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The impact of entrepreneurial orientation on performance in the metals and engineering industry.

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ABSTRACT

This study seeks to understand whether there exists a relationship between entrepreneurial orientation (EO) and firm performance (FP) and whether this is applicable in the context of the South African metals and engineering industry. An exploratory quantitative study of 125 SMEs and large firms in the metals and engineering industry was undertaken in 2012 to investigate the existence of the relationship between EO and FP. EO is measured using the Hughes & Morgan (2007) EO scale which incorporated the five dimensions of Lumpkin & Dess (1996). The Hughes & Morgan (2007) EO scale is used to study the independent effects of these multi-dimensions on FP. A Chi-square test is used to test the significance independence of the relationship between the multi-dimensions of EO and FP. This cross-section study finds out that there is convincingly a moderate to strong relationship between EO and FP.

Keywords: Entrepreneurship, Entrepreneurial Orientation, firm performance, strategy-making.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

_____ Date:_____

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1.1 Introduction

The focal undertaking of the study pertains to the concept of Entrepreneurial Orientation (EO) (Lumpkin & Dess, 1996, 2001). Recent progress in the understanding of EO and its effect on firm performance continues to confirm a relationship that researchers have suspected for some time. After more than thirty years of scholarly inquiry, it is generally accepted that firms that behave entrepreneurially perform better than those firms that are more conservative (Anderson & Eshima, 2011). Consistent with this conclusion, Covin & Wales (2011) stated that "the phenomenon of an entrepreneurial orientation (EO) as a driving force behind the organisational pursuit of entrepreneurial activities has become a central focus of the entrepreneurial literature and the subject of more than 30 years of research".

This study builds on previous work in EO. Earlier normative and descriptive theory on EO research dates as far back to the work of Mintzberg (1973) through to Khandwalla (1976). Covin & Wales (2011) stated that Miller & Friesen (1982) introduced the notion of firm-level entrepreneurship that formed the foundation of a school of thought that EO manifested as a collection of organisational behaviours. The construct of EO was further developed by Miller (1983), who conceived of a construct which was composed of three sub-dimensions of EO; innovativeness, risk-taking, and proactiveness. Based on the original work of Miller (1983), Covin & Wales (2011) recorded that Lumpkin & Dess (2001) had expanded the three of sub-dimensions of EO to five including: innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy. A firm that was truly "entrepreneurial" would exhibit high levels of each dimension (Kreiser, Marino, & Weaver, 2002).

There is conclusive evidence which substantiates that the phenomenon of EO is an entrepreneurial strategy-making process. Covin, Green, & Slevin (2006) reaffirmed that EO is a strategic construct whose conceptual domain includes certain firm-level outcomes and management-related preferences, beliefs, and behaviours as expressed among the firm's top-level managers.

Similarly, Wiklund (1999) further pursued research to identify the effects of EO on various other dimensions of firm performance. Firms are frequently challenged to rapidly adopt new business models, to explore new opportunities and to enhance performance, demand and outputs. Conceptual arguments suggest that EO leads to higher performance (Rauch, Wiklund, Lumpkin, & Frese, 2009). In this context, a firm performance dimension is a measure of self-report instruments comprising financial and non-financial measures.

This chapter aims to undertake a research study about the impact of EO as a construct driving firm performance. Subsequent chapters will further clarify the research objectives and the scope of the study. The purpose of the research is to explore whether there exists a relationship between EO and firm performance. It is a explanatory descriptive study framed in the South African context in the metals and engineering industry.

1.2 Research Significance within the South African Context

The metals and engineering industry is one of the most significant contributors to South Africa's manufacturing employment and performance. This sub-industry of the manufacturing industry produces intermediary products (SEIFSA, 2012). The research setting for this study is specific to the firm performance in the metals and engineering industry in South Africa (SA), focused on the impact of EO on firm performance. Although there is no consensus on appropriate measures of firm performance or success, entrepreneurship researchers have pointed to growth as a crucial indicator of entrepreneurial success (Urban, Van Vuuren, & Barreira, 2008).

From an economic and social point of view, SA firms need to grow and generate new jobs. The evidence provided by the GEM report (2008) states that only 2.3 per cent of South Africans own businesses that have been established for over 3.5 years, which also indicates a relatively high failure rate among start-ups. The failure of small firms has been a problem which contributes to unemployment in SA and to slow economic growth. SA's transition as a developing economy provides a classic setting for this study. Currently in SA most research and policy initiatives focus on necessity entrepreneurs, who represent the unemployed masses (Urban et al., 2008). Entrepreneurial activities are increasingly regarded as important to firms (Kraus, Rigtering, Hughes, & Hosman, 2012). Therefore the goal of this study, to investigate

the influence of EO on the firm performance, is considered to be of strategic significance to job creation and poverty alleviation.

1.3 Research objectives

The purpose of the research project is to explore whether there exists a relationship between entrepreneurial orientation (EO) and firm performance in the context of the South African metals and engineering industry.

The effectiveness of EO as a strategy formation process in a firm can be determined by analysing five dimensions, namely:

- Innovativeness
- Proactiveness
- Risk-taking
- Competitive aggressiveness
- Autonomy

To test these dimensions, the research variables are chosen based on their appropriateness as a supplementary component of the EO model. Furthermore, EO as an independent variable is analysed to establish whether there exists a relationship with the dependent variables of the firm performance measurement instruments. This is also consistent with the work of Lumpkin & Dess (1996), “Sales growth rate is the firm-performance variable examined in this research because an EO is, essentially, a growth orientation”. Growth of the firm is considered to focus on the increase in sales, employees, or market share (Li, Huang, & Tsai, 2009).

EO is measured using the Hughes & Morgan (2007) EO scale which incorporated the five dimensions of Lumpkin & Dess (1996). The Hughes & Morgan (2007) EO scale is designed to study the independent effects of these sub-dimensions on firm performance.

1.4 Research scope

The scope of the research is the investigation of the relationship between entrepreneurial orientation and the firm performance and is limited to the metals and engineering industry in South Africa. The size of the firms researched varied from Small Medium Enterprises (SME) firms to large firms. Large and small firms are faced with completely different challenges and the effects of EO on performance has different outcomes in terms of sales growth rates, growth in number of employees or on overall firm performance.

In 2011, Covin & Wales (2011) cited that according to Lumpkin & Dess (1996), what it means to be entrepreneurial, or which dimensions of EO are likely to contribute to a new entry, depends upon considerations that lie beyond the boundaries of the construct, such as the organisational and environmental context of a firm. However, there are more and less entrepreneurial ends to each of the five dimensions (Covin, & Wales, 2011). Entrepreneurial firms need not to be high on all five dimensions of EO, however, to simply achieve a balanced profile.

The scope followed self-report quantitative indicators in order to differentiate between SMEs and large firms within the metals and engineering industry. The concept of entrepreneurship is the creation of start-ups which includes SMEs. However, this research on the relationship between EO and the firm performance is targeted at the existing firm's orientation toward entrepreneurial activity irrespective of its turnover size, age of the firm, number of employees, and whether it is public or private.

1.5 Research aim

In the process of exploring the relationship between EO and firm performance, the aim of the study is to contribute to EO and general entrepreneurship literature. The contributions include the use of contextual models to assess the effect of EO on the firm performance. EO effectiveness is appropriately measured using criteria that reflect a firm's success at translating entrepreneurial opportunities into growth trajectories (Covin et al., 2006). Growth of the firm is considered to focus on the increase in sales, employees, or market share (Li et al., 2009). This is consistent with the suggestion by Murphy, Trailer, & Hill (1996), which takes efficiency, growth, and profit of firm performance into consideration.

1.6 Conclusion: Chapter One

This chapter provides an overview of the research problem and the background of the metals and engineering industry in South Africa. In addition, an overview of the concept of entrepreneurial orientation (EO) and firm performance is introduced. The relationship between EO and firm performance is established to create the basis for the study. Confirmed evidence of the EO dimensions that relate to firm performance and their benefits to the industry are also highlighted. The research objectives, scope, and aims are finally provided.

2 Chapter Two: Literature review

2.1 Introduction

The aim of the research is to investigate whether there is a positive relationship between EO and firm performance in the South African context in the metals and engineering industry. There is a growing body of literature which provides empirical evidence that there is a positive relationship between EO and performance. This study takes into account the notion that the relationship between an EO and performance is different for different types of firms (Wiklund & Shepherd, 2005). This is consistent with apparent findings that suggest that firms with high EO could be superior performers and that the relationship could be moderated by different environmental factors (Lumpkin & Dess, 1996).

The theory reviewed in this section of the research seeks to draw out an important overall understanding of the effect of EO on the growth of the firm. The concept of EO has over the years contributed to the entrepreneurship domain generally. The concept continues to attract interest from a number of scholars, which has led to a wide acceptance of the meaning and relevance of EO.

According to Pearce, Fritz, & Davis (2010, p. 219), the recent definition of EO is "… conceptualised as a set of distinct but related behaviours that have the qualities of innovativeness, proactiveness, competitive aggressiveness, risk-taking, and autonomy". It is clear that Pearce et al., (2010, p. 219)'s definition of EO has included additional salient dimensions of EO as suggested by Lumpkin & Dess (1996). Lumpkin & Dess (1996) is further supported by the additional work of Voss, Voss, & Moorman (2005); and that of Hughes & Morgan (2007) which also states that EO has been described as a form of strategic orientation (Wiklund & Shepherd, 2003, 2005).

Lumpkin & Dess (1996) drew on extensive research to characterize EO as being the product of five dimensions—risk-taking, innovativeness, proactiveness, competitive aggressiveness, and autonomy. In supporting later research, Lumpkin & Dess (2001), suggested that the different dimensions of EO may relate differently to firm performance and hence promote the use of the multidimensional EO as an explanatory construct.

2.2 Entrepreneurial orientation

A large number of quantitative research studies have been conducted round the concept of EO. The formulations of the EO model, and the original empirical tests, have been predominantly conducted in the North American context, including for instance, the research works of Miller (1983), Covin & Slevin (1989), and Lumpkin & Dess (1996). This is further supported by a large stream of studies of EO which advanced the acceptance of the concept and its relevance to business.

EO has generally been conceived of as an organisational decision-making activity favouring entrepreneurial activities (Lumpkin & Dess, 1996). Kraus et al., (2012) stated that the entrepreneurial activities of an established firm should be referred to as its 'Entrepreneurial Orientation' (EO). The entrepreneurial activities of existing and established firms have, for example, been described by Lumpkin & Dess (1996) and Wiklund (1999) as entrepreneurial orientation. Lumpkin & Dess (2001) noted a distinction between EO and entrepreneurship by suggesting that EO represents key entrepreneurial processes that answer the question of how new ventures are undertaken, whereas the term entrepreneurship refers to the content of entrepreneurial decisions by addressing what is undertaken.

In 2009, Rauch et al., (2009) concluded after reviewing prior strategy making processes and entrepreneurship research that EO represents one of the areas of entrepreneurship research where a cumulative body of knowledge is growing. EO has therefore become a key construct in the entrepreneurship literature (Bradley, 2011).

Consistent with Miller's (1983) definition, researchers studied the three core dimensions of EO; innovativeness, proactiveness, and risk-taking. Prior research suggested that EO is a uni-dimensional construct. Although the definition included only three dimensions, Lumpkin & Dess (1996) further extended the definition of EO by identifying additional dimensions.

Consistent with prior research, EO in this study is described as a product of five dimensions; innovativeness, proactiveness, risk-taking, competitive aggressiveness, and autonomy. These dimensions vary independently of each other (Lumpkin & Dess, 1996). These EO dimensions can each have a universally positive influence on performance. (Wiklund & Shepherd, 2005). In 2002, researchers (Kreiser et al., 2002), further provided empirical evidence to support the multi-dimensional perspective consistent with the suggestion of Lumpkin & Dess (1996). Many perspectives can be

found in the literature concerning the definition of EO and with the majority of research studies following the definition of Miller (1983).

The literature presents various definitions and meanings of the concept of EO. Table 2.1 below presents a sampling of the various definitions of EO advanced in prior research. The entries displayed in the table include the dimensions of EO hypothesised by the authors, sample characteristics, and the definition of EO.

Table 2.1: Selected EO definitions adapted from Rauch et al., 2009

Authors	Sample Characteristics	Definition of EO	Dimensions
Mintzberg (1973)	Not Applicable.	"In the entrepreneurial mode, strategy-making is dominated by the active search for new opportunities" as well as "dramatic leaps forward in the face of uncertainty" (p.45).	Risk-taking, Proactiveness, Centralisation, Growth
Khandwalla (1976/1977)	103 public Canadian firms.	"The entrepreneurial [management] style is characterised by bold, risky, aggressive decision-making" (p.25, [ ] added).	Risk-taking, Flexibility, Centralisation.
Miller & Friesen (1982)	52 Canadian firms.	"The entrepreneurial model applies to firms that innovate boldly and regularly while taking considerable risks in their product-market strategies" (p. 5).	Innovation, Risk-taking.
Miller (1983)	52 Canadian organisations.	"An entrepreneurial firm is one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with 'proactive' innovations, beating competitors to the punch" (p. 771).	Innovation, Risk-taking, Proactiveness.
Morris & Paul (1987)	116 companies in Central Florida.	"An entrepreneurial firm is one with decision-making norms that emphasise proactive, innovative strategies that contain an element of risk" (p. 249).	Proactiveness, Innovativeness, Risk-taking.
Covin & Slevin (1989)	161 small manufacturers, USA.	"Entrepreneurial firms are those in which top managers have entrepreneurial management styles, as evidenced by the firms' strategic decisions and operating management philosophies. Non-entrepreneurial or conservative firms are those in which top management style is decidedly risk-averse, non-innovative, and passive or reactive" (p. 218).	Innovation, Risk-taking, Proactiveness.

Authors	Sample Characteristics	Definition of EO	Dimensions
Merz & Sauber (1995)	370 US organisations.	". . . entrepreneurial orientation is defined as the firm's degree of proactiveness (aggressiveness) in its chosen product-market unit (PMU) and its willingness to innovate and create new offerings" (p. 554).	Innovation, Proactiveness.
Lumpkin & Dess (1996)	Not Applicable.	"EO refers to the processes, practices, and decision-making activities that lead to new entry" as characterised by one or more of the following dimensions: "a propensity to act autonomously, a willingness to innovate and take risks, and a tendency to be aggressive toward competitors and proactive relative to marketplace opportunities" (pp. 136-137).	Innovation, Risk-taking, Proactiveness, Autonomy, Competitive Aggression.
Zahra & Neubaum (1998)	228 U.S organisations.	EO is "the sum total of a firm's radical innovation, proactive strategy action, and risk taking activities that are manifested in support of projects with uncertain outcomes" (p. 124).	Innovation, Risk taking, Proactiveness.
Voss, Voss, & Moorman (2005)	136 non-profit professional theatre industry, USA.	". . . we define EO as a firm-level disposition to engage in behaviours [reflecting risk-taking, innovativeness, proactiveness, autonomy, and competitive aggressiveness] that lead to change in the organisation or marketplace" (p. 1134, [ ] added).	Risk-taking, Innovativeness, Proactiveness, Autonomy, Competitive Aggressiveness.
Avlonitis & Salavou (2007)	149 Manufacturers.	"EO constitutes an organisational phenomenon that reflects a managerial capability by which firms embark on proactive and aggressive initiatives to alter the competitive scene to their advantage" (p. 567).	Innovativeness, Proactiveness

Authors	Sample Characteristics	Definition of EO	Dimensions
Cools & Van den Broeck (2007/2008)	1 580 People.	“Entrepreneurial orientation (EO) refers to the top management’s strategy in relation to innovativeness, proactiveness, and risk-taking” (p. 27).	Innovativeness, Proactiveness, Risk-taking.

The literature presents various studies and draws various conclusions about the concept of EO. Table 2.2 below presents a sample of the main studies of EO. (Kreiser et al., 2002). The entries include the dimensions of EO hypothesized by the author(s), whether or not an aggregated measure of these dimensions was employed, the characteristics of the sample and statistical analysis techniques utilized in the study (if applicable), whether or not EO was utilized as a dependent variable, the number of items included in the EO scale, and the main conclusions of the author(s).

Table 2.2: Main studies of EO adapted from Kreiser et al., 2002

Author(s)	Dimensions	Aggregate Measured?	Sample Characteristics	Statistical Analysis	Dependent Variable?	Number of Scale Items	Study Conclusion
Mintzberg (1973)	Risk-taking, Proactiveness, Centralization, Growth	N / A	N / A	N / A	N / A	N / A	Entrepreneurial firms typically adopt risky growth strategies
Khandwall (1977)	Risk-taking, Flexibility, Centralization	N / A	103 public Canadian firms	N / A	N / A	Six	Entrepreneurial firms take more risks than other organisations
Miller & Friesen (1982)	Innovation, Risk-taking	Yes	52 Canadian firms	Correlation Analysis, Regression Analysis	Yes	Five	Entrepreneurial firms will exhibit higher levels of product-innovation then conservative firms
Miller (1982)	Innovation, Risk-taking, Proactiveness	Yes	52 Canadian organisations	Hypothesis Testing, Analysis of Variance	Yes	Seven	The determinants of entrepreneurship are influenced by organisational type
Miller & Friesen (1983)	Analysis, Innovation	Yes	50 Canadian firms, 36 U.S. firms	Correlation Analysis, Hypothesis Testing	Yes	Ten	The relationship between EO and environment is stronger in successful firms
Covin & Slevin (1988)	Innovation, Risk-taking, Proactiveness	Yes	80 U.S. manufacturing and service firms	Moderated Regression Analysis	No	Six	Entrepreneurial Orientation and organisational structure interact to determine firm performance
Covin & Slevin (1989)	Innovation, Risk-taking, Proactiveness	Yes	161 U.S. manufacturing firms	Moderated Regression Analysis	No	Nine	Performance is related to the fit between EO, structure, and environment
Covin & Slevin (1991)	Innovation, Risk-taking, Proactiveness	Yes	N / A	N / A	N / A	N / A	The relationship between EO and the firm performance is moderated by various internal,

Author(s)	Dimensions	Aggregate Measured?	Sample Characteristics	Statistical Analysis	Dependent Variable?	Number of Scale Items	Study Conclusion
							external, and strategic variables
Miles & Arnold (1991)	Innovation, Risk-taking, Proactiveness,	Yes	169 U.S. manufacturing firms	Factor Analysis, Correlation Analysis, Chi-Square	Yes	Nine	Marketing and orientation and EO are positively correlated
Zahra (1991)	Formal, Informal	Yes	119 U.S. companies	Canonical Analysis, Correlation Analysis	Yes	Nine	The environment, strategy, structure, and values are related to corporate entrepreneurship
Miles, Arnold, & Thompson (1993)	Innovation, Risk-taking, Proactiveness	Yes	169 U.S. companies	Correlation Analysis	Yes	Nine	Environmental Hostility and EO are negatively correlated
Neman & Slevin (1993)	Innovation, Risk-taking, Proactiveness	Yes	82 U.S. manufacturing firms	Correlation Analysis, Regression Analysis	No	Nine	The “fit” between EO, structure, and strategy is positively related to performance
Zahra (1993a)	Venturing and Innovation, Self-renewal	Yes	102 U.S manufacturing firms	Cluster Analysis, MANOVA, ANOVA, Regression Analysis	No	27	The association between corporate entrepreneurship and performance varies by environment
Merz & Sauber (1995)	Innovation, Proactiveness	No	370 U.S organisations	Cluster Analysis, MANOVA, F-tests, Discriminant Analysis, Regression Analysis	No	Seven	The managerial profiles of small firms vary by strategy, structure, and environment

Author(s)	Dimensions	Aggregate Measured?	Sample Characteristics	Statistical Analysis	Dependent Variable?	Number of Scale Items	Study Conclusion
Zahra & Covin (1995)	Innovation, Risk-taking, Proactiveness	Yes	Three samples (Consisting of 24, 39, and 45 U.S. organisations)	Regression Analysis	No	Nine	Entrepreneurial Orientation has a positive impact on financial performance
Lumpkin & Dess (1996)	Innovation, Risk-taking, Proactiveness, Autonomy, Competitive Aggression	No	N / A	N / A	N / A	N / A	The dimensions of EO may be able to vary independently of one another
Becherer & Maurer (1997)	Innovation, Risk-taking	Yes	147 U.S. organisations	Correlation Analysis, Moderated Regression Analysis	No	Nine	The EO-marketing orientation relationship is moderated by environmental factors
Dickson & Weaver (1997)	Innovation, Risk-taking, Proactiveness	Yes	433 Norwegian manufacturing firms	Logistics Regression	No	Eight	Entrepreneurial Orientation moderates the relationship between perceived environmental uncertainty and alliance usage
Knight (1997)	Innovation, Proactiveness	Yes	258 Canadian firms	Factor Analysis, Correlation Analysis	Yes	Eight	The Covin and Slevin EO scale possess high cross-cultural reliability and validity
Zahra & Neubaum (1998)	Innovation, Risk-taking, Proactiveness	Yes	228 U.S. organisation	Regression Analysis	Yes	Seven	New ventures will exhibit high levels of EO under adverse environmental conditions
Barringer & Bluedorn (1999)	Innovation, Risk-taking, Proactiveness	Yes	169 U.S. manufacturing firms	Hierarchical Regression Analysis	Yes	Nine	A positive relationship exists between corporate entrepreneurship and strategic management practices

Author(s)	Dimensions	Aggregate Measured?	Sample Characteristics	Statistical Analysis	Dependent Variable?	Number of Scale Items	Study Conclusion
Wiklund (1999)	Innovation, Risk-taking, Proactiveness	Yes	132 Swedish firms	Regression Analysis	No	Eight	The positive relationship between EO and performance increases over time
Zahra & Garvis (2000)	Innovation, Risk-taking, Proactiveness	Yes	98 U.S. companies	Moderated Regression Analysis	No	Seven	Hostility moderates the relationship between international corporate entrepreneurship and performance

As is evident from the preceding tables, the construct of EO is complex and controversial as there is no agreement on the definition. The definitions of the characteristic traits vary from one-dimensional to multidimensional representations found in the literature. This phenomenon has been given various labels by researchers. The above Table 2.1 demonstrates various distinctions in their presentation of EO concept.

The concept of EO originated from the pioneering work of Mintzberg (1973). Mintzberg in his theory about strategic decision making, conceived the concept of EO by stating that “In the entrepreneurial mode, strategy-making is dominated by the active search for new opportunities” as well as “dramatic leaps forward in the face of uncertainty” (p.45).

Further scholarly inquiry views the concept of EO as an organisational level phenomenon involving key decisions made on behalf of the entire organisation (Covin & Slevin, 1989). This is also supported by the work of Miller (1983) which introduced the notion of firm level entrepreneurship and conceived EO as a construct composed of three sub-dimensions of innovativeness, risk-taking, and proactiveness. Expanding on the definition of EO, Lumpkin & Dess (1996), posit that innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy represent five factors of EO. These dimensions are independent and collectively define the domain of EO (Lumpkin & Dess, 1996). The extent to which each of these dimensions is useful for predicting the success of business may be contingent on the industry environment (Urban, 2008).

2.3 Dimensions of Entrepreneurial Orientation

2.3.1 Innovativeness

The metals and engineering industry is challenged to be innovative by introducing new products in their markets, and keeping abreast with the technologies available to serve their markets. Product innovation requires the firms to have competences relating to technology and relating to customers, and each of these competences is constituted by a set of resources (Danneels, 2002). Organisations require the aptitudes of highly qualified technical managers. Miller & Friesen (1982) examined the “technocratisation” of firms and found that higher levels of innovativeness were associated with greater reliance on technically trained specialists (Dess & Lumpkin, 1996). Davis & Kreiser

(2010) support the conclusion that organisations operating in dynamic environments are more likely to benefit from new product innovation than firms operating in stable environments.

Innovativeness is a dependent variable of the research and is further defined by Hughes & Morgan (2007) as a variable which captures a bias towards embracing and supporting creativity and experimentation, technological leadership, novelty and research and development (R & D) in the development of products, services and processes. Miller (1987) used R & D cost as a percentage of sales to measure financial resources devoted to innovation (Lumpkin & Dess, 1996). According to Lumpkin & Dess (1996), another frequently used market-related method for assessing innovation is to investigate the number of new products or service introductions and the frequency of change in services or product lines (Covin & Slevin, 1989; Miller and Friesen, 1982). Extrapolating this view further, the EO dimension of innovativeness is about pursuing and giving support to novelty, creative processes and the development of new ideas through experimentation (Lumpkin & Dess, 1996).

2.3.2 Risk-taking

Davis & Kreiser (2010) states that organizations that do not take risks in dynamic environments will lose market share and will not be able to maintain a strong industry standing relative to more aggressive competitors (Covin & Slevin, 1991; Miller, 1983). Risk has various meanings, depending on the context in which it is applied (Lumpkin & Dess, 1996).

Ansoff (1965) suggests that strategies involving the development of new products or technological processes and/or those aimed at the satisfaction of new needs and markets are more risk-tolerant than others, so the strategy of market penetration becomes the safest option as compared to diversification, the most risk-taking alternative (Casillas & Moreno, 2008). Ansoff (1965) is further supported by Casillas & Moreno (2008) by noting that firms that want to grow at an exceptional rate (higher than the average growth of the firms of the same sector) will tend to escape or broaden the traditional product–market sphere, through expansion via development of new products–technologies, or via attending to new needs–markets, or both at the same time, which constitutes diversification.

Risk-taking represents a willingness to commit resources to implement projects, activities, and solutions that contain an inherently high level of uncertainty regarding the likely outcomes (Lumpkin & Dess, 1996). Without a degree of risk-taking, firms delay or refrain from introducing innovations, from undertaking exploitative activities and react conservatively to changing market conditions (Hughes & Morgan, 2007). According to Miller's (1983) approach to EO, a measure of risk taking at an organisation can be made by asking the managers about the organisation's proclivity to engage in risky projects and managers' preferences for bold versus cautious acts to achieve organisational objectives. This was further confirmed by Venkatraman (1989) who followed a similar approach.

2.3.3 Proactiveness

The third dimension of EO is about "seeking new opportunities which may or may not be related to the present line of operations, introduction of new products, and brands ahead of competition and strategically eliminating operations which are in the mature or declining stages of the life cycle" (Venkatraman, 1989, p. 949).

Proactiveness relates to a forward-looking perspective where companies actively seek to anticipate opportunities to develop and introduce new products to obtain first-mover advantages and shape the direction of the environment (Hughes & Morgan, 2007). Proactiveness reflects entrepreneurial willingness to dominate competitors through a combination of proactive and aggressive moves, for example, by introducing new products or services ahead of competition and acting in anticipation of future demand to create change and to shape the environment (Keh, Nguyen, & Ng, 2007).

Organisations are expected to anticipate future problems and adjust their plans accordingly in the search for future opportunities. In contrast, proactiveness is absent in the reactive strategy and in routine/habit (Frese, Gelderen, Ombach, 2000). As an EO dimension, proactiveness is closely related to innovativeness. Based on Ansoff's (1965) corporate strategies, Lumpkin & Dess (1996) propose that entrepreneurial firms are quick to identify opportunities derived from technological development and, if we add pro-activeness to this propensity for innovation, they will also be likely to exploit this type of opportunity through the design and marketing of new products, even though this behaviour involves a certain degree of risk.

2.3.4 Competitive aggressiveness

Recent research on competitive advantage has highlighted the importance of entrepreneurial orientation (Lumpkin & Dess, 1996). Competitive advantage involves the propensity to directly and intensely challenge the company's competitors (Lumpkin & Dess, 1996). According to the resource-advantage theory, entrepreneurial orientation is a resource that enables a firm to outperform other rivals and to gain marketplace positions of competitive advantage (Hunt & Morgan, 1996).

Notable scholars like Lumpkin & Dess (2001); Wiklund & Shepherd (2003, 2005); Zahra & Covin (1995); Zahra & Garvis (2000) have, to date, attempted to explain performance by investigating the relationship between EO and firm performance. Given the proven fact that EO is a multidimensional construct, it is important to measure how firms are organized in order to discover and exploit market opportunities. A firm can create a competitive advantage by anticipating changes in future demand (Lumpkin & Dess 1996). Competitive advantage as a construct of EO is also characterized by the ability to offensively respond to competitor threats.

The effect of competitive advantage as a dimension of EO cannot be discussed without considering the resource-advantage theory. The conclusion is that EO is a resource that enables a firm to outperforming its rivals and gain marketplace positions of competitive advantage (Hunt & Morgan, 1996). Resource-advantage theory suggests that competitive advantage cannot be explicitly articulated outside the context of the firm because it is the source of innovative competencies.

Lastly, competitive advantage is about the firm's ability to confront and challenge competitors. The intended research will measure competitive advantage based on the study of Chen, Lin, & Chang (2009).

2.3.5 Autonomy

This fifth dimension of EO refers to independent action undertaken by entrepreneurial leaders or teams directed at bringing about a new venture and seeing it to fruition (Rauch et al., 2009). Because of its importance to entrepreneurship, Lumpkin & Dess (1996) highlighted autonomy as a key dimension of an EO (Lumpkin, Cogliser, Schneider, 2009).

Although autonomy is a dimension of EO, as proposed by Lumpkin & Dess (1996), there has been slow adoption in the investigation of this construct. Firstly, due to the fact that the original suggestion by Miller (1983) did not include autonomy as a dimension of EO, and secondly the adoption has been slow due to a lack of valid measurement instruments of an EO perspective at the level of the firm. This research study is intended to contribute towards the development of existing measurement scales of autonomy.

Organizational autonomy is an established concept within the management literature and has been described using a variety of frameworks (Lumpkin et al., 2009). Autonomy constitutes the bases for innovation and firms need a certain level of autonomous strategic behaviour to be able to radically generate a combination of new productive resources. It is recognized that the type of autonomy suggested by EO is primarily strategic and is concerned with having the freedom and independence to make decisions about entrepreneurial activities.

Lastly, for the purpose of this research, autonomy will be measured using the instruments as proposed by Lumpkin et al., (2009). This selection is motivated by the fact that the majority of research scales focus exclusively on the structural level while a few use a mix of strategic and structural approaches to autonomy, for instance Sprigg, Jackson & Parker (2000) fell short in their efforts to capture the autonomy construct of EO.

2.4 Metals and engineering industry

The manufacturing sector provides downstream stimulation for growth of other activities which include services, and contribution towards employment creation and economic empowerment. The World Bank report (2012) referred manufacturing to industries belonging to International Standard Industrial Classification (ISIC) divisions

15-37. The industry internal structure consists of intermediary inputs and outputs of products with the downstream demand patterns being the prospective determinant of the industry. Reported in Trade Economics (2012), the Manufacturing, value added Gross Domestic Product (% of GDP) in South Africa was last reported at 14.66% in 2010, making it the second largest contributor to the nation's economy (World Bank Report, 2012).

The metals and engineering industry constitutes 29.3% of formal manufacturing employment (FRIDGE, 2003). This is a sizeable contribution towards the manufacturing sector, which in turn is central to the economic well-being of SA. The sector is dominated by the following key industries; Agri-processing, Automotive, Chemical, ICT and electronics, Metals, Textiles, clothing and footwear (SouthAfrica.info, 2012). For the purpose of this study, the well-developed metals and engineering industry, with vast natural resources and a supportive infrastructure, represents roughly a third of all South Africa's manufacturing (SouthAfrica.info, 2012) dominating with revenue worth R 69.8 billion in 2011 (SEIFSA, 2012).

The sub-industries continue to shed employment. Over the period 1999-2002, metal and engineering employment loss appears to have slowed with official data showing a decline of 0.5% (FRIDGE, 2003). This is despite positive performance of some sectors like basic Metals. Performance in the metal and engineering industries has both increased and decrease depending on the nature of the sub-sectors (Guliwe & Moussouris, 2006). Subsequently, since 1994 only 18.7% of firms in the metals and engineering industries have grown export revenues to greater than 10% of their turnover (FRIDGE, 2003).

Consequently, across the industries, a number of factors influence this slow growth. These factors include increases in international trade flows, both imports and exports, as the economy become increasingly integrated into the global economy (FRIDGE, 2003). The metals and engineering industries have been performing poorly due to macroeconomic impacts on industrial performance, such as the strength (and volatility) of the currency, and insufficient capital to support exports. The FRIDGE (2003) reported that further to macroeconomic challenges facing the industry, there is lack of competitiveness and the need to invest in new technologies. The inability of these firms to enable competitiveness, and invest in new technologies will continue to present low productivity, turnover, and profitability levels. These self-report measurements are key indicators to establish the impact of EO on the firm performance.

2.5 Firm Performance

Previous research suggests that EO has a positive influence on performance (Zahra & Covin, 1995; Wiklund & Shepherd, 2005). Performance, the dependant variable (DV), is defined as the degree to which an organisation's goals are achieved (Pearce et al., 2010). Performance is best measured with multiple indicators in entrepreneurial firms to reflect the multiplicity of goals that a firm might have. In this research, firm performance was measured using a subjective self-report instrument consisting of six items. These items comprised of category of the firm (1), primary sub-industry classification (2), size of the firm in annual turnover (3), number of permanent employees (4), duration of the firm in the industry (5) and firm's financial year end (6).

For the purpose of this research study, performance is defined as a composite index of three indicators; size of firm in turnover (1), size of firm in number of employees (2), and age of firm in number of years in the industry (3). Therefore, these three performance indicators were employed as primary proxies for firm performance.

2.6 Dependent variables

The overall performance index is not always appropriate when analysing a concept such as the performance of the firm (Andersen, 2010). In this study, three dependent variables are analysed. Annual turnover and number of employees are used as proxies to measure the size of the firm, and duration of the firm in the industry used to measure the age of the firm.

2.7 Entrepreneurial orientation and firm performance

Majority of the studies recorded assume that EO has an effect on performance. This relationship has received considerable attention over the last decade (Wiklund & Shepherd, 2005). Prior studies have also theorised that firm-level entrepreneurial behaviours will be positively associated with firm profitability and growth. Recent studies by Keh et al. (2007), suggest that in certain situations, firms exhibiting high levels of EO will achieve superior performance than those possessing low levels of EO. Scholars also argued that the sub-dimensions of EO have shown to possess differential relationships with organisational performance (Kreiser et al., 2002, and Lumpkin & Dess, 1996).

2.8 Conclusion: Chapter Two

In summary, related concepts collated through literature review present an array of definitions of EO and cover a wide range of functional disciplines. Although no widely accepted generic definition of EO, the majority of scholars consistently acknowledge the primary role of EO in several industries. The literature review revealed five dimensions of the EO construct; Innovation, Risk-taking, Proactiveness, Competitive aggressiveness, and Autonomy.

There is a growing body of literature which provides empirical evidence that there is a positive relationship between EO and performance. Performance is best measured with self-report multiple indicators in entrepreneurial firms particularly the metals and engineering industry in the context of SA.

The following chapter (Chapter Three) seeks to explore hypothesis of entrepreneurial orientation and the impact on firm performance. The constructs to be answered are categorised in innovation, risk-taking, proactiveness, competitive aggressiveness, and autonomy.

3 Chapter Three: Research hypotheses

3.1 Introduction

Miller's (1983) definition included the three dimensions of EO; innovativeness, risk-taking and proactiveness. The definition was further expanded by researchers to popular models of EO with five dimensions; innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy (Lumpkin & Dess, 1996). Prior research has also argued that these five dimensions have a similar effect on firm performance.

The choice of indicators to measure firm performance may influence the results of the relationship between EO and performance, and this is consistent with Lumpkin & Dess (1996) and Hughes & Morgan (2007). The empirical literature reports a high diversity of performance indicators (Rauch et al., 2009). Performance is multi-dimensional, and the common distinction is whether financial or nonfinancial indicators are measured.

3.2 Control variables

All the firms in the study are classified under the metals and engineering industry. The metals and engineering industry consists of numerous sub-industries. Besides industry type, the following have been included as control variables in the EO model; age of firm and size of firm. Control variables are commonly used in EO research (e.g., Zahra & Garvis 2000; Antoncic, & Hisrich, 2004: Kraus et al., 2012). The age of the firm has been correlated with resistance to innovation and lower performance and size of the firm is included since SME's have been found to be entrepreneurial. However, these variables were based on self-reported subjective information. Firms of different size and age may exhibit different organizational and environmental characteristics, which in turn may influence performance. The same is true for firms in different sub-industries (Wiklund & Shepherd, 2005).

3.2.1 Age of firm in number of years in the industry

The respondents were asked to indicate the duration of the firm in the industry from a selection of less than 10 years, between 10 years and 20 years, and greater than 20 years. Firm age is a measure of the number of years since the firm's self -report of the establishment of the firm. EO studies often include firm age in their specific research models, although most frequently as a statistical control variable (Rauch et al., 2009).

3.2.2 Size of firm in number of permanent employees

The EO of a business is typically investigated through top management (Rauch et al., 2009). Respondents were asked to indicate the number of employees from a selection of less than 50 employees (Small), between 50 employees and 200 employees, and greater than 200 employees, being large firms.

The respondents were also asked to state their primary sub-industry classification, to account for variations.

3.2.3 Size of the firm in annual turnover of the previous year

Consistent with Rauch et al., (2009), and Anderson & Eshima (2011) the respondents were also asked to indicate the firm's size in annual turnover for the previous financial year.

3.3 Research hypotheses

In this section of the chapter, the key objective is to hypothesise the possible influence of EO dimension (independent variables: ID) on firm performance self-report measurements (dependent variables: DV) and whether the relationship is moderated by control variables.

Neuman (2003) predicted a strong relationship exists between the independent variable and the dependent variables when the null hypotheses are rejected, and in that case, the alternative hypotheses are assumed true.
Firms deploying EO would be expected to develop the ability to: innovate to meet emerging opportunities and threats; manage uncertainty and tolerate risk; and to anticipate the direction and the nature of market change. This will help shape the firm's entrepreneurial capabilities to further improve firm performance.

The literature reviewed argues that firms that adopt a strong EO perform much better than those which do not adopt EO (e.g., Covin & Slevin, 1986; Wiklund & Shepherd, 2003). Lumpkin & Dess (2001) and Zahra (1991) reported that there is a lower correlation between EO and performance. Rauch et al., (2009) also recorded that Covin, Slevin & Schultz (1994) were unable to find a significant relationship between EO and performance.

3.3.1 Hypothesis 1: Innovation to firm performance

Innovativeness is an integrative construct of EO, and through extensive and reported research this dimension has a positive relationship with the growth of the firm. This research is intended to further establish the relationship between growth of firms and the strategic innovation capabilities of the firm.

Hypothesis 1: There is a direct positive relationship between the innovativeness dimension of EO and the performance of the firm.

3.3.2 Hypothesis 2: Risk-taking to firm performance

Commitment to high risk is associated with long-term yields for high return, and firms with high EO are categorized by high risk-taking behaviour. The firms with capabilities to constantly embark on higher risk endeavours will exploit the benefits of greater performance.

Hypothesis 2: There is a direct positive relationship between the risk-taking dimension of EO and the performance of the firm.

3.3.3 Hypothesis 3: Proactiveness to firm performance

Proactiveness refers to the firm's ability to seize new opportunities, and the flexibility to introduce new products and brands before competitors. As an EO construct, proactiveness has an integrative relationship with the risk-taking dimension because it is about exploring new risky territories for higher yields. Proactiveness is a response to new opportunities.

Hypothesis 3: There is a direct positive relation between the proactiveness dimension of EO and the performance of the firm.

3.3.4 Hypothesis 4: Competitive Aggressiveness to firm performance

Competitive aggressiveness is about the firm's ability to confront and challenge the competitor. This dimension provides firms with a measure of success, and is reinforced in the strategic capabilities of the firm. Competitive aggressiveness provides forward looking thinking and a first mover advantage and it is also a measure of marketplace position. The rewards include indicators such as capabilities to redefine rules of competition, brand recognition, distribution channels, and market position. Competitive aggressiveness as a construct of EO is also characterized by the ability to offensively respond to competitor behaviour. On this basis it is reactive in nature and has the potential to reduce the firm's performance.

Hypothesis 4: There is a direct negative relation between the competitive aggressiveness dimension of EO and the performance of the firm.

3.3.5 Hypothesis 5: Autonomy to firm performance

Considering conclusive arguments suggested above through several research studies, the strategic autonomy concept is concerned with having the freedom and independence to make decisions about entrepreneurial activities. Autonomy is a vital and integral component of EO. By contrast, autonomy provides entrepreneurial orientated decision making abilities outside the firm's environment to compete with other firms. These strategic decisions enable the firm to outperform the competition.

Hypothesis 5: There is a direct positive relation between the autonomy dimension of EO and the performance of the firm.

3.4 Conclusion: Chapter Three

Although an array of research studies have been identified and confirm the positive relationship between EO and firm performance, a number of scholars argue that firms that adopt a strong EO perform much better than those which do not adopt EO (e.g., Covin & Slevin, 1986; Wiklund & Shepherd, 2003). Lumpkin & Dess (2001) and Zahra (1991) reported that there is a lower correlation between EO and performance.

Based on the research hypothesis, the study tested the research hypotheses listed in Table 3.1.

Table 3.1: Research Hypotheses

Hypotheses Number	Detailed Hypotheses
Hypothesis 1	Hypothesis 1a stated (null): There is a direct positive relation between innovation and the size of the firm in annual turnover
	Hypothesis 1a stated (alternate): There is no direct positive relation between innovation and the size of the firm in annual turnover
	Hypothesis 1b stated (null): There is a direct positive relation between innovation and the size of the firm in number of permanent employees
	Hypothesis 1b stated (alternate): There is no direct positive relation between innovation and the size of the firm in number of permanent employees

Hypotheses Number	Detailed Hypotheses
	Hypothesis 1c stated (null): There is direct positive relation between innovation and the age of the firm
	Hypothesis 1c stated (alternate): There no direct positive relation between innovation and the age of the firm
Hypothesis 2	Hypothesis 2a stated (null): There is a direct positive relation between risk-taking and the size of the firm in annual turnover
	Hypothesis 2a stated (alternate): There is no direct positive relation between risk-taking and the size of the firm in annual turnover
	Hypothesis 2b stated (null): There is a direct positive relation between risk-taking and the size of the firm in number of permanent employees
	Hypothesis 2b stated (alternate): There is no direct positive relation between risk-taking and the size of the firm in number of permanent employees
	Hypothesis 2c stated (null): There is a direct positive relation between risk-taking and the age of the firm
	Hypothesis 2c stated (alternative): There is no direct positive relation between risk-taking and the age of the firm
Hypothesis 3	Hypothesis 3a stated (null): There is a direct positive relation between proactiveness and the size of the firm in number of permanent employees
	Hypothesis 3a stated (alternative): There is no direct positive relation between proactiveness and the size of the firm in number of permanent employees
	Hypothesis 3b stated (null): There is a direct positive relation between proactiveness and the age of the firm
	Hypothesis 3b stated (alternative): There is no direct positive relation between proactiveness and the age of the firm
Hypothesis 4	Hypothesis 4a stated (null): There is a direct negative relation between competitive aggressiveness and the age of the firm
	Hypothesis 4a stated (alternative): There is no direct negative relation between competitive aggressiveness and the age of the firm
Hypothesis 5	Hypothesis 5a stated (null): There is a direct positive relation between autonomy and the size of the firm in annual turnover
	Hypothesis 5a stated (alternative): There is no direct positive relation between autonomy and the size of the firm in annual turnover

Hypotheses Number	Detailed Hypotheses
	Hypothesis 5b stated (null): There is a direct positive relation between autonomy and the size of the firm in number of permanent employees
	Hypothesis 5b stated (alternate): There is no direct positive relation between autonomy and the size of the firm in number of permanent employees
	Hypothesis 5c stated (null): There is a direct positive relation between autonomy and age of the firm
	Hypothesis 5c stated (alternate): There is no direct positive relation between autonomy and age of the firm

The next chapter (Chapter Four) seeks to provide the appropriate research methodology used in the study to address the hypotheses.

4 Chapter Four: Research methodology

4.1 Introduction

The research data pertains to one of the most dynamic industries of the South African economy, the metals and engineering industry. This selection is motivated by the contribution of the industry towards the economy and employment in the manufacturing sector. The research objectives of chapter aim to elaborate on the research design, method of analysis, and research limitations.

4.2 Research design

Creswell (2004) defined correlational design as a "statistical technique describing and measuring the degree of association or relationship between two or more variables of sets of scores" (p. 361). This research aims to show a causal relationship between EO and firm performance.

Creswell (2004) postulated that an independent variable is an attribute or characteristic that influences or affects an outcome of the dependent variables. The established independent variable in the literature review is EO comprising the five dimensions as independent variables that will influence the outcome of the dependent variables of the firm. This study has been categorized as an explanatory research as the stated hypotheses seeks to understand how the five dimensions of EO influence firm performance.

4.2.1 Population of reference

The population of reference for this research study was composed of the membership database of the Steel and Engineering Industries Federation of South Africa (SEIFSA). SEIFSA is a national employer federation representing the metals and engineering industry (SEIFSA, 2012). The association is a non-profit making body and has a combined membership of around 2 224 firms employing 174 257 hourly-paid workers, almost 53% of the industry's workforce (SEIFSA, 2012). The firms range from giant steelmaking to micro-enterprises. These firms, 62% employ fewer than 50 employees (SEIFSA, 2012).

The population consisted of 1 855 firms, and the target respondents were the highest ranking managing director of public and independent private firms. Once permission was obtained from SEIFSA, allowing access to the total population to the firm's respective contact details, questionnaires were solicited electronically. See appendix A for the copy of the request letter.

The study provides evidence in the South African context on the relationship between EO and firm performance. For these purpose data was collected from the metals and engineering industry.

4.2.2 Unit of analysis

The unit of analysis for the study is the firm. Responses were received from the senior directors of public and independent private firms who participated in the survey. The use of a single key informant approach is consistent with prior studies that have collected measures of firm-level entrepreneurship from high-level executives who are responsible for developing and executing firm strategy (Voss et al., 2005).

4.2.3 Sample size and data collection method

To test the hypotheses, the research was administered with an online questionnaire survey (Appendix C) including the cover note (Appendix B). The sampling frame comprised 1 855 firms. A total of 135 firms across the metals and engineering industry responded representing a response (as a percentage of the size of the targeted sample) of 7.3%. It is an expected figure for this type of research (Wiklund & Shepherd, 2005). Numerous research studies highlighted the difficulty in gaining access to and the attention of senior decision-makers (Gabrielsson 2007; and Ogbechie, Koufopoulos, Argyropoulou, 2009). The prevalence use of an online based questionnaire seems to present convenient and efficient access to the targeted respondents.

The survey was distributed on the 7th August 2012 with each email containing a cover note and an embedded link to the online questionnaire. A cover note (Appendix B) accompanied each questionnaire (Appendix C), explaining the aim and objectives of the research and assuring the respondents of the confidentiality of the responses, in line with prior studies (Cycyota & Harrison 2006).

Based on a convenience non probability sample technique, the respondents were drawn from a cross section of nine sub-industry classifications within the metals and engineering industry. A total of 135 respondents started the survey and 92.6% finished. A reminder email notification was followed on the 15th August 2012 to non-respondents and the survey closed on the 17th August 2012. Subsequently, final usable responses were 125 firms. This response rate of 6.7% is satisfactory, considering that the survey was completed by the most senior directors whose time is often limited.

4.2.4 Research instrument

The instrument is the means of interface for data collection. In this study, the research instrument was an online self-report questionnaire which consisted of three sections. The first section (Section A) consists of demographic information of the respondents firms, including variables such as category of firm, primary sub-industry classification, size of firm by annual turnover, age of firm by duration in the industry, size by number of permanent employees, and firm's financial year-end. The questionnaire was designed in such a manner that it enabled the respondents to be candid and honest with their responses (Cooper & Schindler, 2003) cited in Neneh (2012).

The second section (Section B) of the survey questionnaire specifically focuses on EO dimensions; innovation, risk-taking, proactiveness, competitive aggressiveness, and autonomy, as drawn from the literature.

Hughes & Morgan (2007) EO scale measures five separate first order reflective scales pertaining to the sub-dimensions proposed by Lumpkin & Dess (Covin & Wales, 2011). These items are developed for industry settings (Pearce et al., 2010), and consistent with the objectives of the study. The Hughes & Morgan (2007) EO scale is intended to study the independent effects of the sub-dimensions on firm performance. This measurement is looking at those factors that collectively make firms entrepreneurial.

All questions excluding those of the first section were measured using a seven-point Likert (1931) type scale anchored by "strongly disagree (=1)" to "strongly agree (=7)". The cross-tabulations of data highlighted too many empty cells which resulted in the diminution of data. To avoid presentation of unreliable statistics, the 7-point Likert scale was subsequently re-categorised as follows to a three-point Likert scale to avoid sparse tables:

- disagree, partially disagree, and strongly disagree grouped to be collectively represented disagree
- neutral was maintained as neutral
- strongly agree, partially agree, agree grouped to be collectively presented by agree

4.3 Method of analysis

As a result of extensive supporting literature and proven success, Hughes & Morgan (2007) EO scales were used for the study. Nonparametric data is an irregular estimate of confidence. To avoid functional assumptions of the variables, the study used widely accepted tests; and Cronbach Alpha test, as well as Chi-square tests to analyse the data.

To prepare the study in the metals and engineering industry settings, a factor analysis was performed to validate the EO constructs.

4.3.1 Factor analysis

Factor analysis was used to ascertain the validity and reliability of the research questionnaire. The analysis is intended to identify patterns among variables to determine whether latent combination of the original variables can reflect the original set. Factor analysis was also used to establish the existence of relationships between variables and to discover latent constructs that explain the variables (Cooper and Schindler, 2008). This is consistent with Diamantopoulos and Schlegelmilch (2004) indications which are cited in Labuschagne (2011) that factor analysis refers to a range of techniques where the aims are to describe a large number of variables by means of a small set of composite variables called factors. As cited in O'Sullivan, Abela, & Hutchinson (2008), a factor loading of 0.4 was set as the cut off to establish themes and labels for the factors this is consistent with prior research (Washburn & Plank, 2002; Mitchell & Walsh, 2004).

4.3.2 Cronbach Alpha Test

The second section of the questionnaire used for the study measured five dimensions of EO by asking the respondents to rate sub-statements. These dimensions are categorised into the following constructs: innovation, risk-taking, proactiveness, competitive aggressiveness, and autonomy according to the research instrument EO scales developed by Hughes & Morgan (2007). The common method to estimate reliability is Cronbach's Alpha co-efficient ((Schwab, 1999) cited in Labuschagne (2011) Reliability refers to the degree of reliability of a measurement or low variation between the results of different samples of the same population cited in Kunene (2008). A 7-point Likert scale was used for the second section of the survey questionnaire for data collection.

In order to establish reliability of the data received from the respondents, statistical calculations were completed, utilising SPSS (originally, Statistical Package for the Social Sciences) version 19.0. This study applied the most common internal consistency method to assess the reliability of the data collected, Cronbach Alpha (Cronbach, 1951). By definition, Cronbach Alpha is the average value of the reliability coefficients obtained for all possible combinations of variables when split into half-tests (Gliem & Gliem, 2003). Cronbach's Alpha measures how well a set of variables measures a single uni-dimensional latent construct. When data have a multidimensional structure, Cronbach's Alpha is usually expected be low. According to George & Mallery (2003) cited in Gliem & Gliem (2003), the rule of thumb for Cronbach's alpha interpretation of $0.7 \leq \alpha < 0.8$ indicates an acceptable internal consistency and reliability.

A seven-point Likert scale ranging from 1 (Strongly disagree) to 7 (Strongly agree) was collapsed to 3-point Likert scale. The multi-variable EO scale (Hughes & Morgan, 2007) presented below was also used. When using Likert-type scales it is imperative to calculate and report the Cronbach Alpha co-efficient for internal consistency and reliability for any scales or subscales (Gliem & Gliem, 2003). The results of this study use summated variables and not individual variables.

4.3.3 Chi-Square Test

For statistical results, nonparametric measures of association were employed for this study. Chi-square-based measures were used to detect the strength of the relationship between the test variables and the analysis was directional using an alpha of 0.05 (Barreira et al., 2008). The Chi-square test is probably the most widely used nonparametric test of significance that is useful for tests involving nominal data (Kunene, 2008).

The *p*-value of a sample is the probability of seeing a sample with at least as much as evidence in favour of the alternative hypothesis as the sample actually observed. The smaller the *p*-value, the more evidence there is in favour of the alternative hypothesis (Albright, Winston, & Zappe, 2009).

Figure 4.1: Evidence in Favour of the Alternative Hypothesis (Adapted from Albright et al., 2009)

p-value	0.000 to 0.010	0.010 to 0.050	0.050 to 0.100	0.100 to p-value
Decision	Convincing	Strong	Moderate	Weak to None

Figure 4.1 above indicates the attitude of many analysts. If a *p*-value is less than 0.010, it provides "convincing" evidence that the alternate hypothesis is true. If the *p*-value is between 0.010 and 0.050, there is "strong" evidence in favour of the alternative hypothesis. A type I error is committed when a deliberate decision is taken by rejecting the null hypothesis in favour of the alternative convincingly knowing that the null hypothesis is true.

4.4 Data Analysis

The accuracy of analysing data is of importance. Missing member's response and non-response bias has an effect in the accuracy of data. In many instances, random missing measurements are a common occurrence and these affect the conclusions about the variables being analysed. In this research study, the 125 finished responses included missing at random (MAR) data. The technique used to extrapolate the missing at random data was to ignore the incomplete observations by applying listwise deletion (LD). The SPSS software package use LD as a default module to manage MAR data. The LD data set was sufficient to enable data analysis to commence.

Data analysis commenced subsequent to completion of data collection and only complete cases were used for the research study. The metals and engineering firms included SME's and large firms. Below Table 4.1 is a characteristics profile of the responding firms.

Table 4.1: Characteristic profile of firms

Characteristic Profile of Firms	Frequency	Valid per cent
Category of firms		
Sole trader / proprietor	2	2.6
Close corporation	17	21.8
Private company (Pty) Ltd	52	66.7
Private equity	1	1.3
Public company	4	5.1
Joint venture	1	1.3
Parastatal	1	1.3
TOTAL	**78**	**100**
Firm primary sub-industry classification		
Basic iron and steel products	12	15.6
Non-ferrous metal products	11	14.3
Structured metal products	6	7.8
Other fabricated metal products	13	16.9
General purpose machinery	2	2.6
Specific purpose machinery	15	19.5
Household appliances	1	1.3
Plastic products	4	5.2
Services and maintenance	8	10.4
Non-metal services	4	5.2
TOTAL	**77**	**100**
Size of the firm by previous years turnover		
Less than R 3 million	1	1.3
R 3 million to R 35 million	35	44.9
R 35 million to R 50 million	8	10.3
Greater than R 50 million	34	43.6
TOTAL	**78**	**100**
Size of the firm by number of permanent employees		
Less than 50 employees	34	44.2
Between 50 employees and 200 employees	22	28.6
Greater than 200 employees	21	27.3
TOTAL	**77**	**100**
Age of firm in number of years in the industry		
Less than 10 years	2	3.8
Between 10 years and 20 years	12	23.1
More than 20 years	38	73.1
TOTAL	**52**	**100**

Table 4.1 indicates information about the respondents' firms. The variables were categorised as indicators in order to distinguish firms by size in annual turnover, size of firms by number of permanent employees, and age of the firm in duration in the industry. 66.7% of the firms survey were categorised as private companies and 44.9%

earned an annual turnover ranging between R 3 million and R 35 million and with 43.6% earning greater than R 50 million per annum.

For the demographic variables, additional information collected included the age of the firm in duration in the industry and the size of the firm in number of permanent employees, and. 73.1% of the firms recorded being the industry for more than 20 years with the majority (44.2%) employing fewer than 50 employees. The metals and engineering industry firms range from giant steelmaking to micro-enterprises, and 62% of the firms employ fewer than 50 employees (SEIFSA, 2012).

4.5 Limitations of the study

To gain an in-depth understanding of the impact of EO on the firm performance, it would have been beneficial to receive a larger sample size representing majority of the firms in the metals and engineering industries. The majority of the firms which responded were firms in the private company (Pty) Ltd category (66.7%), and firms older than 20 years in the industry (73.1%). Firms which were not reachable through the electronic distribution of the questionnaire were excluded from the research study. As a result a relatively small sample size of only 125 respondents finishing the questionnaire represented only 6.7% of the metals and engineering firms. However, these respondents are from the same industry and have the same common characteristics.

The questionnaire survey included measures of self-report by respondents. These might have presented a possibility that responses may be biased.
Lastly, the findings of this research study will be restricted to firms in the metals and engineering industry due to the size of the sample not representing a cross section of the industry.

4.6 Conclusions: Chapter Four

An explanatory quantitative study of 125 SMEs and large firms in the metals and engineering industry was undertaken to investigate the relationship between EO and firm performance. EO is measured using the Hughes & Morgan (2007) EO scale which incorporated the five dimensions of Lumpkin & Dess (1996). The methodology employed to collect data was a through a self-completion electronic survey questionnaire. The next chapter on results presents data processing and empirical analysis in an attempt to provide answers to the research hypotheses.

5 Chapter Five: Results of the Survey

5.1 Introduction

The objective of Chapter Five is to present the results of the study relative to the hypotheses that were stated in Chapter Three, in graphic and table format. The aim of the study was primarily to understand the effect of EO on firm performance in the metals and engineering industry. This empirical study is further articulated by providing a description of the demographic profile frequencies, assessment of research instrument used, and consequently, the inferential statistics applied.

Throughout the results section, the term “dimension” will indicate one of the five sets of scales that Hughes & Morgan (2007) created to measure EO. The term “survey item” will indicate a question statement from one of Hughes & Morgan’s (2007) EO scales; in all, 18 survey items were part of Hughes & Morgan’s (2007) original questionnaire.

5.2 Descriptive frequency results

5.2.1 Demographic profile statistical results

In this study, the first section of the results present the demographic profile of the sample. The metals and engineering industry demographic profile is divided into questions to establish categories which might influence the impact of EO on firm performance. These questions included the following listed constructs:

- Category of the firm
- Primary sub-industry classification
- Size of the firm in annual turnover
- Number of permanent employees
- Duration of the firm in the industry
- Firm’s financial year end

The demographics of the respondents are presented in below Figure 5.1 to 5.5.

Figure 5.1: Category of firms

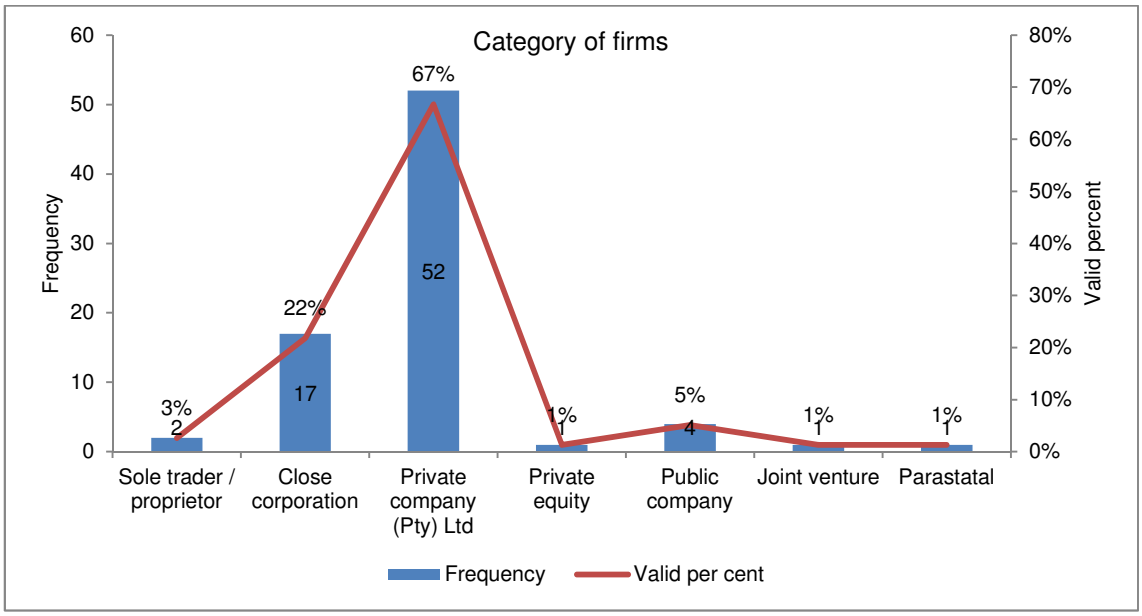
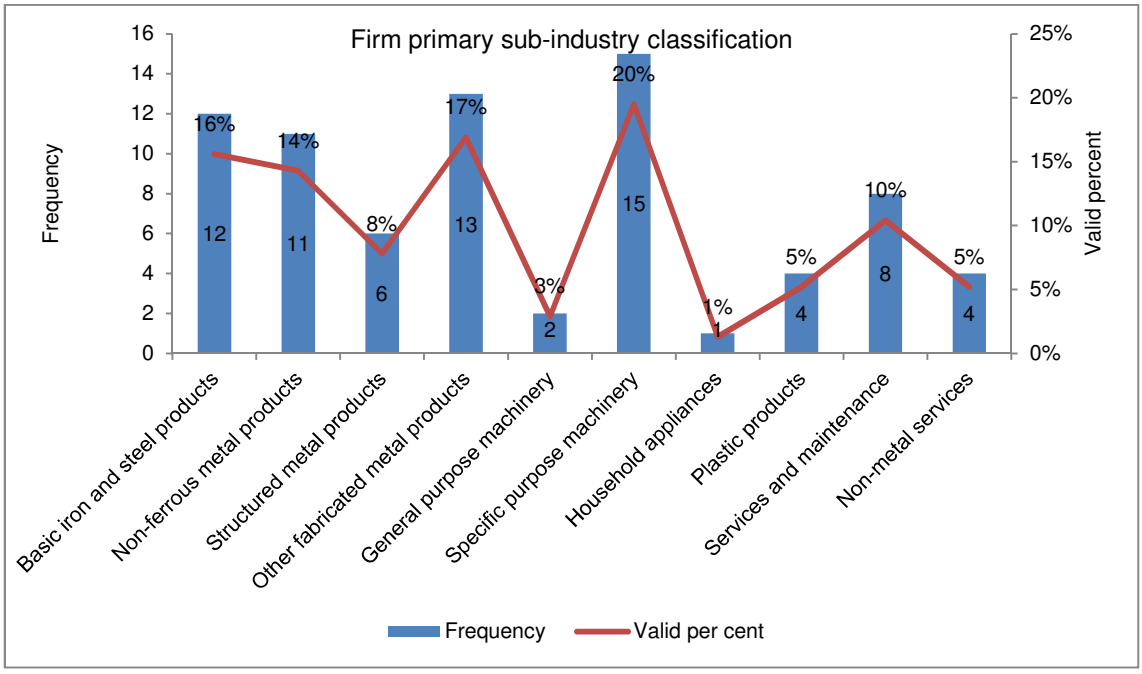


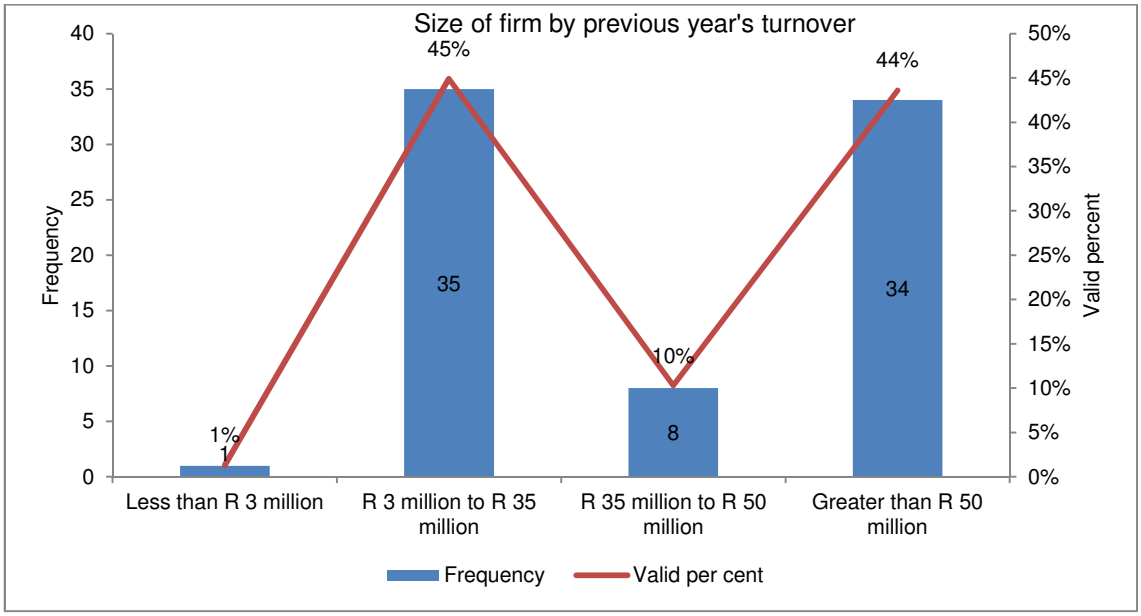
Figure 5.1 shows that the majority of the firms in this study are 66.7% private companies, and 21.8% are close corporations.

Figure 5.2: Firm primary sub-industry classification



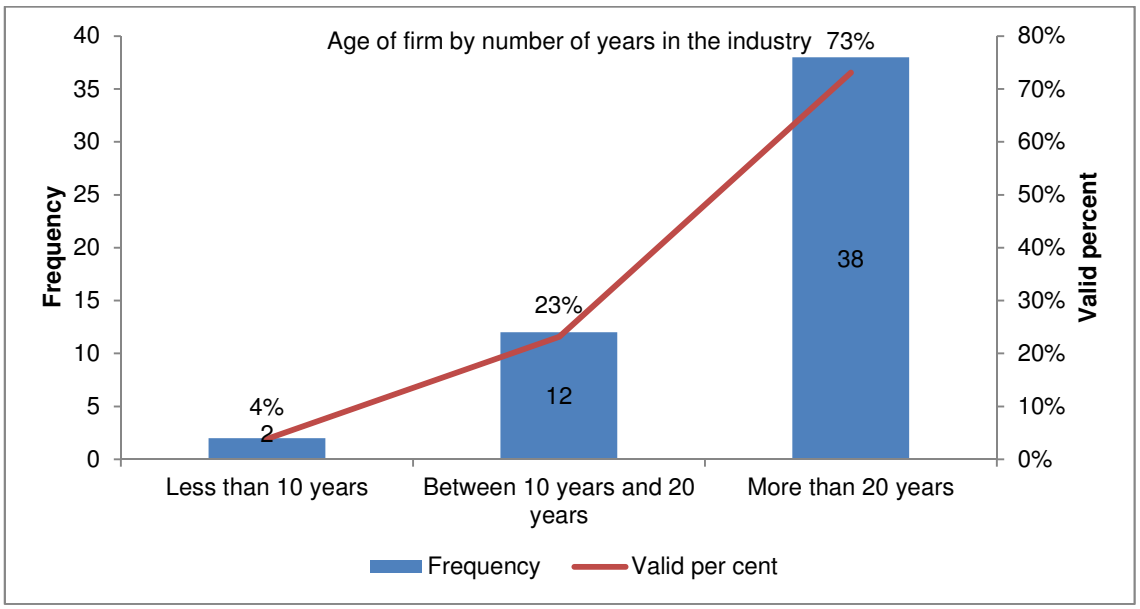
The results in Figure 5.2 shows the primary sub-industries of the firms

Figure 5.3: Size of the firm by previous year's turnover



The results (Figure 5.3) shows the dispersion of respondents in this study according to size of the firm by annual turnover, with 44.9% and 43.6% being at a range R 3 million to R 35 million and greater than R 50 million respectively.It can be concluded that these represent a fair balance of firms classified as small and medium entreprises to large as per SIC. The Standard Industry Code (SIC) is based on the 1990 International Standard Industry Code (ISIC) of all Economic Activities with suitable adaptations for local conditions by the DTI.

Figure 5.4: Age of firm by number of years in the industry



The results in Figure 5.4 above show the age of the firms in the study. Firms fall between 10 years and 20 years range (23.1%) and the majority of the firms have been in the industry for more than 20 years (73.1%). These results conclude that majority of the respondents understand the metals and engineering industry and their own firms.

Figure 5.5: Size of the firm by number of permanent employees

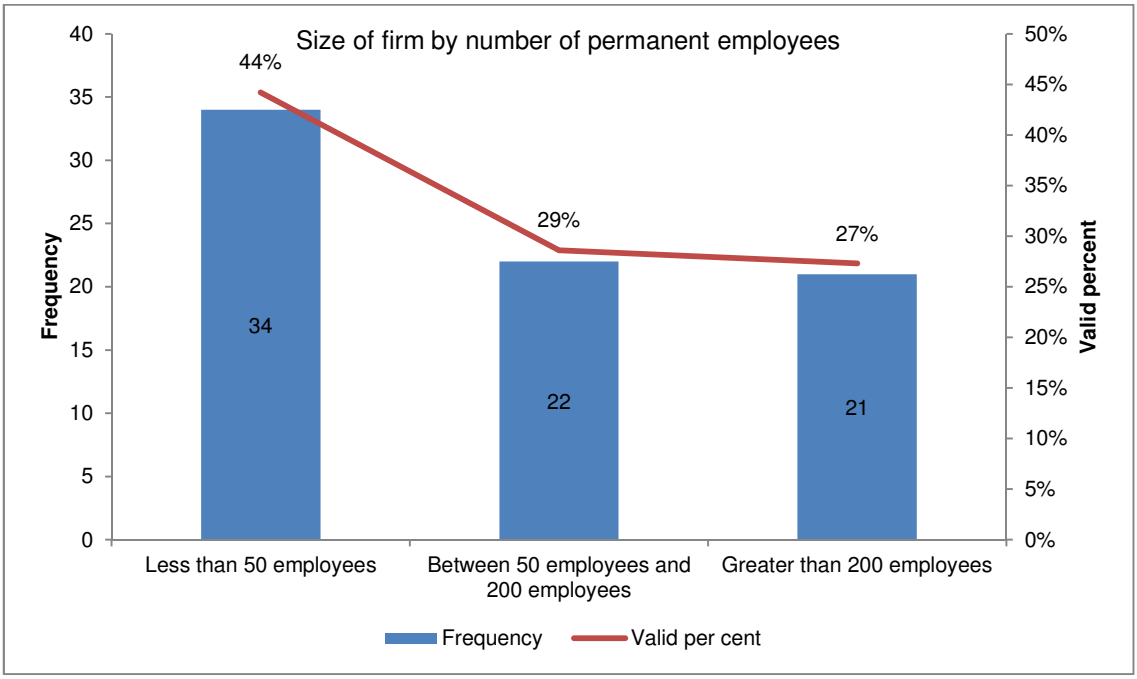
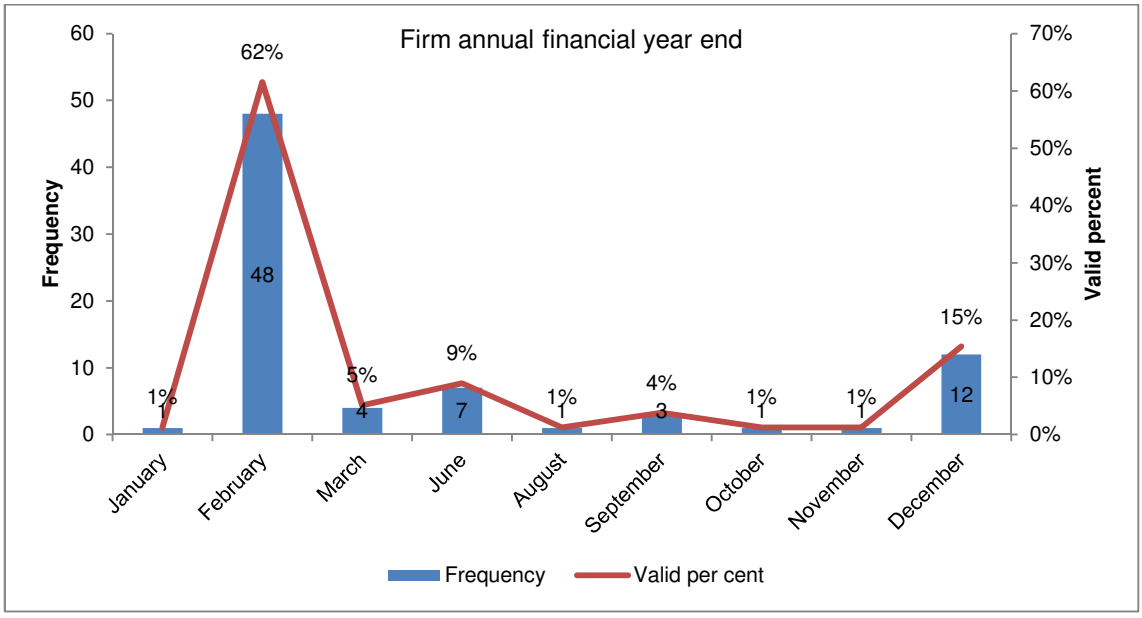


Figure 5.5 shows the number of permanent employees of firms in the study. The majority of firms employ fewer than 50 employees (44.2%). It can be concluded that the majority of the firms are small entreprises. Companies range from giant steelmaking corporations to micro-enterprises (SEIFSA, 2012).

Figure 5.6: Firm's annual financial year end



The results in Figure 5.6 shows the financial year end of the firms, with 61.6% of the firms being February which is the expected norm.

5.2.2 Central tendency statistics

Table 5.7 is a collection of the eighteen questions answered by respondents. These variables are sub-scales of the EO construct comprising innovation, risk-taking, proactiveness, competitive aggressiveness, and autonomy. The 7-point Likert scale was used, with measurements scale code interpreted as 1 being strongly disagree and 7 being strongly agree. The central tendency results are consistent evidence across the majority of the variables that the respondents agree with the questionnaire statements identified by Hughes & Morgan (2007) EO scales.

Table 5.1: Central tendency statistics results for EO constructs

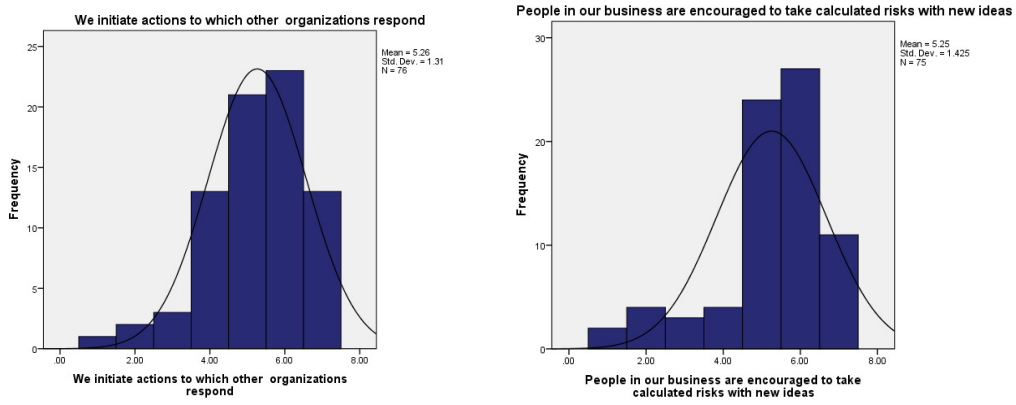
Table 20: The Central Tendency Statistics Results for EO scale										
VARIABLES (Questionnaire statements)	EO DIMENSIONS	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness	
		Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
We actively introduce and innovations in our business **(Q7)**	INNOVATION	78	5,00	2,00	7,00	**6,1026**	**,98811**	,976	-1,702	,272
Our business is creative in its methods of operation **(Q8)**		78	5,00	2,00	7,00	5,7821	1,14696	1,316	-,989	,272
Our business seeks out new ways to do things **(Q9)**		78	3,00	4,00	7,00	**6,1667**	**,82834**	,686	-,886	,272
The term "risk taker" is considered a positive attribute for people in our business **(Q10)**	RISK-TAKING	75	6,00	1,00	7,00	4,6667	**1,44571**	2,090	-,632	,277
People in our business are encouraged to take calculated risks with new ideas **(Q11)**		75	6,00	1,00	7,00	5,2533	**1,42462**	2,030	-1,269	,277
Our business emphasizes both exploration and experimentation for opportunities **(Q12)**		75	6,00	1,00	7,00	5,1067	**1,41968**	2,015	-1,154	,277
We always try to take the initiative in every situation (e.g., against competitors, in projects when working with others) **(Q13)**	PROACTIVENESS	76	5,00	2,00	7,00	5,9211	1,09256	1,194	-1,100	,276
We excel at identifying opportunities **(Q14)**		76	5,00	2,00	7,00	5,2763	1,20663	1,456	-,835	,276
We initiate actions to which other organizations respond **(Q15)**		76	6,00	1,00	7,00	5,2632	1,31015	1,716	-,798	,276
Our business is intensely competitive **(Q16)**	COMPETITIVE AGGRESSIVENESS	76	5,00	2,00	7,00	5,8289	1,11221	1,237	-1,264	,276
In general, our business takes bold or aggressive approach when competing **(Q17)**		76	5,00	2,00	7,00	5,3553	1,21879	1,485	-,674	,276
We try to undo and out-maneuver the competition as best as we can **(Q18)**		76	6,00	1,00	7,00	5,4737	1,26989	1,613	-1,163	,276
Employees are permitted to act and think without interference **(Q19)**	AUTONOMY	76	5,00	2,00	7,00	4,8026	1,29635	1,681	-,678	,276
Employees perform jobs that allow. them to make and instigate changes in the way they perform their tasks **(Q20)**		76	6,00	1,00	7,00	4,9079	1,25621	1,578	-1,024	,276
Employees are given freedom and independence to decide on their own how to go about doing their work **(Q21)**		76	6,00	1,00	7,00	**4,4737**	**1,37087**	1,879	-,502	,276
Employees are given freedom to communicate without interference **(Q22)**		75	4,00	3,00	7,00	5,7333	1,10690	1,225	-,860	,277
Employees are given authority and responsibility to act alone if they think it to be in the best interests of the business **(Q23)**		76	6,00	1,00	7,00	4,8816	**1,51409**	2,292	-,788	,276
Employees have access to all vital information **(Q24)**		75	5,00	2,00	7,00	5,22667	1,26889	1,610	-,890	,277
Valid N (listwise)		**73**								

The 7-point Likert measurement scale code is interpreted as 1 being strongly disagree and 7 being strongly agree. Table 5.1 above indicate that all the EO variables significantly performed above average mean statistics value of 4. The lowest being 4.4 and the highest is 6.1 mean statistics value. This above average value of the mean statistics suggest that the respondents understand their industry. Over 65% of the respondents were private companies, and 73.1% have been in the industry for over 20 years.

The results of the constructs also indicate low standard deviation values ranging from the lowest 0.828 to the highest 1.514 std. deviation. As a measure of dispersion, the low results relative to the mean statistics suggests lowest difference in respondents perceptions.

As a measure of normality of the test instrument and to further qualify , the above Table 5.1 observations include the skewness of the scales. Skewness is a measure of distributional asymmetry (von Hippel, 2003). Majority of the observations in this study revealed a negative distribution. These observations are consistent and confirms that the respondents perceptions of the respondents. Generally displayed an above average mean statistics. Negative skewness (left-tailed) represent desirable observations and consequently transformed scales to reduce skewness were not considered further in the analysis. Presented below in Figure 5.7 is a distribution plot of the surey items.

Figure 5.7: Frequency distribution and tests of normality of EO construct



These results are consistent across the majority of the variables that the respondents agree with the questionnaire statements.

5.2.2.1 Innovation

Table 5.1, below is a collection of all the responses in the innovation variables. The majority of the respondents indicate significantly a higher tendency to agree.

Table 5.1: Collation of the innovation dimension of EO (Q7-Q9)

We actively introduce innovations in our business (Q7)
Our business is creative in its methods of operation (Q8)
Our business seeks out new ways to do things (Q9)

	Q7	Q8	Q9
Disagree	2.6%	3.8%	-
Neutral	5.1%	11.5%	5.1%
Agree	92.3%	84.6%	**94.9%**

The majority of the respondents (94.9%) agree that their firms seek out new ways to do things. Each individual response to questions which are inclined towards a higher tendency to agree (positive) is depicted in Figure 5.8 and Figure 5.9.

Figure 5.8: We actively introduce innovations in our business (Q7)

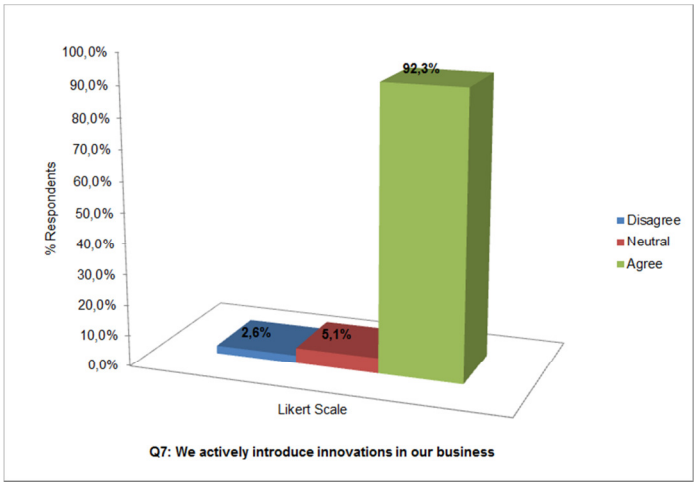


Figure 5.8: Indicates that 92.3% of the respondents agree that their firms actively introduce innovations in their businesses.

Figure 5.9: Our business seeks out new ways to do things (Q9)

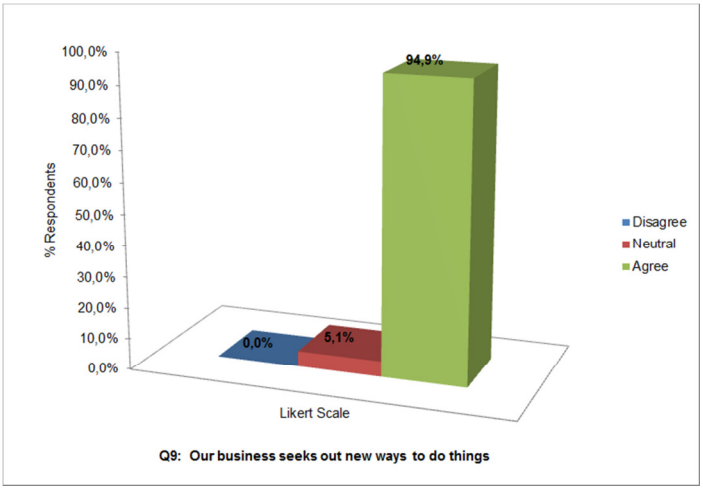


Figure 5.9: 94.9% of the respondents agree that their firms continue to seek out new ways to do things differently. It is also noted that none of the respondents are in disagreement.

5.2.2.2 Risk-taking

Table 5.1: Collation of Risk-taking dimension of EO (Q10-Q12)

The term “risk taker” is considered a positive attribute for people in our business (Q10)
People in our business are encouraged to take calculated risks with new ideas (Q11)
Our business emphasizes both exploration and experimentation for opportunities (Q12)

	Q10	Q11	Q12
Disagree	18.7%	12.0%	13.3%
Neutral	20.0%	5.3%	10.7%
Agree	61.3%	82.7%	76.0%

In Table 5.1, a high 82.7% of the respondents agree that people in their businesses are encouraged to take calculated risks with new ideas.

Figure 5.10: The term "risk-taker" is considered a positive attribute (Q10).

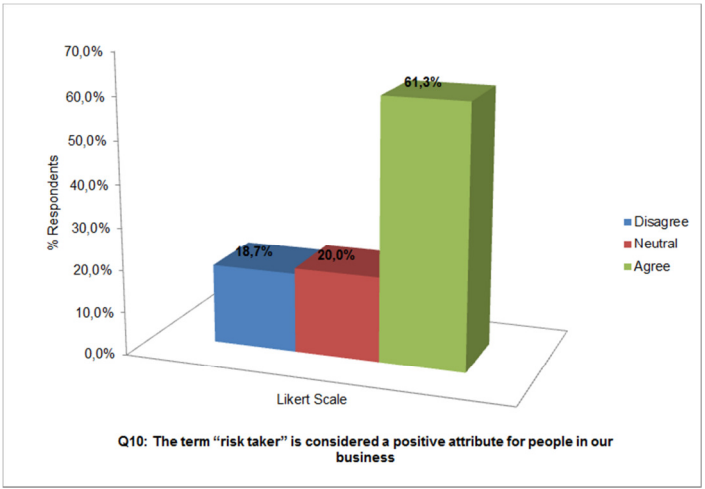


Figure 5.10. 64.3% of the respondents agree that their employees consider risk as a positive attribute in their businesses. However, 18.7% of the respondents disagree, with 20.0% of the respondents revealing a neutral response.

5.2.2.3 Proactiveness

Table 5.2: indicate that 89.5% of respondents agree that their firms always try to take the initiative in every situation against their competitors.

Table 5.2: Collation of Proactiveness dimension of EO (Q13-Q15)

We always try to take the initiative in every situation (e.g., against competitors, in projects when working with others) (Q13)
We excel at identifying opportunities (Q14)
We initiate actions to which other organizations respond (Q15)

	Q13	Q14	Q15
Disagree	2.6%	9.2%	7.9%
Neutral	7.9%	9.2%	17.1%
Agree	89.5%	81.6%	75.0%

Figure 5.11: We initiate actions to which other organisations respond (Q15)

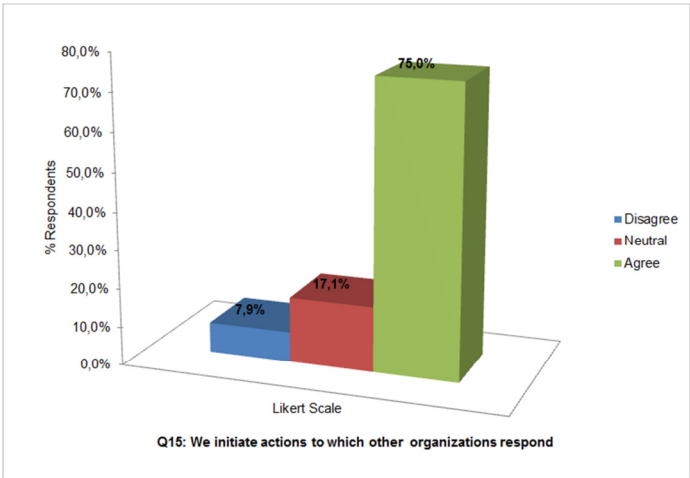


Figure 5.11: 17.1% of the respondents are neutral about their firm's position in initiating actions and other firms being followers. However, a large percentage, 75.0% is in the affirmative.

5.2.2.4 Competitive Aggressiveness

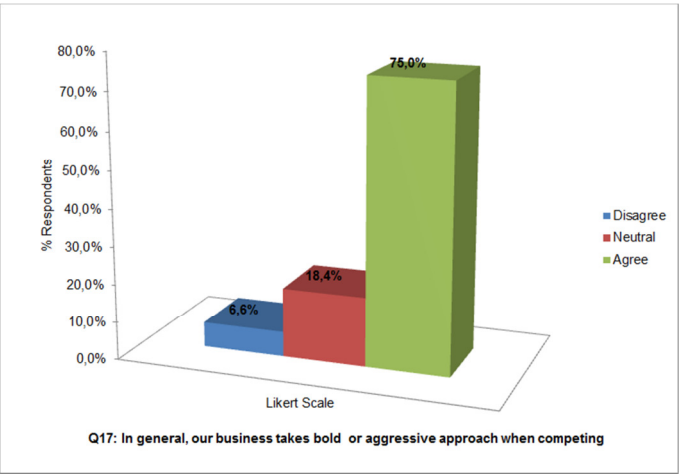
In Table 5.3 below, 88.2% of respondents agree that their firms are intensely competitive and this is further supported by 82.9% of the respondents agreeing that their firms try to always out manoeuvre the competition.

Table 5.3: Collation of the Competitive aggressiveness dimension of EO (Q16-Q18)

Our business is intensely competitive (Q16)
In general, our business takes bold or aggressive approach when competing (Q17)
We try to undo and out-manoeuvre the competition as best as we can (Q18)

	Q16	Q17	Q18
Disagree	5.3%	6.6%	6.6%
Neutral	6.6%	**18.4%**	10.5%
Agree	88.2%	75.0%	82.9%

Figure 5.12: In general, our business takes bold or aggressive (Q17)



In Figure 5.12, 75.0% of the respondents agree that their firms take bold or aggressive approaches when competing.

5.2.2.5 Autonomy

In Table 5.4, 85.3% of the respondents agree that their firms give employees the freedom to communicate at all levels without interference. It must also be noted that 27.6% of the respondents disagree with the statement that their firms give freedom and independence to employees to decide on their own how to go about their work.

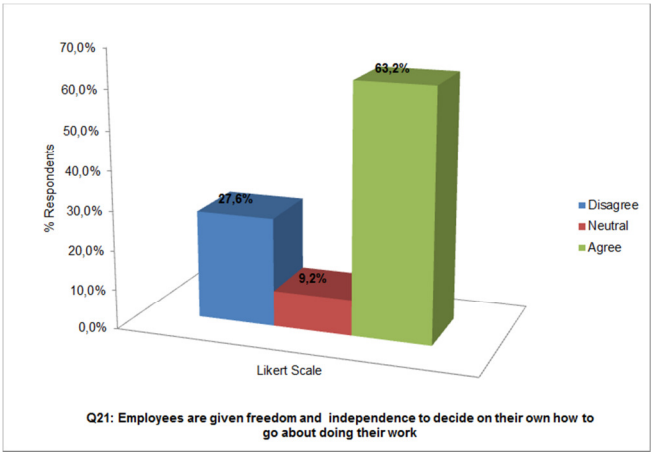
Table 5.4: Collation of Autonomy dimension of EO (Q19-Q24)

Employees are permitted to act and think without interference (Q19)
Employees perform jobs that allow them to make and instigate changes in the way they perform their tasks (Q20)
Employees are given freedom and independence to decide on their own how to go about doing their work (Q21)
Employees are given freedom to communicate without interference (Q22)
Employees are given authority and responsibility to act alone if they think it to be in the best interests of the business (Q23)
Employees have access to all vital information (Q24)

	Q19	Q20	Q21	Q22	Q23	Q24
Disagree	17.1%	14.5%	27.6%	5.3%	18.4%	16.0%
Neutral	15.8	10.5%	9.2%	9.3%	11.8%	5.3%
Agree	67.1%	75.0%	63.2%	85.3%	69.7%	78.7%

In Table 5.4 indicate that majority of the respondents agree that their firms give their employees the freedom to communicate without interference.

Figure 5.13: Employees are given freedom and independence (Q21)



In Figure 5.13, over a quarter of the respondents are neutral about their firms giving the employees the freedom and independence to decide on their own how to go about doing their work.

Figure 5.14: Employees are given freedom to communicate (Q22)

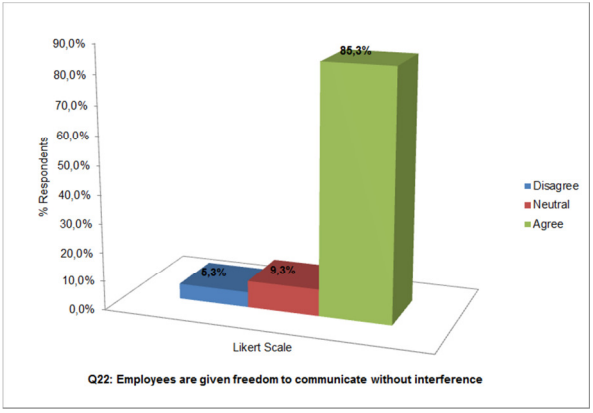


Figure 5.14: 85.3% of the respondents agrees that their firms give employees the freedom to communicate without interference.

5.3 Validation of EO scales

5.3.1 Factor analysis

Although strongly grounded literature in Chapter two of this study validated the measurements items of the EO constructs, they were never tested to suit the metals and engineering industry in South Africa. The EO construct of Hughes & Morgan (2007) consist of 18 survey items and all 18 survey items were included in the analysis. Factor analysis was run with the 18 survey items using principal components extraction and varimax rotation.

The final results of analysis are presented in Table 5.5. As a result of this analysis deletions and additions were made. The original questionnaire remained with 17 items. Subsequent to completion of data, the Risk-taking item had a misloading on the Innovation factor at levels below the 0.40 cut off (O'Sullivan et al., 2008) and the item Q10 (The term "risk taker" is considered a positive attribute for people in our business) was dropped. The Innovation item Q8 (Our business is creative in its methods of operation) misloaded on the Proactiveness factor at a level 0.739 (>0.40) and the item was retained as an addition. Similarly, the Proactiveness item Q13 ((We always try to take the initiative in every situation (e.g., against competitors, in projects when working with others)) misloaded on the Risk-taking factor at a level 0.669 (>0.40) and the item was also retained as an addition.

In general, factor analysis results highlighted the highest item loading of 0.870 and the lowest being -0.699. Although the lowest item below 0.40 was dropped, these raises a concern about item (Q10), "The term "risk taker" is considered a positive attribute for people in our business". This is the only significantly negative correlation.

In conclusion, factor analysis was run with the 17 items, and the results have successfully isolated six empirical factors that represented the Hughes & Morgan (2007) EO scales. The loadings are above 0.55 (good) with the majority being above 0.60.

Table 5.5: Final factor loading results for Hughes & Morgan (2007) EO scales

Hughes & Morgan (2007) EO scales (FACTORS / DIMENSIONS of EO)	ORIGINAL Research Questionnaire statements (Variables) - Before Factor Analysis	Movement	FINAL Research Questionnaire statements (Variables) - After Factor Analysis	Loading	Comments
FACTOR 1. INNOVATIVENESS (Q7, Q8, Q9)	We actively introduce innovations in our business **(Q7)**		We actively introduce innovations in our business **(Q7)**	0.535	Q7 and Q9 retained in Innovation. Q8 misloaded to Proactiveness Q10 misloaded with a very low factor (-0.699) and dropped
	Our business is creative in its methods of operation **(Q8)**		Our business seeks out new ways to do things **(Q9)**	0.617	
	Our business seeks out new ways to do things **(Q9)**		The term "risk taker" is considered a positive attribute for people in our business **(Q10)**	-0.699	
FACTOR 2. RISK - TAKING (Q10, Q11, Q12)	The term "risk taker" is considered a positive attribute for people in our business **(Q10)**		People in our business are encouraged to take calculated risks with new ideas **(Q11)**	0.707	Q11 and Q12 retained in Risk-Taking Q10 misloaded to Innovation Q13 misloaded with a loading above 0.4 and addition accepted
	People in our business are encouraged to take calculated risks with new ideas **(Q11)**		Our business emphasizes both exploration and experimentation for opportunities **(Q12)**	0.677	
	Our business emphasizes both exploration and experimentation for opportunities **(Q12)**		We always try to take the initiative in every situation (e.g., against competitors, in projects when working with others) **(Q13)**	0.669	
FACTOR 3. PROACTIVENESS (Q13, Q14, Q15)	We always try to take the initiative in every situation (e.g., against competitors, in projects when working with others) **(Q13)**		Our business is creative in its methods of operation **(Q8)**	0.739	Q14 and Q15 retained in Proactiveness Q13 misloaded with a loading above 0.4 and addition accepted
	We excel at identifying opportunities **(Q14)**		We excel at identifying opportunities **(Q14)**	0.815	
	We initiate actions to which other organizations respond **(Q15)**		We initiate actions to which other organizations respond **(Q15)**	0.837	
FACTOR 4. COMPETITIVE AGGRESSIVENESS (Q16, Q17, Q18)	Our business is intensely competitive **(Q16)**		Our business is intensely competitive **(Q16)**	0.870	In agreement (Q16, Q17, Q18)
	In general, our business takes bold or aggressive approach when competing **(Q17)**		In general, our business takes bold or aggressive approach when competing **(Q17)**	0.795	
	We try to undo and out-manoeuvre the competition as best as we can **(Q18)**		We try to undo and out-manoeuvre the competition as best as we can **(Q18)**	0.762	
FACTOR 5. AUTONOMY (Q19, Q20, Q21)	Employees are permitted to act and think without interference **(Q19)**		Employees are permitted to act and think without interference **(Q19)**	0.751	In agreement (Q19, Q20, Q21, Q22, Q23, Q24)
	Employees perform jobs that allow them to make and instigate changes in the way they perform their tasks **(Q20)**		Employees perform jobs that allow them to make and instigate changes in the way they perform their tasks **(Q20)**	0.674	
	Employees are given freedom and independence to decide on their own how to go about doing their work **(Q21)**		Employees are given freedom and independence to decide on their own how to go about doing their work **(Q21)**	0.794	
FACTOR 6. INDEPENDENCE (Q22, Q23, Q24)	Employees are given freedom to communicate without interference **(Q22)**		Employees are given freedom to communicate without interference **(Q22)**	0.806	The six factor and the theme is named Independence All variables have a loading above 0.4 and addition accepted The number of factors increased from 5 to 6 factors
	Employees are given authority and responsibility to act alone if they think it to be in the best interests of the business **(Q23)**		Employees are given authority and responsibility to act alone if they think it to be in the best interests of the business **(Q23)**	0.773	
	Employees have access to all vital information **(Q24)**		Employees have access to all vital information **(Q24)**	0.650	
A: FACTORS	**B: Original EO Variables before Factor Analysis**	**C: Movement**	**D: EO Variables after Factor Analysis**	**E: Loading**	**F: Comments**

The analysis anticipated identifying five factors on the basis of the established literature. However six theoritical dimensions were identified. Besides items dropping out of the factors, there was an element of overlap between the new factor (Independence) and Autonomy. The two factors were re-merged into one factor and labeled Autonomy as per the original EO scales. The respective item loading for Autonomy were above 0.60.

For the purpose of the research study, the five highest correlated survey items identified with each of the five hypotheses were subjected to factor analysis (Table 5.5). Table 5.6 below present the specific survey items subjected to analysis. The summary is derived from Table 5.5 above.

Table 5.6: Hypotheses testing

Survey item	Hypothesis	Correlation Coefficient
Our business seeks out new ways to do things (Q9)	**Hypothesis 1**: There is a direct positive relation between innovativeness dimension of EO and firm performance	0.617
People in our business are encouraged to take calculated risks with new ideas (Q11)	**Hypothesis 2**: There is a direct positive relation between risk-taking dimension of EO and firm performance	0.707
We initiate actions to which other organisations respond (Q15)	**Hypothesis 3**: There is a direct positive relation between proactiveness dimension of EO and firm performance	0.837
Our business is intensely competitive (Q16)	**Hypothesis 4**: There is a direct negative relation between competitive aggressiveness dimension of EO and firm performance	0.870
Employees are given freedom to communicate without interference (Q22)	**Hypothesis 5**: There is a direct positive relation between autonomy dimension of EO and firm performance	0.806

Lastly, there is minor probability of expecting the Hughes & Morgan (2007) dimensions of EO to be uncorrelated. These facts suggests that the dimensions positively correlate and are conceptually sound. The study defined the constructs of EO as innovativeness, risk taking, proactiveness, competitive aggressiveness, and autonomy. Factor analysis confirmed that these five constructs were statistically significant indicators of EO.

5.4 The Inferential Statistics

When the focus of analysis is on estimation or hypothesis testing, inferences from the sample are made and the process is formally known as statistical inference (Labuschagne, 2011). The Cronbach's Alpha and Chi-square test are appropriate methods of analysis for this purpose.

5.4.1 The Cronbach Alpha Test (Reliability Test)

To further evaluate the reliability of the items, Cronbach's Alpha and corrected item total correlations were computed. Table 5.7 below shows descriptive statistics and measurement of internal consistency (reliability). Cronbach (1951) and Nunnally (1978) cited in Li, Liu, & Zhao (2006) note that typically, reliability coefficients of 0.70 or higher are considered adequate. Thus the suggested minimum cut-off value for Cronbach's Alpha is 0.70.

After a number of iterations in an effort to improve the reliability of the questionnaire, those items which had a low contribution were removed. Consequently, the several items which seem to have a position loading in improving the reliability were separately considered. Out of the 18 survey items, only 12 survey items were used to assess reliability. The observation revealed that out of the 12 survey items assessed, several items seem to have repeated because they loaded high on several factors.

In Brown, Davidsson, & Wiklund (2001), Lumpkin & Dess (1996; 1997) cited that previous research suggests that one of the EO items, dealing with "seeking or avoiding competitive clashes", taps competitive aggressiveness rather than proactiveness as intended and was therefore dropped.

Lastly, to measure EO the Hughes & Morgan's (2007) scale version was used in the instrument. The scale was initially developed to tap five conceptually distinct dimensions of EO (Innovation, Risk-taking, Proactiveness, Competitive aggressiveness, and Autonomy). The Cronbach's Alpha of the factors computed with the 12 survey items were as follows; Innovation (α=0.539), Risk-taking (α=0.627), Proactiveness (α=0.747), an overlap combination of Risk-taking and Proactiveness (α=0.705) and also an overlap combination of Innovation and Risk-taking (α=-0.181). These results are consistent with the original work of Miller (1983) who conceived a construct which was composed of three sub-dimensions of EO; innovativeness, risk-taking, and proactiveness.

Table 5.7: Descriptive statistics and measurement internal consistency (reliability).

RECONSTRUCTED Variables	ITEM STATISTICS				
Variables	**Mean**	**SD**	**N**	**Cronbach Alpha (≥ 0.7)**	**Cronbach Alpha If Item Deleted**
1. We actively introduce innovations in our business **(Q7)**	5.795	0.762	78	0.539	0.455
2. Our business is creative in its methods of operation **(Q8) - Reversed**	5.615	0.970	78		0.350
3. Our business seeks out new ways to do things **(Q9)**	5.897	0.444	78		0.467
4. The term "risk taker" is considered a positive attribute for people in our business **(Q10) - Reversed**	4.853	1.582	75	0.627	0.715
5. People in our business are encouraged to take calculated risks with new ideas **(Q11)**	5.413	1.347	75		0.248
6. Our business emphasizes both exploration and experimentation for opportunities **(Q12)**	5.253	1.425	75		0.582
7. We always try to take the initiative in every situation (e.g., against competitors, in projects when working with others) **(Q13) - Reversed**	5.737	0.822	76	0.747	0.819
8. We excel at identifying opportunities **(Q14)**	5.447	1.248	76		0.489
9. We initiate actions to which other organizations respond **(Q15)**	5.342	1.238	76		0.565
16. Employees are given freedom to communicate without interference **(Q22)**	5.594	1.046	74	0.672	0.509
17. Employees are given authority and responsibility to act alone if they think it to be in the best interests of the business **(Q23)**	5.000	1.596	74		0.539
18. Employees have access to all vital information **(Q24)**	5.243	1.506	74		0.690
5. People in our business are encouraged to take calculated risks with new ideas **(Q11)**	5.413	1.347	75	0.705	0.539
6. Our business emphasizes both exploration and experimentation for opportunities **(Q12)**	5.253	1.425	75		0.518
7. We always try to take the initiative in every situation (e.g., against competitors, in projects when working with others) **(Q13)**	5.733	0.827	75		0.715
4. The term "risk taker" is considered a positive attribute for people in our business **(Q10)**	4.853	1.583	75	-0.181	0.348
3. Our business seeks out new ways to do things **(Q9)**	5.893	0.452	75		(0.380)
1. We actively introduce innovations in our business **(Q7)**	5.787	0.776	75		(0.024)

Cronbach Alpha reliability co-efficient is also written as a function of a number of test variables and the average inter-correlation among the variables. As a result, increasing the value of Cronbach's Alpha is dependent upon a number of variables in the scale. A high value of Cronbach's Alpha means good internal consistency of the variables in the scale.

According to George & Mallery (2003), cited in Gliem & Gliem (2003), the following below Table 5.8 depicting rule of thumb for Cronbach's Alpha was provided.

Table **5.8**: Cronbach's Alpha rule of thumb adapted from George & Malley (2003)

Cronbach's Alpha	**α ≥ 0.9**	**0.8 ≤ α < 0.9**	**0.7 ≤ α < 0.8**	**0.6 ≤ α < 0.7**	**α < 0.5**
Internal consistency	Excellent	Good	Acceptable	Questionable	Poor

Survey items (Q7, Q9, and Q10) were found to have a negative "unacceptable" internal consistency output with a scale of Cronbach's Alpha being -0.181. This very low result raises concerns. When the variable Q7 is deleted, the Cronbach's Alpha result in an increase from -0.181 to 0.380, however this is not significant. This is a function of poor inter variable correlation and respondents poorly understanding the question statement ("The term "risk taker" is considered a positive attribute for people in our business").

This result suggests that the respondents seem to agree that the term "risk taker" is a negative attribute to the their firms. Due to a very low Cronbach's Alpha (-.0181), this result is deemed "Unacceptable" and only five EO dimensions will be tested in the metals and engineering industry in South Africa.

Despite one construct found to have "poor" internal consistency, two constructs were found to have a "questionable" internal consistency. Cronbach's Alpha was calculated using reduced scales, from 7-point Likert scale to 3-point Likert scale, in order to avoid the empty cells in the cross tabulations and to reduce missing values, thus, insufficient data and sparse tables. Two constructs were found to have an "acceptable" internal consistency. Using the Cronbach's Alpha from the above Table 14, removing variable Q13 increases Cronbach's Alpha from 0.705 to 0.715. Cited in Brown et al., (2001), Nunnally & Bernstein (1994) stated that the Cronbach's Alpha results also indicate that the items share a high variance with their respective constructs and that the addition of one or two items with similar measurement properties to the problematic indices should have increased their reliability coefficients considerably.

To further validate reliability of firm performance self-report constructs, a case processing of the demographic data was concluded (Table 5.9).

Table 5.9: Case processing summary: Firm performance self-report measurements

Firm performance indicators	N - Valid	N- Excluded	Valid-N %
How long has your firm been in the industry?	49	32	34,7%
How many permanent employees does your firm employ?	73	8	89,0%
In which category does your firm fall?	73	8	89,0%
What is your firm's financial year end?	73	8	89,0%
What is your firm's size in annual Turnover for the last financial year?	73	8	89,0%
What is your primary sub-industry classification?	72	9	87,5%

Table 5.9 indicates the summary of the question validity of above 80% validity and higher. These results reveals reliability of the questionnaire and high internal consistency. The input answer resulted in an error and consequently a low 34.7%. The research questionnaire questionn item 5 was reviewed (What is the duration of your firm in the current industry?). The respondents had to input a numeric as the duration in current industry (What is the duration of your firm in the industry?).

5.4.2 The Chi-Square Test

The variable correlation results presented below in Table 5.10 shows the p significant value to be below 0.05. This reveals that dependent variables (previous year's turnover, number of permanent employees, number of years in the industry) have a statistically significant positive correlation to the independent variables of the study.

The p significant value above 0.05 indicate that there is no significant statistical difference between the respective independent and dependent variables.

To avoid presentation of unreliable statistics, the seven-point Likert scale was subsequently grouped as to a three-point Likert scale to avoid sparse tables.

Table 5.10: The Chi-Square test results: EO constructs (As per Table 5.6)

Cross-tabulations		FACTOR 1 Innovation	FACTOR 2 Risk-taking	FACTOR 3 Proactiveness	FACTOR 4 Competitive aggressiveness	FACTOR 5 Autonomy
		We actively introduce and innovations in our business (Q9)	People in our business are encouraged to take calculated risks with new ideas (Q11)	We initiate actions to which other organizations respond (Q15)	Our business is intensely competitive (Q16)	Employees are given freedom to communicate without interference (Q22)
Firm Performance: Size in previous years turnover	Asymp.Sig. (2-sided)	0.303	0.069	**0.002**	0.101	0.791
	Value	3.638	11.711	20.345	10.615	3.142
	df	3	6	6	6	6
	N	78	75	76	76	75
Firm Performance: Size in number of permanent employees	Asymp.Sig. (2-sided)	0.069	0.266	**0.000**	**0.011**	0.505
	Value	5.336	5.210	22.427	13.017	3.324
	df	2	4	4	4	4
	N	77	74	75	75	74
Firm Performance: Age of firm in years in industry	Asymp.Sig. (2-sided)	**0.000**	0.150	0.541	0.385	**0.021**
	Value	42.291	12.029	6.659	10.651	17.978
	df	6	8	8	10	8
	N	52	51	52	52	51

Consequently, the above Table 5.10 indicates that there is a statistically significant relationship between the previous year's annual turnover of the firm, number of permanent employees, and the duration of the firm in the industry and the variables (question statements) constituted in the EO dimensions of Innovation, Risk-taking, Proactiveness, Competitive aggressiveness, and Autonomy.

There exist a statistically significant relationship (p=0.000) between innovation survey item (Our business seeks out new ways to do things) and the size of the firm in number of years in the industry. Statistical significant correlation (p=0.002) exists between the proactiveness survey item (We initiate actions to which other organisations respond) and size of the firm in annual turnover. The EO survey item of autonomy (Employees are given the freedom to communicate without interference) has p=0.021 which

indicates a statistically significant correlation with age of the firm in number of years in the industry.

As a consequence of the low number of observations (N=51) on firm performance measurement; age of the firm in number of years in the industry, the seven-point Likert scale was grouped into a three-point Likert scale and the listwise deletion (LD) technique was applied. It was expected that this observation would result in an unreliable results which would affect the statistical significance correlations ($p < 0.05$). Chi-square-based measures were used to detect the strength of the relationship between the test variables.

5.5 Conclusion: Chapter Five

In this Chapter, the empirical results of the survey were presented. Factor analysis was used in order to investigate whether the number of variables was linearly related. Thus, identification of the latent characteristics of the research questionnaire was followed by a process of validating the EO construct. The reliability and consistency of the EO scales as a research instrument was validated through Cronbach's Alpha test. The Chi-square-based measures were used to detect the independence and the strength of the relationship between the test variables.

6 Chapter Six: Discussion of the Findings

6.1 Introduction

This chapter (Chapter Six) involves the interpretations of the results in chapter five.. The primary objective in the chapter is to discuss the results in terms of the literature examined in chapter two and the hypotheses presented in chapter three. Inferential and descriptive statistics were applied to estimate if a statistically significant difference exists in the perceptions of the respondents towards the research survey items. These survey items are question statements derived from the EO scale (Hughes & Morgan, 2007) comprising innovation, risk-taking, proactiveness, competitive aggressiveness, and autonomy. Consequently, this chapter provides answers to the research hypotheses previously established in chapter three.

6.2 EO and Firm Performance Constructs

6.2.1 EO and Firm Performance

The relationship between EO and firm performance was measured using the Chi-square test. The study follows a multi-dimensional approach to distinguish real causal relationships. The test indicated that EO and firm performance are significantly related.

Recognising that firm performance is multi-dimensional, the respondents were requested to provide a selection of the firm's self-report measures in intervals of age of the firm, size in annual turnover, and size in number of permanent employees. The hypotheses were tested against the respective measurements of firm performance.

The below Table 6.1 is a summary of the hypotheses stated (null) to be tested.

Table 6.1: Summary of the hypotheses stated (null)

Hypotheses number	Detailed Hypotheses	Chi-square (p - value)	Decision
Hypothesis 1 (FACTOR 1)	Hypothesis 1a stated (null): There is a direct positive relation between innovation and the size of the firm in annual turnover	0.303	Weak
	Hypothesis 1b stated (null): There is a direct positive relation between innovation and the size of the firm in number of permanent employees	0.069	Moderate
	Hypothesis 1c stated (null): There is direct positive relation between innovation and the age of the firm	0.000	Convincing
Hypothesis 2 (FACTOR 2)	Hypothesis 2a stated (null): There is a direct positive relation between risk-taking and the size of the firm in annual turnover	0.069	Moderate
	Hypothesis 2b stated (null): There is a direct positive relation between risk-taking and the size of the firm in number of permanent employees	0.266	Weak
	Hypothesis 2c stated (null): There is a direct positive relation between risk-taking and the age of the firm	0.150	Weak
Hypothesis 3 (FACTOR 3)	Hypothesis 3a stated (null): There is a direct positive relation between proactiveness and the size of the firm in number of permanent employees	0.002	Strong
	Hypothesis 3b stated (null): There is a direct positive relation between proactiveness and the age of the firm	0.541	Weak
Hypothesis 4 (FACTOR 4)	Hypothesis 4a stated (null): There is a direct negative relation between competitive aggressiveness and the age of the firm	0.385	Weak
Hypothesis 5 (FACTOR 5)	Hypothesis 5a stated (null): There is a direct positive relation between autonomy and the size of the firm in annual turnover	0.791	Weak
	Hypothesis 5b stated (null): There is a direct positive relation between autonomy and the size of the firm in number of permanent employees	0.505	Weak
	Hypothesis 5c stated (null): There is a direct positive relation between autonomy and age of the firm	0.021	Weak

6.2.2 Innovativeness

Hypothesis 1a stated (null): There is a direct positive relation between innovation and the size of the firm in annum turnover.

The distinct evidence of firm innovativeness may take several forms. Innovativeness represents a bias toward embracing and supporting creativity, experimentation, technological leadership, and R & D in the development of products, services, and processes to generate novel solutions to customer needs and problems (Hughes & Morgan, 2007). Consistent with other studies, innovation is the predictor of firm revenue growth. In South Africa's metals and engineering industry, much of the design and technology of the sector's products are of foreign origin with elements of local adaptation design, although there are notable exceptions in the areas of ultra-deep level mining equipment, construction equipment, equipment for agriculture and forestry, utilities and processing equipment (SEIFSA, 2012).

The mean value for survey item (Q9: Our business seeks out new ways to do things) are 6.2 (highest mean and the average is 4.0) which is the highest mean score. Majority of the respondents are in agreement that their firms seek our new ways to do things (Q9). However, the Chi-square test of independence indicate that there exists a weak statistically significant relationship (p=0.303) between innovation survey item (Q9: Our business seeks out new ways to do things), and size of the firm in turnover. These conclusions to support hypothesis 1b stated (alternative) take into cognisance that 44.9% of the firmed surveyed are SMEs and 43.6% are large enterprises. This further confirms that innovativeness of firms does not depend on the size of the firm in annual turnover.

Firms are expected to be innovative regardless of their size in annual turnover. It may therefore be concluded that the hypothesis stated (null) is **rejected** in favour of the hypothesis stated (alternative): Hypothesis 1a stated (alternate): There is no direct positive relation between innovation and the size of the firm in annum turnover.

Hypothesis 1b stated (null): There is a direct positive relation between innovation and the size of the firm in number of permanent employees.

Table 5.10 in section 5.4.3 indicates that the size of the firm in number of employees has a statistical difference (p=0.069). This correlation is consistent with the view that

the metal products and fabrication sector in the metals and engineering industry is a technology intensive environment constituting 52.3% of the industry. In high technology industries, innovation has the greatest impact on firm performance. Thornhill (2006) confirmed that firm size is positively associated with innovation in the high-technology sector. The metals and engineering industries in South Africa display evidence of a mixture of low technology and high technology firms. A number of firms are involved in the design of ultra-deep level mining equipment, construction equipment, equipment for agriculture and forestry, utilities and processing equipment (SEIFSA, 2012).

In section 5.2.3.1, it is indicated that the vast majority (94.9%) of the respondents agree that their firm seeks out new ways to do things. Leadership abilities, competence, knowledge, and skills are needed to leverage the abilities of the firm's EO activities to a superior level relative to their competitors.

Higher levels of innovativeness are associated with greater reliance on technically trained specialists (Lumpkin & Dess, 1996). The majority of the growth in the metals and engineering industry is driven by the mining and quarry industries. In this industry, engineers decide which machinery and equipment to purchase. Shortage of skills hinders innovation, because firms with EO tend to depend on employees' knowledge and skills as key inputs in the knowledge process (Lumpkin & Dess, 1996). Given the skills intensive nature of the industry, having a workforce that has learned is instrumental towards achieving firm performance. This is also achieved by facilitating an environment for creative thinking. A well trained workforce is instrumental in achieving firm performance. In Lumpkin & Dess (1996), Hage (1980) argue that that the more professionals and specialists in a firm, such as engineers and scientists, the higher the level of innovation. The metals and engineering industry in South Africa is also affected by shortly of skills, namely tool-making, machinery design and manufacturing and engineering skills.

The desperate prerequisite need for skills in the metals and engineering industry in SA necessitates that the multinational private firms commit to the transfer of skills. The industry structure remains a difficult phenomenon to change, however on the other hand knowledge is a factor over which firms have much greater control. It was found that the majority of the respondents agreed that their firms seek new ways to do things.

Based on a chi-square test of independence, there exists a moderately significant relationship (p=0.000) between the size of the firm in number of employees and the

innovation survey item (Q9: Our business seeks out new ways to do things). It may therefore be concluded that the hypothesis stated (null) is accepted: Hypothesis 1b stated (null): There is a direct positive relation between innovation and the size of the firm in number of permanent employees. Relative to its overall rank (45th), SA scores relatively high on the innovation index (29th), an area typically reserved for rich, innovation driven economies (Urban, 2008).

Hypothesis 1c stated (null): There is a direct positive relation between innovation and the age of the firm in the industry.

Two thirds of the firms surveyed are private firms and 73.1% being in the industry for over 20 years. Age of the firm was reported for three intervals with the younger age firms being classified under less than ten years. Innovation is a multi-dimensional scale of EO and comprises of many forms of measurements. Age and size determine much of firms' needs and Lumpkin & Dess (1996) highlighted that very young firms might exhibit dependency on innovativeness. However, it should be noted that Thornhill (2006) posited that age of the firm is a negative predictor of revenue growth within the low technology industries.

Convincingly, there is a statistically significant relationship between the age of the firm in duration in the industry and innovation survey item (Q9: Our business seeks out new ways to do things), p=0.000 (p<0.05). The significant level is defined at 5% (p<0.05). These results suggest that different firms across different age intervals in the industry have different perceptions of innovation. Thornhill (2006) confirmed firm size to be positively associated with innovation in the high-technology sector. This hypothesis is accepted: Hypothesis 1c stated (null): There is a direct positive relation between innovation survey item (Q9: Our business seeks out new ways to do things) and the age of the firm in the industry.

6.2.3 Risk-taking

Hypothesis 2a stated (null): There is a direct positive relation between the risk-taking and the size of the firm in annual turnover.

Risk-taking is often used to describe the uncertainty that follows from behaving entrepreneurially (Kraus et al., 2012). The risk-taking dimension of EO may be higher in some type of firms than in others.

Over 20% of the firms surveyed are close corporations and 44.9% generating turnover of between R 3 million and R 35 million. The status of a close corporation is generally beneficial to small enterprises and they are characterised by little formalities for governance. Taking into account that less than 4.0% of the firms sampled are less than 10 years in the metals and engineering industry, the observation displays a negative relationship. It is generally expected that large firms will be more risk-averse, due to a larger size.

This research study shows that risk-taking is an important dimension of EO. Lumpkin & Dess (1996) advise that firms should ensure that risk-taking does not become a hindrance to performance. The significance level is defined at 5%. Moderately, there is a statistically significant relationship (p=0.069) between the size of the firm in annual turnover and innovation survey item (Q11: People in our business are encouraged to take calculated risks with new ideas). It was found that the majority of the respondents moderately agree that people in their firms are encouraged to take calculated risks with new ideas. This survey item was rated above average mean of 5.3 (average=4.0). Further observations indicate that 44% of the firms generate turnover greater than R 50 million and with 56% of firms generating less than R 50 million. The effects of size in annual turnover on risk-aversion seem to be controversial as the respondents' results indicate a balance in number of observations. It may be concluded that there is convincing evidence in favour of Hypothesis stated (null): Hypothesis 2a stated (null): There is a direct positive relationship between risk-taking (Q11: People in our business are encouraged to take calculated risks with new ideas) and the size of the firm in annual turnover. This hypothesis is accepted.

Hypothesis 2b stated (null): There is a direct positive relation between the risk-taking and the size of the firm in number of permanent employees.

The Chi-square test of independence indicates that there is a weak statistically significant difference between the size of the firm as measured by number of permanent employees and the risk-taking survey item (People in our business are encouraged to take calculated risks with new ideas), p=0.266 (p<0.05). The significance level is defined at 5%. Risk taking is associated with attempting to achieve commercial success. Non entrepreneurial firms are risk averse and seem to innovate less. It requires the propensity of the employees and senior employees of the firms to demonstrate the ability to take risk.

It may be concluded that this hypothesis is rejected in favour of Hypothesis stated (alternative): Hypothesis 2b stated (alternative): There is no direct positive relationship between risk-taking (Q11: People in our business are encouraged to take calculated risks with new ideas) and the size of the firm in number of permanent employees.

Hypothesis 2c stated (null): There is a direct positive relation between the risk-taking and age of the firm in the industry.

There is no statistically significant difference between the different ages of the firms in duration in the industry and risk-taking survey item (People in our business are encouraged to take calculated risks with new ideas), p=0.150 (p<0.05). The significance level is defined at 5%. Lumpkin & Dess (1996) highlighted that very young firms might exhibit dependency on risk-taking more than older firms to achieve improved performance.

Further observations indicate the 26.9% of the firms have been less than 20 years in the industry and 73.1% of the firm are more than 20 years in the industry. It is expected that firms generating new innovations, services and products typically take risks as demand for the products would not be known. It is also noted that investing in new firms involves a high level of uncertainty as well as a high risk of failure. In section 5.2.32, it is reported that 82.7% of the respondents agree that their firms encourage people to take calculated risks with new ideas.

The Chi-square test of independence indicates that there is a weak relation between risk-taking (Q11: People in our business are encouraged to take calculated risks with

new ideas) and the age of a firm in years in the industry, p=0.150 (p<0.05). . It may be concluded that this hypothesis is rejected in favour of Hypothesis stated (alternative): Hypothesis 2c stated (alternative): There is no direct positive relation between risk-taking (Q11: People in our business are encouraged to take calculated risks with new ideas) and the age of the firm in years in the industry.

6.2.4 Proactiveness

Hypothesis 3a stated (null): There is a direct positive relation between the proactiveness and the size of the firm in number of permanent employees.

Proactiveness relates to a forward-looking perspective where companies actively seek to anticipate opportunities to develop and introduce new products to obtain first-mover advantages and shape the direction of the environment (Hughes & Morgan, 2007). The export market, particularly exports into the Southern African Developing Countries (SADC) has been the main growth contributor to the metals and engineering industry. The importance of exporting to, and through the SADC region necessitates the development of new products. However, in terms of export performance, the industries output is still relatively low.

Proactiveness is a response to perceived opportunities. Proactive tendencies give firms the ability to anticipate changes in the market and to be among the first to act on them, and such first-mover advantage translates into superior performance (Lumpkin & Dess, 2001).

Proactive firms exploit new areas and leverage their core competencies. The respondents surveyed seem to moderately agree that their firms initiate actions and benefit from taking advantage of being the first-mover. Covin & Slevin (1991) suggested that proactive firms compete aggressively with other firms. This further suggests that the metals and engineering industry in SA has to proactively initiate export performance improvement strategies, and pursue the development of the industry by stimulating demand.

There is a statistically significant relationship between the size of the firm in terms of number of permanent employees and the proactiveness survey item (Q15: We initiate actions to which other organisations respond), p=0.002 (p < 0.05). The significance level is defined at 5%. The ability of firms to engage in entrepreneurial activities

depends on their stock of human capital and competences. This suggests that the metals and engineering industry has to proactively introduce interventions to respond to the general lack of skills in SA. In view of factors such as resource scarcity, firms have to simplify decision making processes.

This hypothesis is accepted in favour of the hypothesis stated (null): Hypothesis 3a stated (null): There is a direct positive relation between the proactiveness and the size of the firm in number of permanent employees.

Hypothesis 3b stated (null): There is a direct positive relation between the proactiveness and the age of the firms in the industry.

There is a weak but statistically significant relationship between the age of the firm in the industry and proactiveness survey item (Q15: We initiate actions to which other organisations respond), p=0.541 (p<0.05). The significance level is defined at 5%. Evidence of non-entrepreneurial firms begins to show when firms imitate the moves of their competitors instead of leading the way. Entrepreneurs initiate actions to which other firms respond, 75.0% of the respondents agree, and this is further confirmed by an above average mean score of 5.3 (average=4.0). In section 5.2.1, Figure 5.4 indicate that 38 (73.1%) of the firms are more than 20 years in the industry.

The Chi-square test of independence indicate that there is a weak relationship, and therefore this hypothesis is rejected in favour of the hypothesis stated (alternative). Proactiveness reflects entrepreneurial willingness to dominate competitors through a combination of proactive and aggressive moves, for example introducing new products or services ahead of competition and acting in anticipation of future demand to create change and to shape the environment (Keh et al., 2007).

6.2.5 Competitive Aggressiveness

According to the resource-advantage theory, entrepreneurial orientation is a resource that facilitates a firm to outperform other rivals and to gain marketplace positions of competitive advantage (Hunt & Morgan, 1996). Figure 5.1 indicate that 66.7% of firms surveyed are private firms. It is inherently expected that these firms are large companies (43.6%) with closer relationships with multinational companies. The metals and engineering industry firms surveyed comprise of 27% (cumulative) of small enterprises, and this encourages young firms to hone their entrepreneurial capabilities.

It was found that the majority of the respondents strongly agree that their businesses are intensely competitive. This was also confirmed by an above average mean score of 5.83 suggesting that majority of the respondents are in agreement.

There is a statistically significant weak relationship between the age of the firm in number of years in the industry and the competitive aggressiveness survey item (Q16: Our business is intensely competitive), p=0.385 (p<0.05). The significance level is defined at 5%. It may be concluded that this hypothesis is rejected in favour of Hypothesis stated (alternative): Hypothesis 4a stated (alternative): Hypothesis 4a stated (null): There is no direct negative relationship between the competitive aggressiveness and the age of the firms in the industry.

6.2.6 Autonomy

Autonomy in an entrepreneurial sense is the independent action by a team or individual to bring forth a vision or idea and then see it through to completion (Lumpkin & Dess, 1996). It was found that the majority of the respondents strongly agree that employees are given freedom to communicate without interference. This was further confirmed with a rated mean score of 5.73 (average=4.0) concluding that the majority of the respondents agree that their firms give employees freedom to communicate without interference. Autonomy encourages employees to participate in change and become actively involved in entrepreneurial activity (Lumpkin & Dess, 1996).

There is a statistically significant weak relationship between the age of the firm in year in the industry and autonomy survey item (Q22: Employees are given freedom to communicate without interference), p=0.791 (p< 0.05). The significant level is defined at 5%. Lumpkin & Dess (1996) highlighted that larger firms may require greater autonomy to achieve improved performance.

The Chi-square test of independence indicate a weak relation and this hypothesis stated (null) is rejected in favour of the hypothesis stated (alternative): Hypothesis 5a stated (alternative): There is no direct positive relation between autonomy and the size of the firm in annual turnover.

Hypothesis 5b stated (null): There is a direct positive relation between autonomy and the size of the firm in number of permanent employees.

There is a weak statistically significant relationship between the size of the firm in number of permanent employees and autonomy survey item (Employees are given freedom to communicate without interference), p=0.505 ($p < 0.05$). The significant level is defined at 5%. This result is discouraging because Hughes & Morgan (2007) cited that lack of autonomy would likely result in passivity when change is needed to initiate effective response to opportunities and threats to performance. This hypothesis stated (null) is rejected in favour of the hypothesis stated (alternative): Hypothesis 5b stated (alternative): There is no direct positive relation between autonomy and the size of the firm in number of permanent employees.

Hypothesis 5c stated (null): There is a direct positive relation between autonomy and age of the firm in the industry.

Studies have shown that autonomy promotes development of new knowledge (Wall, Jackson, & Davids, 1992). This suggests that autonomy leads to superior levels of innovation.

There is a strong statistically significant relationship between the age of the firm in duration in the industry and autonomy survey item (Employees are given freedom to communicate without interference), p=0.021 (p<0.05). The significant level is defined at 5%. With a strong statistical relation, this hypothesis stated (null) is accepted. Hypothesis 5c stated (null): There is a direct positive relation between autonomy and age of the firm in the industry. In Figure 5.15 it is indicated that 85.3% of the respondents agree that their firms give employees the freedom to communicate without interference. Younger firms, less than 10 years in the industry and less than 20 years indicted 4.0% and 24% of the firms respectively. Younger firms would be more decentralised than older firms.

6.3 Conclusion: Chapter Six

The purpose of the research project was to explore whether there exist a relationship between entrepreneurial orientation and firm performance in the metals and engineering industry in South Africa. The EO scales (Hughes & Morgan, 2007); innovation, risk-taking, proactiveness, competitive aggressiveness and autonomy multi-dimensional approach the study was presented.

The study tested each of the research hypotheses (Table 6.2). Based on the most important and consistent results, it was possible to identify the following factors influencing firm performance:

Table 6.2: Summary of hypotheses tested

Hypotheses number		Detailed Hypotheses	Chi-square (p - value)	Decision
Hypothesis (FACTOR 1)	**1**	Hypothesis 1b stated (null): There is a direct positive relation between innovation and the size of the firm in number of permanent employees	0.069	Moderate
		Hypothesis 1c stated (null): There is direct positive relation between innovation and the age of the firm	0.000	Convincing
Hypothesis (FACTOR 2)	**2**	Hypothesis 2a stated (null): There is a direct positive relation between risk-taking and the size of the firm in annual turnover	0.069	Moderate
Hypothesis (FACTOR 3)	**3**	Hypothesis 3a stated (null): There is a direct positive relation between proactiveness and the size of the firm in number of permanent employees	0.002	Strong
Hypothesis (FACTOR 5)	**5**	Hypothesis 5c stated (null): There is a direct positive relation between autonomy and age of the firm	0.021	Strong

The setting of the EO as multi-dimensional variable to firm performance seems to be conceptually and empirically pertinent. The hypotheses were tested as accept or reject and the main findings are summarised as follows:

- There is a moderate to strong relationship between innovation and firm performance
- There is a moderate relationship between risk-taking and firm performance
- There is a strong relationship between proactiveness and firm performance
- There is a strong relationship between autonomy and firm performance

The above findings are consistent with a number of studies on the relationship between EO and firm performance.

The following chapter (Chapter Seven), study research objectives are revisited, stipulated research hypothesis applicable to the literature review are discussed, and summarised. The chapter makes specific recommendations to stakeholders, and academic suggestions for further research on the impact of EO on firm performance.

7 Chapter Seven: Conclusions and recommendations

While research in the area of entrepreneurial orientation is growing, this study was undertaken to investigate the impact of EO on firm performance in the metals and engineering industry in South Africa (SA). Between the years 2000 and 2006, no less than thirty four studies have been published (Rauch et al, 2009). In the 1980's the majority of the studies were from North America. New studies show the use of data from outside of the United States and from more than one continent (Rauch et al, 2009).

No generic definition of EO could be identified that can consistently be universally applied while inclusively accommodating either uni-dimensional or multi-dimensional constructs. In section 2.2, Table 2.1 (Adapted from Rauch et al., 2009) presents selected definitions of EO. The common themes are the five distinct dimensions of EO; innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy. This research study convincingly tested that there exist a moderate to strong relationship between EO and firm performance. Strong entrepreneurial orientation will ultimately lead to increased entrepreneurship and global competitiveness (Pretorius & Van Vuuren).

With reference to the methodology of entrepreneurial orientation, authors are in agreement that EO has a positive relation to firm performance. In many instances, the literature defines firm performance in the context of both financial and non-financial indicators.

The findings of this research study are consistent with the work of Urban (200) which cited the following, "What this study has demonstrated is that South African firms which engage in innovativeness, proactiveness and risk-taking are also associated with success measures" (Urban, 2008, p. 440).

7.1 Academic contribution

All of these findings are very useful in future academic research and in the practical world. For instance, entrepreneurs, and managers of firms should know which of the EO dimensions they should strengthen to yield positive effects on the performance of their firms. This study re-establishes EO validity and reliability and finds associations between EO and firm performance. “For South African firms the increasing trend towards globalization presents multiple opportunities for international expansion (Rwigema and Venter, 2004), and a strong EO can provide the necessary competitive advantage for SA and other African countries to compete globally” (Urban, 2008, p 439).

The concept of EO has over the years contributed to the entrepreneurship domain. EO has therefore become a key construct in the entrepreneurship literature (Bradley, 2011). The research study successfully satisfied the aims and objectives and has added to the body of knowledge and the entrepreneurship literature. It may be concluded that the concept of EO may be broadly defined as a strategy driven process characterised by the ability to be innovative, tendency to take risk, act proactively, degree of aggressiveness towards the competition and demonstrate autonomous management to drive firm performance.

Lastly, this study makes empirical contribution and validates the results of the study previously conducted by Urban (2008). “This finding is additionally affirmed by the relatively high country innovation index compared to other country measures, which means that the principles of EO are alive and apply even in a multicultural developing country context” (Urban, 2008, p. 440).

7.2 Recommendations

The research study findings provided support for some of the existing literature. As expected, the present study confirms the link between entrepreneurial orientation and firm performance. This research paper concentrates on South African context, and highlights the importance of entrepreneurial orientation contribution towards firm performance. Pretorius & Van Vuuren (2003) concluded that strong entrepreneurial orientation will ultimately lead to increased entrepreneurship and global competitiveness.

In South Africa, the importance of entrepreneurship to the nation's development can hardly be overestimated (Kerrin Myres, 2008). The key vehicles in South Africa that have to do with entrepreneurial development is the Department of Trade and Industry (DTI) and its implementation arms namely the IDC, Ntsika and Khula (Pretorius & Van Vuuren). This research finding makes the study significantly relevant in South Africa and recommendations to the stakeholders include the enhancement of current entrepreneurial development initiatives by government, entrepreneurs and private institutions.

7.3 Limitations and Further research

Modern day firm-level and multi-dimensional perspective is now becoming the main stream of EO research. The study used a plausible cross-sectional (snap-shot) research design. Considering time as a limitation, the cross sectional approach was the most suitable approach. Future longitudinal studies may assess EO and firm performance outcomes to examine changes in the configuration over time. Thus, tracking the performance of entrepreneurial firms over time will help to distinguish more complex causal relationships. The positive EO-performance relationship generally increases over time (Urban, 2008).

The relevance of study is that research on EO, in the South African context, may be considered as valuable, as very few empirical studies have been previously conducted which focus on entrepreneurial propensity of firms in this context. Future researches are encouraged to use longitudinal research methodology to test cohorts of firms within the metals and engineering industry and determine performance changes over time. The longitudinal approach will provide an attempt to generalise and confirm these findings.

Future research should also comprehensively explore the educational background of the respondents and their position in the organisational structure of the firm. This is intended to eliminate the tendency of respondents delegating completion of the survey question to lower level respondents. To avoid the potential for the bias associated with subjective and archival data, future research should include data collection from multiple respondents. This would allow for cross-checking of the accuracy of data within the form-level unit of analysis. Another limitation relates to the fact that the sample size did significantly represent the population and these findings cannot be used to make inferences. Caution should therefore be exercised before generalising the findings to non-comparable population.

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APPENDICES: Measuring Instrument

Appendix A: Request letter

Tel.: 011 370 2862 or 082 823 4619
Email: aubreyb@toolquip.co.za
11 May 2012

Steel and Engineering Industries Federation of South Africa (**SEIFSA**)
Metal Industries House
42 Anderson Street
JOHANNESBURG

PERMISSION TO CONDUCT STUDY: The impact of EO on performance in metals and engineering industry.

Dear Henk Langenhoven

Thank you for allowing me to discuss the concept of Entrepreneurial Orientation (EO) during the meeting we held on the 8th May 2012. I am seeking your help to conduct this research study with SEIFSA affiliate firms.
The research study seeks to understand how the dimensions of EO positively influence performance of the firms. EO as a strategic orientation that characterizes the strategy making behaviours that entrepreneurs engage in to discover and exploit opportunities (Lumpkin, 2006). The EO model has five dimensions including innovativeness, risk-taking, proactiveness, competitive advantage and autonomy. Performance of the firms is a measure of growth dimensions in terms of turnover sales, and employment rates.

The objective of the research is to understand the relationship between EO dimensions and performance of the firms and whether the South African firms will provide new settings for this type of analysis. The audience population for the study is firms managing directors, owners, financial directors, and marketing directors. Before participating in the study, firms will be required to complete a consent form which will ensure necessary confidentiality to the extent provided by law. Your affiliate firm's participation will be voluntary, and should the firms choose not to participate or to withdraw from the study at any time, there will be no penalty.

For your convenience, I have attached a sample survey questionnaire and formal consent form which will be electronically sent by SEIFSA to ALL the affiliate member firms registered on your database. For data gathering purposes, the study will employ survey questionnaire methodologies, and the target population should take no more than 20 minutes of their time to electronically complete the survey. Data collection process is planned to commence from 9th July 2012.

Gordon Institute of Business Science (GIBS) Research Ethics Committee (REC) will review my request to conduct this research project. Should you have any questions concerning the research study, please do not hesitate to contact me at my contacts above. You may also wish to contact Dr. Kerrin Myres, Research supervisor, at Kerrin@resonance.co.za.

I am looking forward to hearing from you concerning this request.

Yours faithfully,

Aubrey Bahula
Gordon Institute of Business Science (GIBS)
Master of Business Administration (MBA), 2nd year student.

Appendix B: Cover Note

Dear Respondent,

I am a MBA student with the Gordon Institute of Business Science (GIBS), University of Pretoria. I am conducting research on the impact of Entrepreneurial Orientation (EO) dimensions and performance of the firms. This research is endorsed by SEIFSA and the objective is to understand the relationship between EO and performance of the firm and whether the South African firms will provide new settings for this type of analysis.

Your participation in the study is voluntary, and you can choose to withdraw from the study at any time. The University of Pretoria Gordon Institute of Business Science (GIBS) will treat your answers confidentially, and the final report will be for academic purposes only. It will take you no more than five minutes to complete the questionnaire. Should you have any questions concerning the research study, please do not hesitate to contact:

Researcher: Aubrey Bahula,
Email Address: aubreyb@toolquip.co.za,
Email Address: abahula@gmail.com,
Contact Details: 082 823 4619

OR you may also wish to contact:

Research Supervisor: Dr. Kerrin Myres,
Email Address: kerrin@resonance.co.za
Contact Details: 083 263 4175,

OR

SEIFSA Chief Economist: Henk Langenhoven,
Email Address: henk@seifsa.co.za,
Contact Address: 083 634 1859.

Thank you.

Kind Regards,

Aubrey BAHULA

Appendix C: Research questionnaire

SECTION A: Demographic Information

1. **What is the form of your firm (Tick the appropriate box)?**

Form of firm	Tick (X)
1.1. sole trader,	
1.2. close corporation,	
1.3. private company,	
1.4. private equity,	
1.5. public company,	
1.6. joint venture,	
1.7. partnership,	
1.8. business trust,	
1.9. other – specify.	

2. **What is your primary sub-industry classification (Tick the appropriate classification)?**

Sub – industry classification	Tick (X)
2.1 Basic iron and steel products	
2.2 Non – ferrous metal products	
2.3 Structural metal products	
2.4 Other fabricated metal products	
2.5 General purpose machinery	
2.6 Special purpose machinery	
2.7 Household appliances	
2.8 Rubber products	
2.9 Plastic products	

3. **What is your firm's size in annual Turnover for the last financial year? (Tick the appropriate box)**

Turnover	Tick (X)
R 3 million to R 35 million	
R 35 million to R 50 million	
Greater than R 50 million	
Other	

4. **How many numbers of permanent employees does your firm employ? (Tick the appropriate box)**

Number of employees	Tick (X)
Less than 50 employees	
Between 50 and 200 employees	

Greater than 200 employees	
Other	

5. What is the duration of your firm in the industry? (Tick the appropriate box)

Number of years in the Industry	Tick (X)
Less than 10 years	
Between 10 years and 20 years	
More than 20 years	

6. What is your firm's number of employees by work categories?

Firms Financial year end	Tick (X)
February	
March	
December	
Other	

SECTION B: EO Scales (Hughes & Morgan, 2007)

7 – Point, Likert – type scale ranging from "Strongly disagree" (=1) to "Strongly agree" (=7)

	Strongly disagree	disagree	Partially disagree	neutral	Partially agree	agree	Strongly agree
	1	2	3	4	5	6	7
7. We actively introduce improvements and innovations in our business.							
8. Our business is creative in its methods of operation.							
9. Our business seeks out new ways to do things.							
10. The term "risk taker" is considered a positive attribute for people in our business.							
11. People in our business are encouraged to take calculated risks with new ideas.							
12. Our business emphasizes both exploration and experimentation for opportunities.							
13. We always try to take the initiative in every situation (e.g., against competitors, in projects when working with others).							
14. We excel at identifying opportunities.							

15. We initiate actions to which other organizations respond.							
16. Our business is intensely competitive.							
17. In general, our business takes bold or aggressive approach when competing.							
18. We try to undo and out-maneuver the competition as best as we can.							
19. Employees are permitted to act and think without interference.							
20. Employees perform jobs that allow them to make and instigate changes in the way they perform their tasks.							
21. Employees are given freedom and independence to decide on their own how to go about doing their work.							
22. Employees are given freedom to communicate without interference.							
23. Employees are given authority and responsibility to act alone if they think it to be in the best interests of the business.							
24. Employees have access to all vital information.							

SECTION C: Open ended questions

25. How many competitors in your market today compared to 5 years ago?

26. What is the single most important critical success factor of your business?

27. Do you have an active innovation technology transfer strategy for your business? (Tick the appropriate box)

Technology Transfer Strategy	Tick (X)
Yes	
No	
N / A	