In 1995 CISCO formed a Joint Venture with Reinforcing Steel Contractors, known as RSH.
1996 saw the start of construction of the Saldanha Steel plant, a joint venture between Iscor and the Industrial Development Corporation.
In 1998 Iscor Pretoria Works was decommissioned following the failure of the stainless steel venture.
By 1999 the Saldanha Steel plant was commissioned.
In 1999 Murray & Roberts Limited acquired full ownership of CISCO.
Iskor transferred its mining companies and businesses to Kumba Resources Limited, captured a portion of the mineral rights at Sishen mine entitling it to delivery of 6.25 Mtpa of iron ore. Kumba was successfully unbundled and separately listed on the Johannesburg Securities Exchange on 26 November 2001.
Acerinox of Spain acquired a 64% share in Columbus Stainless from the three founding partners of Columbus i.e. Highveld Steel, Samancor and the IDC with effect from 1 January 2002.

With effect from 1 January 2002 Highveld Steel disposed of 64 % of its interest in Columbus Stainless, thereby retaining a 12 % interest in Columbus and acquiring a 2.9 % interest in the share capital of Acerinox, S.A.
Iscor acquired the IDC's 50% shareholding in Saldanha Steel and fully integrated Saldanha Steel into Iscor's flat steel products division as from April 2002.
In 2003 the Highveld Steel corporation acquired a 50 % shareholding in South Africa Japan Vanadium (Proprietary) Limited with a plant situated at the steel works, which produces ferrovanadium specifically for the Japanese market.
LNM acquired more than 51% of Iscor Ltd and the LNM subsidiary's name was changed to Ispat Iscor Limited as from September 2004.
On 14 March 2005, Ispat Iscor Limited was officially renamed Mittal Steel South Africa Limited. This development followed the December 2004 merger of Ispat International and LNM Holdings, the parent company, to form Mittal Steel Company N.V.
Half of the Acerinox S.A. interest was sold on 7 January 2005 and the balance together with the investment in Columbus Stainless (proprietary) Limited, on 13 May 2005.
Acerinox increased its shareholding in Columbus Stainless by 12% from 64% to 76% on 13 May 2005.
Following Anglo American's announcement on 26 October 2005 that it had decided to rationalise its portfolio and increase the focus on its controlled mining businesses, Anglo American reduced its 79% interest in Highveld Steel & Vanadium Corporation Ltd. On 13 July 2006 Evraz and Credit Suisse have each acquired 24.9% of Highveld's share capital from Anglo American. Anglo American retained a 29.2% interest in Highveld.

In 2007 Anglo American plc. disposed of its remaining 29.2% shareholding in Highveld Steel and Vanadium Corporation Limited to the Evraz Group S.A. As of May 4, 2007, Evraz owned approximately 54.1% of all outstanding shares in Highveld.

Evraz executed the option to acquire the remaining Credit Suisse shares in Highveld Steel and Vanadium Corporation. As of 28 September 2007 Evraz owned 80.9% of the entire issued share capital of Highveld.

2007 saw the merger between Arcelor and Mittal Steel to form the world's largest steel company, formerly Mittal Steel South Africa Limited was now known as ArcelorMittal South Africa Limited.

On 29 August 2008 the conditions set by the Commission of the European Communities for Evraz Group S.A. in relation to the divestment of Highveld's vanadium-related assets were met.

The name of Highveld Steel and Vanadium Limited was changed to Evraz Highveld Steel and Vanadium Limited on 19 July 2010.

Murray & Roberts sold the Cape Town Iron and Steel Works (CISCO) in September 2012 to DHT Holding, a Turkish investment group. CISCO had been placed on care and maintenance in 2010.

The sale of Scaw South Africa (Pty) Ltd. and related companies by Anglo American plc. was completed on 23 November 2012. Anglo American announced on 24 April 2012 the sale of Scaw South Africa to an investment consortium led by the Industrial Development Corporation of South Africa ("IDC") and Anglo American's partners in Scaw South Africa, being Izingwe Holdings (Pty) Limited, Shanduka Resources (Pty) Limited and the Southern Palace Group of Companies (Pty) Limited.

Source: www.saisi.co.za. 2012