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PERSONALITY TRAITS, MOTIVATION AND KNOWLEDGE WORKER PRODUCTIVITY



BY

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A dissertation submitted to the Faculty of Commerce, Law and Management, University of Witwatersrand, Johannesburg, in fulfilment of the requirements of the degree of Master of Commerce in Management.

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ABSTRACT

In an economic environment where knowledge based-work is the strategic component of value creation and competitive advantage, knowledge workers have become the engine that drives sustainability and profitability. Knowledge workers are described as workers with high degrees of education, expertise and whose primary task is to create, distribute and apply knowledge. With the increasing demand and number of knowledge workers in the work force, the productivity of knowledge workers has become an imperative management task as well as a decisive economic factor.

Despite the continuous stream of research on knowledge worker productivity, knowledge worker productivity continues to be one of the greatest challenges facing managers today. Knowledge worker productivity refers to ability of knowledge workers to effectively collect, create and use inherent knowledge to produce goods and services. Inherent knowledge is highly personal and cannot be separated from the person who holds it. Further, inherent knowledge is closely related to the technical skills that an individual has and are only known to the person who possesses those skills. If organisations wish to leverage this inherent knowledge to their competitive advantage, they need to know how to engage and stimulate the deepest parts of the human mind. However, no two individuals are the same. Personnel psychology literature has long stressed that meaningful differences exist between people. These individual differences influence individual work performance and behaviour. Although several studies have addressed the issue of personality predicting job performance, there is a lack of knowledge of the relationship between personality, motivation and knowledge worker productivity, specifically in the South African context.

This study attempts to address this lack of knowledge through a quantitative study of the relationship between personality, motivation and knowledge worker productivity. The study investigated whether the intrinsic personalities of knowledge workers and motivation predict knowledge worker productivity. Although several studies have directly addressed the issue of personality predicting job performance, few studies have directly investigated whether motivation mediates the relationship between personality and specifically knowledge worker productivity. Consequently, there is limited evidence to support the arguments of the present study. The theoretical and practical implications for knowledge worker productivity are discussed.

Keywords: *knowledge, knowledge worker productivity, personality, motivation*

CONTENT OVERVIEW

An overview of the content is provided to give the reader a brief description of the subject matter of the dissertation.

Chapter 1, titled "*Introduction"*, introduces the reader to the research topic, the background of the study and the rationale for the study. The research problem, objectives, questions and hypotheses are specified. This chapter also provides a basis for the research methodology chosen for the study. A theoretical model for the study is provided.

Chapter 2 titled *"Literature Review"*, identifies and evaluates the other research findings in the literature that relate to this study. The literature review also indicates where the study fits into the existing body of literature as well as the gap in previous studies.

Chapter 3, titled *"Methodology",* examines the steps taken to ensure that the research method chosen adheres to a scientific approach. This chapter provides a rationale for the research design and method, data collection method, sampling method, the population of the study and the placement of the research within a research paradigm. Issues relating to validity and reliability are addressed. Ethical issues and the limitation of the study are also discussed.

Chapter 4, titled "*Data Analysis and Discussions",* consists of the analysis of the research findings of the study. It provides a discussion of each hypothesis and research questions. The findings provide a basis for the conclusions and recommendations offered in the final chapter.

Chapter 5, titled "*Conclusions and Recommendations",* this chapter provides a summary and discussion of the research findings; the research questions and hypothesis are revisited and answered. Recommendations are made based on the research findings.

DECLARATION

I hereby declare that this research is my own, unaided work. It is being submitted in fulfilment of the requirements for the degree of Master of Commerce in Management at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree of examination in any other university.

_____

PEACE MAJORIE AKURE

Signed on this the day of 31/August /2015

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CHAPTER 1

RESEARCH PROBLEM AND RESEARCH QUESTIONS

"*For we know now that the source of wealth is something specifically human: knowledge"*

(Drucker, 1992: 23)

1 INTRODUCTION

In an economy that is primarily driven by knowledge-based work, organisations cannot afford to underestimate the importance of paying careful attention to the productivity of knowledge workers (Drucker, 2002; Keursten, Verdonschot, Kessels & Kwakman, 2006). Increasing the productivity and efficiency of knowledge workers ensures that organisations are more profitable, strategies are more successful and that our societies and economies are more advanced (Davenport, 2005). Knowledge worker productivity is therefore one of the 'biggest challenges' facing the 21st century organisation (Steyn & Du Toit, 2009; Drucker, 1999).

Knowledge workers have become the fastest growing group of white collar employees (Davenport, 2005; El-Farr, 2009; Levenson, 2012). The number of knowledge workers in the workforce has rapidly increased in recent decades as organisations have transitioned from manual means of production to more innovative and knowledge-driven means of production (Ramírez & Nembhard, 2004; Acsente, 2010). According to the Organisation for Economic Co-operation and Development (OECD) report (1996) knowledge based industries and service sectors account for more than 50 percent of the gross domestic product (GDP) in developed countries and they account for 40 percent of the working population (Pyoria, 2005; El-Farr, 2009). In South Africa, the service industry accounts for more than 30 percent of the country's GDP (Statistics South Africa, 2014). "This means, that developing countries can no longer expect to base their development on low wages. They too, must learn to base it on applying knowledge" (Drucker, 1994:10). The pace of change may differ but all economies are moving towards a knowledge based economy, where the true source of competitive advantage will be knowledge (Brinkley, 2008; Drucker, 2001). Consequently, increasing knowledge worker productivity has become essential to organisational success, competitiveness and ultimately the survival requirement of any nation in the emerging knowledge society (Drucker, 1999; Eschenbach, Riedl & Schauer, 2006).

Knowledge worker productivity is a concept that refers to the ability of individuals to use knowledge as a personal competence to create innovative mediated solutions, processes, products and services (Keursten, Kessels & Kwakman, 2003; Stam, 2007). This places knowledge as the strategic component of value creation, innovation, productivity and economic transactions that offers a sustainable competitive advantage (Florida & Kenney, 1993; Mort, 2001; Alavi & Leidner, 1999; Drucker, 1993; Stam, 2007; Kessels & Keursten, 2002). The process of knowledge creation is highly subjective and personal and therefore requires the skills and participation of the individual who possesses it (Nonaka, 1994; Polanyi, 1973; Mládková,

2011). Further, knowledge is created and owned by individuals and organisations provide the context to support this process (Callaghan, 2013). Unlike sophisticated machines, the knowledge embedded in the minds of knowledge workers cannot be manipulated (Smith, 2003; Amar, 2004; Mäki, 2008). Instead, if organisations wish to leverage this knowledge to their competitive advantage, they need to know how to engage and stimulate the deepest parts of the human mind (Amar, 2004). To do this, organisations need to know how to motivate their knowledge workers, for the process of knowledge productivity is linked to the motivational values and the belief system of an individual (Amar, 2004; Langevelde, 2013; Callaghan, 2013). However, no two knowledge workers are the same (Yarkoni, 2013). Research has showed that individuals greatly differ in the way they perceive their jobs, even if the job description and the tasks they perform remain constant (O'Reilly, Parlette & Bloom, 1980). Although the majority of the motivational literature focuses on organisational predictors of work performance and motivation, psychology literature has long stressed the importance of meaningful individual differences as a predictor of work performance and other job related outcomes (Furnham, Eracleous & Chamorro-Premuzic, 2009). Additionally, the process of knowledge creation, which is the source of productivity for knowledge workers, is subjective and is associated with the individual who possesses it (Nonaka, 1994; Polanyi, 1973). Furthermore, the concept of individuality which is interlinked to personality is an important characteristic of knowledge workers (Amar, 2002).

Personnel psychology literature has established that biological individual differences influence motivational values that determine individual responses to rewards and punishments, which influence individual work performance (Corr, DeYoung & McNaughton, 2013; Schwartz & Boehnke, 2004). Further, several studies have found personality to predict job performance in various occupations (Barrick and Mount, 1991; Hurtz and Donovan, 2000; Neubert, 2004; Barrick, Mount & Judge, 2001; Matzler, Herting & Matzler, 2008). What is absent from the literature is a lack of knowledge that provides insight into the relationship between personality, motivation and specifically knowledge worker productivity. What is not clear is how these relationships predict the productivity of knowledge workers in different industries and how these relationships differ according to the different industries in the South African context. Therefore, in order for organisations to increase knowledge worker productivity, they firstly need to acknowledge that meaningful individual differences exist among knowledge workers, and secondly organisations need to understand how these meaningful individual differences

interact with organisational factors to influence individual motivational values that influence productivity (Furnham, Eracleous & Chamorro-Premuzic, 2009).

To address this gap in the literature, this research investigated whether the intrinsic personalities of knowledge workers interact with motivation predict knowledge worker productivity. This knowledge will enable managers to better understand why individual knowledge workers differ in their motivation to work and how these individual differences influence motivation which in turn affects productivity. Additionally, this research aims to contribute new insight and a better understanding, as well as expand on previous research on knowledge worker productivity. This contribution to the body of literature has practical implications for motivating and managing knowledge workers and theoretical implications for increasing knowledge productivity. This is especially important in the South African context due to the small population of knowledge workers (Smith, 2008) and the limited research to date on knowledge workers in this context.

1.1 RESEARCH PROBLEM

Knowledge worker productivity is the single greatest challenge facing managers today (Steyn & Du Toit, 2009; Drucker, 1999). Much has been written about knowledge worker productivity over the last four decades and yet "when it comes to knowledge worker productivity, we are in the year 2000 roughly where we were in the year 1900 in terms of understanding how to improve the productivity of the manual worker" (Drucker, 1999:83). Additionally, emphasis has been placed on the methods and systems used to measure knowledge worker productivity, which has proven to be a difficult task due to the complex nature of knowledge work (Drucker, 1991, 1999; Mäki, 2008; Ramírez & Nembhard, 2004; Bosch-Sijtsema, Ruohomäki, & Vartiainen, 2009; Scarbrough, 1999).

Despite the continuous stream of research surrounding knowledge worker productivity, knowledge worker productivity continues to be an ambiguous task (Bosch-Sijtsema, Ruohomäki, & Vartiainen, 2009). Consequently, organisations have "limited understanding of what makes knowledge workers tick" (Davenport et al., 2002:23). Without understanding what makes knowledge workers 'tick', organisations are not in a position to improve the productivity of knowledge workers, let alone determine what methods should be used to measure their productivity (Amar, 2004; Davenport et al., 2002; Drucker, 1999).

For organisations to increase the productivity of their knowledge workers, they must know how to motivate them and what motivates them (Amar, 2004; Wang, 2003; Hendricks & Sousa,

2006). One important aspect of this challenge is determining how individual differences interact with motivational forces to motivate knowledge workers to perform, given that knowledge and knowledge productivity are personal capabilities that cannot be separated from the individual (Keursten, Kessels & Kwakman, 2003; Mládková, 2015). However, individual differences relating to knowledge worker productivity has hardly received any attention in the literature so far, yet examining how individual differences influence behaviour which in turn influences work performance appears to be a prerequisite for increasing knowledge worker productivity, since personality is the key predictor of components of motivation (Latham & Pinder, 2005), and motivation plays a primary role in the quality of knowledge work (Hendricks & Sousa, 2006).

What is lacking in knowledge management literature is this insightful knowledge that relates individual differences and motivation to knowledge worker productivity. Additionally, there is a lack of knowledge within the South African context. The research problem that will be addressed by this study is therefore the lack of knowledge as to the relationship between individual personality traits, motivation and knowledge worker productivity. To increase knowledge worker productivity, meaningful differences between individual knowledge workers need to be acknowledged and the factors that influence their productive behaviours must be analysed.

1.2 RESEARCH OBJECTIVES

Research objectives state the specific aim of the study and they provide an idea of who the subjects of the study will be (Farrugia, Petrisor, Farrokhyar & Bhandari, 2010). For the purpose of this research, the objective of this study is to test theory that relates motivation and personality to knowledge worker productivity. The fundamental objective is to contribute new knowledge to the existing body of literature on knowledge worker productivity and to provide better understanding and recommendations for managers that will enable organisations to effectively leverage the knowledge embedded in the minds of knowledge workers and ultimately increase the productivity of knowledge workers.

1.3 RESEARCH QUESTIONS

According to Creswell (1994), research questions represent distinctive statements that are important for producing relevant results. A well-defined and specific research question is important in guiding the researcher in making decisions about the research design, population of the study and what data collection methods to use (Farrugia, Petrisor, Farrokhyar, &

Bhandari, 2010). The core research question is: "*what is the relationship between individual personality traits, motivation and knowledge worker productivity?"* From the core question the following sub-questions are derived:

1. To what extent is personality related to knowledge worker productivity?
2. To what extent is personality related to motivation?
3. To what extent does intrinsic and extrinsic motivation mediate the relationship between personality and knowledge worker productivity?

1.4 HYPOTHESES

Research in the field of psychology has established that meaningful individual differences in personality exist (Yarkoni, 2013; DeYoung & Gray, 2009) which influence work performance and other job related outcomes (Furnham, Eracleous & Chamorro-Premuzic, 2009; Latham & Pinder, 2005). Given that knowledge worker productivity is based on the notion of knowledge as a personal competence (Keursten, Kessels & Kwakman, 2003; Amar, 2004), the influence of individual differences on knowledge worker productivity needs to be acknowledged and addressed. Theoretical developments discussed in chapter two have shown that personality traits predict and influence job performance as well as other job related outcomes (Latham & Pinder, 2005; Barrick & Mount, 1991; Rothmann & Coetzer, 2005; Saldado, 1997; Hurtz & Donovan, 2000; Barrick, Mount & Judge, 2001; Matzler, Herting & Matzler, 2008). Additionally, workplace behaviour is strongly associated with the response an individual has to motivational values which influence work performance (Schwartz & Boetinke, 2004). The following hypotheses are derived from the research questions which represent the theoretical framework of the research:

HI: *Personality is significantly associated with knowledge worker productivity.*

H2: *Personality is significantly associated with extrinsic motivation.*

H3: *Personality is significantly associated with intrinsic motivation.*

H4: *Extrinsic motivation mediates the relationship between Personality and knowledge worker productivity.*

H5: *Intrinsic motivation mediates the relationship between Personality and knowledge worker productivity.*

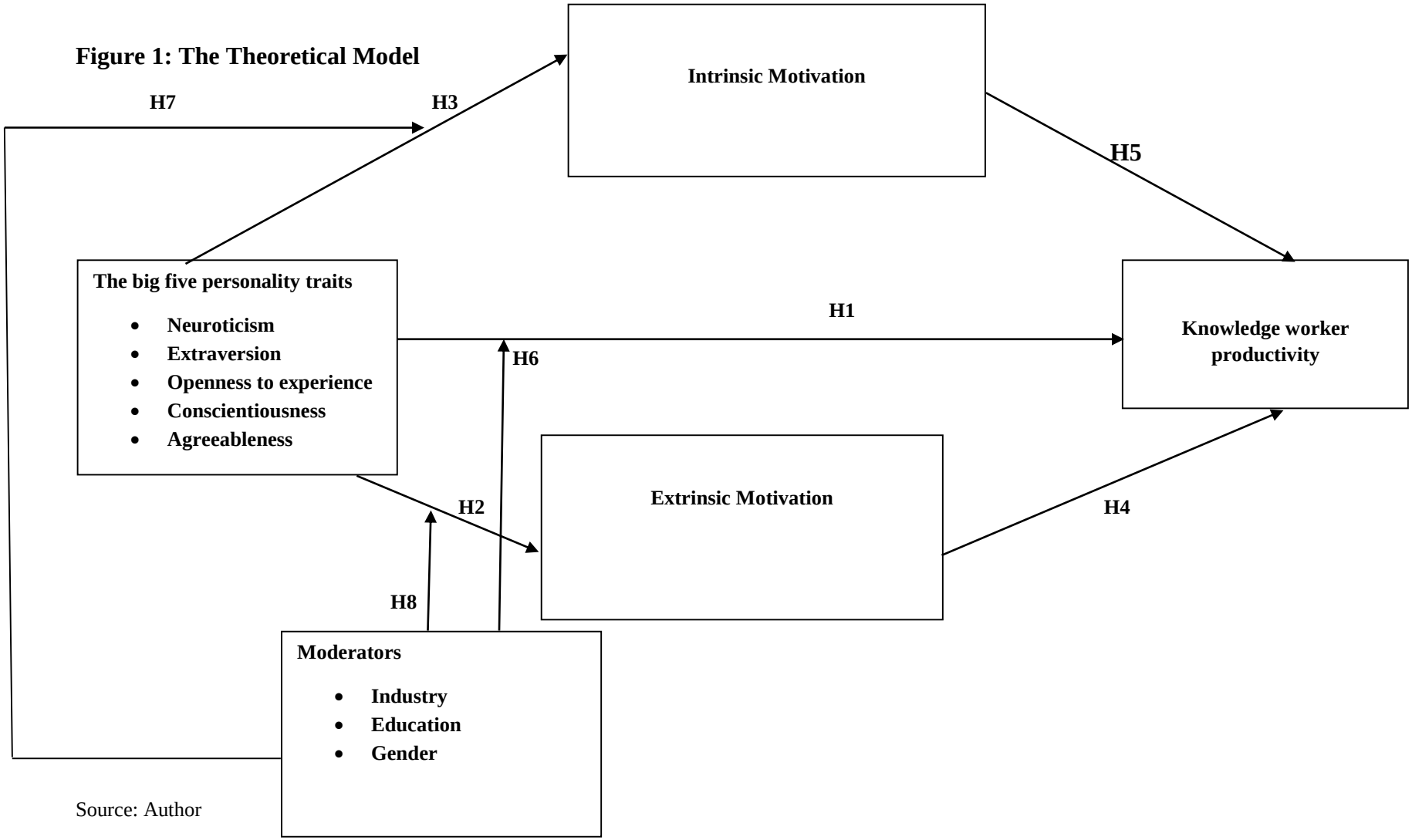
H6: *Industry, education and gender significantly moderate the relationship between the big five personality traits and knowledge worker productivity*.

H7: *Industry, education and gender significantly moderate the relationship between the personality traits and intrinsic motivation.*

H8: *Industry, education and gender significantly moderate the relationship between personality and extrinsic motivation.*

The above sections introduced the background to the study, the aim of the research, the research objectives, the research questions and the derived hypotheses. A theoretical model that represents the relationships and the variables of the study derived from the hypotheses is provided as follows.

Figure 1: The Theoretical Model



Source: Author

1.5 OVERVIEW OF THE RESEARCH PROCESS

The research investigated the relationship between personality and knowledge worker productivity with the mediating effect of motivation. To answer the research questions and provide support for the derived hypotheses, quantitative research was employed for this study. Quantitative research was used to test if meaningful relationships between the identified variables in the theoretical model (see Figure 1) exist (Sukamolson, 2007; Mukherji & Albon, 2009). These relationships identified in the model were formulated based on the existing relevant literature discussed in chapter two. Given the unique characteristics of quantitative research discussed in Table 8 in chapter three, this study adopted a positivist research paradigm (Golafshani, 2003). The positivist paradigm employs scientific and systematic approaches to research, which are suitable to the use of quantitative analysis (Mukherji & Albon, 2009).

An online survey approach was selected to obtain the relevant information pertaining to the variables identified in the theoretical model in Figure 1. The data collected was analysed using the Statistical Analysis System (SAS) for data analysis and reporting. This first involved conducting an exploratory analysis to deal with the problem of common method bias. Then a confirmatory factor analysis was performed to ensure a good fit of the model and construct validity. A series of multiple linear regression tests were then performed to test the significance of the theoretical relationships identified in figure 1. A detailed explanation of the data analysis process and findings are provided in chapter four. The following section provides the definitions of important terms that are used in this study.

1.6 DEFINITION OF KEY TERMS

This section provides the operational definitions of key terms and concepts that are used in this study to increase shared understanding.

Knowledge

Information possessed in the mind of an individual: it is personalised or subjective information related to facts, procedures, concepts, interpretations, ideas, observations and judgments (Alavi & Leidner, 1999:2).

Knowledge work

A cognitive effort to use, generate and extract value from knowledge (El-Farr, 2009:4).

Knowledge worker productivity

The way in which individuals, teams and units across an organisation achieve knowledge-based improvements and innovations (Stam, 2007:3).

Knowledge workers

Employees with high degrees of expertise, education or experience and the primary purpose of their jobs is to create, distribute or apply knowledge. (Davenport, 2005).

Motivation

A set of energetic forces that originates both within as well as beyond an individual's being, to initiate work-related behaviour, and to determine its form, direction, intensity and duration (Pinder 1998:11)

Personality

Behaviour that differentiates one person from another and is the most proximal source of individual differences and behaviour (McAdams, 2006; McAdams & Pals, 2006; Beer & Brooks, 2011; Yarkoni, 2013).

1.7 CHAPTER SEQUENCE

A breakdown of the chapters of the dissertation is as follows:

1.7.1- Chapter 1: Research Problem and Research Questions

In this chapter, a comprehensive synopsis and the theoretical foundation of the study is explained. An overview of the study is outlined, a brief description of the research problem, the aim of the research, the objectives, the research questions and the hypotheses are provided. In addition, the theoretical model, an overview of the methodology and the definitions of key terms are presented. This chapter also explains the significance of this study as well as the contribution of the study to the existing body of literature. Lastly this chapter provides the structure of the dissertation.

1.7.2- Chapter 2: Literature Review

This chapter explores, evaluates and provides a comprehensive review of the literature that relates to the concepts of knowledge, personality, motivation and productivity. The literature that relates to personality and the big five personality traits: (i) Openness to experience, (ii) Consciousness, (iii) Extroversion, (iv) Agreeableness, and (v) Neuroticism is reviewed. Next, literature that relates the big five personality traits to motivation and job performance is critically discussed. Literature that relates motivation to knowledge workers is then discussed after which, the literature that pertains to productivity in particular knowledge productivity and knowledge worker productivity is examined. A summary of the chapter then concludes the discussions in chapter two.

1.7.3- Chapter 3: Research Methodology

The methodology chapter provides the structure for the chosen research method employed in this study. The research design and approach are first discussed. The research is then placed in relation to a positivist paradigm. The chapter also includes a review of the population and sample of the study. In addition, this chapter presents the data collection method used to collect the data. The issues of validity and reliability are addressed. A discussion of the ethical considerations and the limitations of the study conclude this chapter.

1.7.4-Chapter 4: Data Analysis and Discussions

In this chapter, the quantitative results are reported and discussed in relation to the hypotheses and research questions developed in Chapter 1.

1.7.5- Chapter 5: Conclusions and Implications

The objectives of this chapter are to summarise the research findings and discussions; to discuss the implications of this study and to make recommendations based on the research findings. Therefore, in this chapter the summary of the research findings and the recommendations are made for further research.

1.8 CONCLUSION

The background to the study, the research problem and the research questions were presented in this chapter. This chapter established the foundation for the dissertation and the purpose of the study. This chapter also provided the validation for this study by highlighting the gaps in the literature. An explanation of the research methodology was provided as well as the definitions of key terms used in this study. The chapter concluded with an outline of the dissertation.

CHAPTER 2

LITERATURE REVIEW

The knowledge society is the first human society where upward mobility is potentially unlimited. Knowledge differs from all other wealth in that it cannot be inherited or bequeathed. It has to be acquired anew by every individual, and everyone starts out with the same total ignorance.

(Drucker 2001:8)

2. LITERATURE REVIEW

"*Knowledge is a slippery and elusive concept and every discipline has its own secret realisation of it"*

(Scarborough & Burrell, 1996:178)

2.1 INTRODUCTION

In this chapter, literature that relates to knowledge is reviewed. The concept of knowledge is broad and subjective, and thus lends itself to many interpretations depending on its usage and context. Knowledge is not a unitary concept, therefore is no single definition that can be used to describe it. The literature review thus offers different definitions of knowledge from seminal contributors in the field of knowledge management. The literature that relates to knowledge workers is then reviewed. Personality traits are then discussed, particularly the big five personality traits (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness) and their relationship with motivation and job performance. The concept of motivation relating to knowledge workers and personality is then reviewed. Motivation is an important concept in organisational and personnel psychology. Despite the contradictory research that links motivation to job performance; numerous citations (Barrick and Mount, 1991; Saldado, 1997; Hurtz & Donovan, 2000; Barrick, Mount & Judge, 2001; Matzler, Herting & Matzler, 2008) have shown a strong correlation between motivation and increased job performance. This chapter concludes with a review of the literature that relates to productivity in terms of knowledge work and knowledge worker productivity. The concept of knowledge thus is introduced as follows.

2.2 KNOWLEDGE

Knowledge is increasing being acknowledged as an intrinsically important corporate asset that provides a sustainable competitive advantage (Alavi & Leidner, 1999). Knowledge, though complex and difficult to imitate, is increasingly playing a key role in economic transactions and wealth creation (Drucker, 1993, 1995, 1999; Alavi & Leidner, 1999; Alder, 2001; Rahimli, 2012). Organisations that are able to effectively leverage, generate, duplicate, use and apply new forms of knowledge are able to create and maintain a sustainable competitive advantage in hyper-competitive environments (Drucker, 1993; Mort, 2001; Kamya Ntayi & Ahiauzu, 2010; Alavi & Leidner, 1999; Danskin, Englis, Solomon, Goldsmith & Davey, 2005). Knowledge as a key ingredient of value creation, organisational wealth and productivity has introduced a paradigm shift that has altered the nature and the global landscape of organisations

(Drucker, 1993, 1999; Florida & Kenney1993; Drucker, 1999; Keursten, Kessels & Kwakman, 2003; Alder, 2001; Kakabadse, Kakabadse & Kouzmin, 2003).

2.2.1 What is knowledge?

Knowledge is an abstract and multifaceted notion (Alavi & Leidner, 1999; Nonaka, 1994). How to define and analyse the concept of knowledge has been an ongoing epistemological debate among philosophers since the Greek era (Davenport & Völpel, 2001; Nonaka, 1994; Alavi & Leidner, 1999; Keursten, Kessels & Kwakman, 2003). "Problems of interpretation haunt every attempt to use the concept effectively" (Scarborough & Burrell, 1996:178). Knowledge is intuitive and thus difficult to capture in words and comprehend in logical, mathematical or observe in empirical terms (Davenport & Prusak, 1998; Polanyi, 1966). Consequently, there is no universally accepted definition and unit of analysis for the term 'knowledge' (Alavi & Leidner, 1999; Prusak, 1996).

Knowledge generally refers to codified information that mainly consists of subjective human reflection, interpretation and experience (Davenport & Völpel, 2001). Knowledge can also be seen as the associations that people form from information and its possible applications (Baker & Badamshina, 2002). Luijendijk and Mejia-Velez (2005: 115) define knowledge "as a personal capability that is the product of information, experience, skills and attitudes a person possesses at a given moment". Zack (1998) on the other hand, defines knowledge as a thing or object that can be manipulated. The assumption that knowledge can be separated from the person who possesses it, "may underlie the excessive emphasis on technology in many portrayals of knowledge workers and the relative lack of attention to sociocultural forces in shaping an educated work force" (Acesente, 2010:282).

Nonaka (1994) on the contrary describes knowledge as justified personal belief that increases an entity's capability for taking effective action in pursuit of the truth. Cook and Brown (1999), define knowledge as something that is possessed and static. Clark (2001) further describes knowledge as a 'body of facts and principles'. Alavi & Leidner (1999) on the other hand describe knowledge as personalised information possessed in the mind of individuals, since knowledge is considered to be a cognitive interpretation originating from the human mind (Nonaka, 1994; Grover & Davenport, 2001). This suggests that knowledge cannot exist independently of the knower (Prusak, 1996; Nonaka & Takeuchi, 1995), for knowledge is shaped by one's needs and initial stock of knowledge (Fahey & Prusak, 1998). Furthermore, knowledge is always associated with individuals, their personal beliefs, vales, experiences,

intuition and competences (Vaivada, Blinstrobas & Mockeuicine, 2001). Knowledge is therefore not impersonal (Polanyi, 1962; Nonaka, 1994; Prusak, 1996), but rather it is information that is embedded in the mind of the knower and hence cannot be separated from the knower (Alavi & Leidner, 1999; Nonaka, 1994; Prusak, 1996; Polanyi, 1966). The following definition of knowledge has been adapted for this study based on the work of Nonaka (1994), Amar (2004), Prusak (1996), Davenport and Prusak (1998) and Polanyi (1966). Knowledge is the product of the human mind that is shaped by the beliefs, values, experiences and competencies of knower and thus cannot exist independently of the knower.

Knowledge is often used interchangeably and identified as having a hierarchical relationship with information and data (Alavi & Leidner, 1999: Nonaka, 1994; Davenport & Prusak, 1998). However, it should be noted that there is a significant difference between knowledge, information and data (Nonaka, 1994; Liebowitz, 2001; Viavada, Blinstrubas & Mockevicience, 2011). Data is referred to as raw numbers or materials (Baker & Badamshina, 2002; Dreske, 1981; Davenport & Prusak, 1998) and only becomes information when it is processed and interpreted into objective facts that are represented in a meaningful manner or framework (*ibid,* 1998; Vance, 1997). Dreske (1981) defines information as a commodity that is capable of yielding knowledge. Machulp (1983) defines information as a flow of messages and meaning that may add to, restructure or change the knowledge of the recipient. In order for information to be transformed into knowledge, humans must basically do all the work (Davenport & Prusak, 1998). Knowledge can therefore be seen as information that relates to human action (Nonaka, 1994).

In contrast to data and information, knowledge resonates within the human mind and is always associated with personal beliefs, values, experiences and intuition (Vaivada, Blinstrobas & Mockeuicine, 2011; Nonaka, 1991, 1994; Prusak, 1996; Nonaka, Takeuchi, & Umemoto, 1996; Davenport & Prusak, 1998) thus making knowledge more complex and unpredictable (Davenport & Prusak, 1998). Knowledge is therefore richer than data or information, which subsequently makes it difficult to capture or comprehend in logical terms *(ibid,* 1998).

Davenport and Prusak (1998:5), describe the transformation of data to information to knowledge through "C" words such as:

- **Comparison**: how does information about this situation compare to other situations we have known?
- **Consequences:** what implications does the information have for decisions and actions?

- **Connection:** how does this bit of knowledge relate to others?
- **Conversation:** what do other people think about this information?

Table 1: Definitions of knowledge from seminal contributors in the field of knowledge management

Author(s)	Definition
Plato, 1953	Knowledge is a "justified true belief."
Machlup, 1983: 642	Knowledge is personalised and static information.
Huber, 1991	Knowledge is a justified belief that increases the knower's capacity for effective action.
Nonaka, 1994	Knowledge is a justified personal belief that is linked to human action.
Davenport & Prusak 1998:4	Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information.
Schubert, Lincke & Schmid, 1998	Knowledge is a state of action or fact of knowing.
Alavi & Leidner, 1999:2	Knowledge is information possessed in the mind of an individual: it is personalised or subjective information related to facts, procedures, concepts, interpretations, and ideas, observations and judgments (which may or may not be unique, useful, accurate, or structural).
Liebowitz, 2001: 1	Knowledge includes the set of facts and rules of thumb that experts may have acquired over many years of experience.
Davenport & Prusak, 2000	Knowledge is a product of the knower's experience and it encompasses the norms by which the knower evaluates his or her new inputs from the knower' surroundings.
Zack,1999	Knowledge is an object or a thing that can be manipulated and stored.

Source: Developed for this study

2.2.2 Types of Knowledge

Polanyi (1966) classified knowledge into two categories "explicit" or codified knowledge and "tacit" knowledge.

2.2.2.1 Explicit Knowledge

Explicit knowledge, sometimes referred to as 'know-what' (Brown & Duguid, 1998) refers to knowledge that is transferrable in formal, systematic language (Nonaka, 1991, 1994). This type of knowledge can easily be codified, documented, categorised, transmitted into other information and articulated into words or numbers (Nonaka & Takeuchi, 1995). Explicit knowledge embodies all levels of cognition (including information and data) that can be transformed in to data, visual presentations, words or numbers (Baker & Badamshina, 2002; Nonaka, 1991, 1994; Nonaka & Konno, 1998).

2.2.2.2 Tacit Knowledge

According to Polanyi (1967: 4) we should start from the fact that "we know more than what we can tell". With this famous quote, Polanyi (1967), termed this phase of knowing as 'tacit knowledge' (Smith, 2003). This type of knowledge resides within the human mind, and is made up of conceptual and sensory information that is embodied in personal experiences, beliefs, values, preferences, institution and insights (Smith, 2003; Baker & Badamshina, 2002; Nonaka, 1991, 1994; Nonaka & Takeuchi, 1995, 1997).

Tacit knowledge has a personal quality, making it hard to formalise and articulate, yet alone capture and share with others (Nonaka, 1994; Nonaka & Takeuchi, 1995, 1997). Nonetheless, tacit knowledge is arguably the important and indispensable form of knowledge (Polanyi, 1966, 1967; Nonaka, 1991; Nonaka & Takeuchi, 1997; Nonaka, Takeuchi & Umemoto, 1996).

Tacit knowledge is deeply rooted in actions, experiences and is context dependent (Nonaka, 2000; Nonaka & Takeuchi, 1995). It is highly personal and cannot be separated from the person who holds it (Nonaka, 1994; Mladkova, 2015). Further, tacit knowledge is closely related to the technical skills that an individual has and are only known to the person who possesses those skills (Nonaka, 1991; Nonaka & Takeuchi, 1995, 1997; Nonaka, Takeuchi & Umemoto, 1996; Berman, Down & Hill, 2002). Thus, tacit knowledge is referred to as 'know-why'-intuition that is largely based on experience and therefore hard to articulate, communicate or capture (Nonaka, 1991, 1994, 2002; Nonaka & Takeuchi, 1995, 1997; Baker & Badamshina, 2002).

According to Polanyi (1966) tacit knowledge that underlines explicit knowledge is more valuable for all knowledge is either tacit or was initially rooted in tacit knowledge. Further, tacit knowledge and therefore all knowledge cannot be objective, for knowledge is constructed by humans, and thus it contains what Polanyi describes as 'passions' which can never be fully accounted for by articulated words or mathematical formulae or algorithms (Baker and Badamshina, 2002; Smith, 2003; Kakabadse, Kakabadse & Kouzmin, 2003).

Zack (1999:46), identified the following types of knowledge, all which can be made explicit:

- **Declarative knowledge** is knowledge about describing something. A shared, explicit understanding of concepts, categories and descriptors lays the foundation for effective knowledge sharing in organisations.
- **Procedural knowledge** is knowledge about how something occurs or is performed. Shared knowledge explicit procedural knowledge lays a foundation for effective coordinated action in organisations.
- **Causal knowledge** is knowledge about why something occurs. Shared explicit causal knowledge, often in the form of organisational stories, enables organisations to coordinate strategy for achieving goals or outcomes.

Table 2: Frame work for the categorisation of knowledge

Codified Knowledge	Common knowledge	Social knowledge	Embodied knowledge
Effective information of all kinds – facts and figures	Knowledge that is accepted as standard without being made formally codified	Knowledge of social links and shared values	Knowledge that is rooted in experience, background and skill of a person, strongly related to the person that holds it
Knowledge of things and objects **Knowledge of statements & propositions** *Musgrave 1993* **Know what** **Know why** *Lundvall 1996*	**Embedded knowledge** Knowledge that resides in systematic routines *Blacker, 1995* **Embrained knowledge** Knowledge that is dependent on conceptual skills and cognitive abilities Knowledge that or knowing about *Blackler 1995*	**Know who** *Lundvall, 1996* **Social knowledge** Know who Context dependent knowledge. Millar	**Embodied knowledge** Knowledge of playing golf (feeling that I right) *Collins* **Embodied knowledge** Dependent on combining sentient or sensory information and physical cues. Knowledge how or knowledge by aquaintaince (craft skills) only partly explicit Blacker, 1995
Explanatory knowledge Know why Knowledge of information**.** *Millar* **Catalogue knowledge** Know why Knowledge of information. *Millar* **Symbolic knowledge** *Collins 1993* **Encoded knowledge** Information conveyed by signs and symbols, books, manuals *Blackler 1995* **Formal knowledge** **Contingent knowledge** *Fleck 1997* **Explicit knowledge** *Polanyi 1966; Nonaka & Takeuchi 1995*	**Experiential knowledge** What was Context dependent knowledge *Millar* **Informal knowledge** **Meta knowledge** *Fleck 1997* **Knowledge of how to do things** *Musgrave 1993* **Process knowledge** Know how Context dependent knowledge. Millar	**Encultured knowledge** Other social knowledge that reflects certain common experiences. *Collins* **Encultured knowledge** Share understanding of social links *Blacker, 1995*	**Tacit Knowledge** **Instrumentalities** *Fleck, 1997* **Tacit Knowledge** *Polanyi, 1966* These concepts might contribute to either process knowledge or embodied knowledge depending on their content

Source: Blumentritt & Johnston (1999: 292)

2.3 KNOWLEDGE WORK

The term ‘knowledge work’ continues to be a contentious and an ambiguous concept. Despite its many definitions, it has become increasingly clear that the term ‘knowledge work’ is still an ill- defined concept (Kelloway & Barling, 2000; Pyöriä, 2005). According to Kelloway and Barling (2000) there are at least three thematic definitions of knowledge work: knowledge work as a profession, knowledge work as an individualistic characteristic and knowledge work as an individual activity. Despite the varying definitions, there is a consensus in the literature on certain elements that constitute knowledge work and knowledge workers.

Knowledge work can generally be regarded as a process that utilises, generates and extracts value from knowledge (El-Farr, 2009). Knowledge work requires cognitive ability rather than physical effort (Drucker, 1999; Heerwagen, Kampschroer, Powell & Loftness, 2004). This is due to the fact that knowledge work tasks involve “planning, creating, interpreting, developing and creating products and services using information, data or ideas as the raw materials” (Heerwagen, Kampschroer, Powell & Loftness, 2004:511). Although knowledge work is highly cognitive, knowledge workers still perform routine tasks such as storing and retrieving information (Mäki, 2008; Heerwagen et al., 2004).

Drucker (1995) refers to knowledge work as a growing set of work roles that require formal education, qualifications and one’s ability to acquire and apply theoretical and analytical knowledge. On the contrary, Depres and Hiltrop (1995) view knowledge work as a task of manipulating information, producing knowledge which ultimately leads to new processes, products or applications. Davenport, Jarvenpaa and Beers (1996) on the other hand, refer to knowledge work as an activity of acquiring, creating, packaging or applying knowledge. Efimova (2003) further sees knowledge work as a process of creating, applying, transferring and acquiring knowledge. This process requires a high level of skills, expertise, intellectual demands, creativity, interaction, mobility and innovation (Davenport et al. 1996; El-Farr, 2009).

Authors such as Drucker (1999), Choi and Varney (1995), Nomikos (1989) and Bently (1990) argue that, the high level of skills and expertise involved in knowledge work can only be gained through formal education and qualifications. However, certain knowledge work such as information technology, does not necessarily require formal education and yet the work involved requires a high level of skills and expertise (Mäki, 2008).

Unlike manual work, knowledge work requires a great deal of autonomy. Knowledge workers expect and are expected to have autonomy over their work roles (Drucker, 1999; Davenport et al., 1996, 2002). Additionally, knowledge work is highly social (Heerwagen et al, 2004). This is due to the nature of knowledge work, which requires networking and social interactions in order to acquire, learn and share knowledge embedded in the minds of individuals (El-Farr, 2009; Depres and Hiltrop, 1995). The process of interaction is facilitated through the social networks that people develop as they encounter each other formally or informally during the course of their normal working day (Heerwagen et al, 2004). Furthermore, knowledge work requires knowledge workers to continuously be involved in the process of learning (Drucker, 1999; Mäki, 2008; Pyöriä, 2005; Keursten, Verdonschot, Kessels & Kwakman, 2006). Identifying and collecting relevant information, and creating and applying new competencies, requires powerful learning processes and conditions (Keursten, Verdonschot, Kessels & Kwakman, 2006). Therefore, a good learning environment that fosters the competencies needed to achieve knowledge based improvements and radical innovations is key in knowledge work and productivity (Keursten et al., 2006; Stam, 2007).

2.4 KNOWLEDGE WORKERS

Knowledge workers are workers whose major source of productivity is knowledge (Davenport, 2005). Examples of knowledge workers include doctors, lawyers, scientists, engineers, professors, accountants and software engineers. The main distinguishing factors between Knowledge workers and other types of workers are that: knowledge workers have more autonomy over their work, they own the means of production, their tasks are less standardised and structured and they 'think for a living' (Davenport, 2005; Pyöriä, 2005; Mládková, 2011).

The term 'knowledge worker' was first used by Peter Drucker in 1959 (in his book Landmarks of Tomorrow) to describe a new class of workers whose primary source of productivity is dependent upon their ability to acquire and to apply theoretical and analytical knowledge that can only be gained through formal education and qualifications rather than apprenticeship (Drucker, 2001). According to Drucker (1995) this new class of workers would be the largest work- force group that would shape the future of business in a society driven by knowledge and information rather than the production of goods (Acsente, 2010).

Davenport (2005) describes knowledge workers as individuals with high degrees of expertise, education or experience whose primary task is to create, distribute or apply knowledge. According to Davenport (2005) knowledge workers 'think for a living' and they are responsible for stimulating innovation and growth within organisations as well as creating new strategies.

Knowledge workers additionally, solve problems, understand and meet the needs of customers, make decisions and communicate with others during the course of their work (Davenport, 2005). Thus, the main work tool for knowledge workers is their brain rather than their hands (Mladkova, 2011).

Most definitions of knowledge workers place emphasis on the importance of formal education. This limits the term 'knowledge worker' to only professional occupations such as doctors, lawyers, accountants and engineers (Kelloway & Barling, 2000). However, knowledge can be derived from informal sources of education such as experience or expertise gained over time (Ramírez & Nembhard, 2004; Hammer, Leonard & Davenport, 2004) Additionally, an increasing number of workers no longer perform standardised tasks that do not require knowledge or expertise (Hammer, Leonard & Davenport, 2004). Thus, a knowledge worker can be defined as an individual who has more knowledge about his or her job than anyone else in the organisation (Hammer, Leonard & Davenport, 2004). Essentially, this classifies all workers as knowledge workers. However, one factor that distinguishes knowledge workers from other workers is that, knowledge workers own the means of production, something that manual workers do not own (Drucker, 1999; Davenport, 2005; Horwitz, Heng & Quazi, 2003; Hammer et al, 2004).

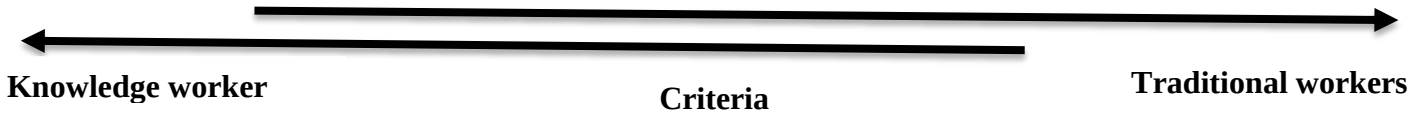
Table 3: A summary of the characteristics of knowledge (intensive) work

Authors	Characteristics
Alvesson (2001), Hayman & Elliman (2000), Kelloway & Barling (2000), Scarbrough (1999), Davenport et al. (1996), Alvesson (1993), Starbuck (1992)	**Content of work**- knowledge workers work from, with and for knowledge. For knowledge work involves the acquisition, creation, packaging and application of knowledge.
Pyöriä (2005), Korac-Kakabadse et al. (2002), Alvesson (2001), Donaldson (2001), Hayman & Elliman (2000), Kelloway & Barling (2000), Scarbrough (1999), Drucker (1999), Collins (1997), Alvesson (1993)	**Complexity of the work**- knowledge work is ambiguous, non-repetitive and non-routine.
Pyöriä (2005), Alvesson (2001), Hayman & Elliman (2000), Davenport et al. (1996), Blackler (1995), Despres & Hilltrop (1995), Alvesson (1993), Blackler et al. (1993), Starbuck (1992)	**Knowledge and skills**- knowledge work requires a high level of skills and expertise that are acquired through formal education.
Hayman & Elliman (2000), Davenport et al. (1996), Tsoukas (1996)	**Autonomy over work**- knowledge workers are self-managing and thus demand, expect and are expected to have autonomy over the work they do.
Styhre (2002), Scarbrough (1999), Tsoukas (1996), Blackler et al. (1993)	**Collective knowledge systems**- collectivity and social context provide a foundation for interaction, which then provide opportunities for individual and collective knowledge development and learning.
Pyöriä (2005), Alvesson (1993), Blackler et al. (1993)	**Learning orientation**- learning is an important element of knowledge work. The ambiguous and contradictory nature of knowledge provides opportunities for individual and collective development and learning.

Source: Adapted from Mäki (2008:8)

Figure 2: Characteristics of knowledge work and traditional work

Knowledge workers	Criteria	Traditional workers
Seeking employability & career self-reliance	Employment orientation	Seeking lifelong employment
External to the organisation via education, experience, socialisation	Career foundation	Internal to the organisation via training and development
Specialised and deep, with diffuse peripheral focuses	Skills and knowledge	Narrow and functional knowledge and skills
Seeking lifelong learning to strengthen professional competence	Learning orientation	Requiring training and development relevant to better job performance
Creativity, complexity, variety, challenging	Nature of work	Routine, well-defined, repetitive, simplified tasks
More intrinsically motivated, prone to recognition, related reward	Reward and motivation	More extrinsically motivated, prone to financial incentive
Irregular, major contributions over a longer term	Performance outcome	Regular dependable, small contributions over a short term



Source: Adapted from Wang & Ahmed (2003: 6)

2.5 PERSONALITY

According to the American Psychological Association (APA) personality refers to "individual differences in characteristic patterns of thinking, feeling, and behaving". Ryckman (2012: 4), defines personality as "the dynamic and organised set of characteristics possessed by a person that uniquely influences his or her cognitions, motivations and behaviours in various situations." Yahaya, Yahaya, Bon, Ismail and Noor (2012) describe personality as cognitive and behavioural patterns that are stable over time and across contexts. Personality is also defined as "the scientific study of psychological individuality" (McAdams and Olson 2010: 518). Mayer (2007) on the other hand defines personality as a system of components that are organised, developed and expressed in the actions of an individual. This system of components consists of motives, emotions, mental models and one's self (*ibid*, 2007).

Personality is generally seen as behaviour that differentiates one person from another and is the most proximal source of individual differences (McAdams, 2006; McAdams & Pals, 2006; Beer & Brooks, 2011; Yarkoni, 2013). It encompasses the unique genetic makeup of a person (except in the case of genetic twins), learning history and it helps account for why and how people uniquely respond to various environmental and contextual demands (Ryckman, 2012). Further, personality psychology tries to take into account the individual human as a complex whole and it constructs a scientifically credible account of psychological individuality (McAdams, 2006; McAdams & Pals, 2006).

2.6 PERSONALITY TRAITS

Personality traits are predispositions that help direct the thoughts, emotions and behaviour of a person (Pervin, Cervone & John, 2005). They are a differentiating characteristic way in which a person perceives, feels, believes or acts (Boeree, 2009; Meyer, 1998; Funder, 1991). Personality traits are also considered to be biological unique characteristic differences that people display over time and across situations (Pervin, Cervone & John, 2005; DeYoung & Gray, 2009; Denissen, van Aken & Roberts, 2011). They capture the prominent aspects of an individual's personality that have a high tendency to lead and determine certain behaviour and attitudes (Awadh & Wan Ismail, 2012). Personality traits also display relatively stable patterns of behaviour that transcend time and specific situations (Funder, 1991). They are considered to be the most proximal or closest measure of human individual differences (Callaghan, 2013). The trait personality theory makes the following three main assumptions (Bernstein, 2011:432):

Table 4: Definitions of personality

Author (s)	Definition
Allport, 1937: 48	Personality is the dynamic organisation within the individual of those psychological systems that determine his or her unique adjustments to his or her environment.
Funder, 2005: 4	Personality refers to individuals' characteristic patterns of thought, emotion and behaviour, together with the psychological mechanisms hidden or not-behind those patterns.
Feist & Feist, 2009	Personality is a pattern of relatively permanent traits and unique characteristics that give both consistency and individuality to a person's behaviour
Larsen & Buss, 2005: 4	Personality is the set of psychological traits and mechanisms within the individual that are organised and relatively enduring and that influence his or her interactions with and adaptations to intrapsychic physical and social environments.
McAdams, 2006:12	Personality is the scientific study of the whole person.
Mayer, 2007:14	Personality is the organised developing system within the individual that represents the collective action of that individual's major psychological subsystems.
Pervin, Cervone & John, 2005: 6	Personality refers to those characteristics of the person that account for consistent patterns of feelings, thinking and behaving.

Source: Developed for this study

Personality traits are relatively stable, and therefore predictable, over time (Pervin, Cervone & John, 2008; Costa &Mccrae, 2002).

Personality traits are relatively stable across situations, and they can explain why people act in predictable ways in many different situations. A person who is competitive at work, will also be competitive on the tennis court or at a party (Roberts et al., 2007).

People differ in how much of a particular personality trait they possess; no two people are exactly alike on all traits. The result is an endless variety of unique personalities.

2.7 THE BIG FIVE PERSONALITY TRAITS

The most commonly used measure of personality is the big five personality model. The 'Big five' or 'The five-factor model' of personality represents the five major factors used to comprehensively describe human individual differences in personality (Amayah, 2011; Judge, Thoresen, Bono & Patton, 2001; Yahaya, Yahaya, Bon, Ismail, & Noor, 2012). The big five personality traits have a genetic basis and tend to be inherited (Rothmann & Coetzer, 2003). They are an empirical generalisation of the covariation of trait personality theories which have been developed over time through studies of diverse populations, the analysis of trait adjectives in numerous languages and the analysis of existing personality inventories (Judge, Higgins, Thoresen & Barrick, 1999; John, Robins, Pervin, 2008). The personality traits are neuroticism (versus emotional stability), extraversion (versus introversion), openness to experience (versus closeness to experience), agreeableness (versus rudeness) and conscientiousness (versus non dependability) (Barrick & Mount, 1991; Amayah, 2011). The five personality traits have been found to be universal and generalisable virtually across all cultures and they remain consistent over time (Judge, Higgins, Thoresen & Barrick, 1999). According to Barrick and Mount (1995), the big five personality traits are necessary and adequate to describe the basic dimensions of normal personality and they provide the best representation of trait structure **(**Coasta and McCrae, 1997).

2.7.1 Neuroticism

Neuroticism, frequently referred to as emotional stability (Barrick & Mount, 1991) refers to "a lack of positive psychological adjustment and emotional stability" (Jude et al., 1999: 624). Neuroticism has been found to be the most prevalent and affective trait across personality measures (Jude et al, 1999). It is described as the inclination to experience negative emotions and is often associated with anxiety, hostility, poor social skills and depression (Barrick & Mount, 1991; Yahaya, Yahaya, Bon, Ismail, & Noor, 2012).

Table 5: Key personality theories

Author(s)	Theories	Main Contributions
Sigmund Freud (1894, 1896, 1900, 1915, 1920, 1923, 1925, 1961, 2001); Alfred Adler (1927); Erik Erikson(1950, 1958, 1964, 1968)	**Psychoanalytic Theories**	Structural model of personality Levels of awareness Components of personality Defence mechanisms Psychosexual stages Inferiority and Birth order Theory of Psychosocial development
Abraham Maslow (1943, 1954, 1962, 1968, 1970); Carl Rogers (1951, 1957, 1959)	**Humanistic Theories**	Self- determination Self-realisation Self-actualisation Person centred theory
Hans Eysenck (1967, 1992)	**Biological Theories**	Studies of Temperament Heritability studies Environmental studies Evolutionary approaches (behaviour) Natural selection
Burrhu Frederick Skinner (1935, 1938, 1950, 1971, 1989); John. B. Watson (1913, 1920)	**Behavioural, Social learning and Cognitive Theories**	Operant conditioning Schedules of reinforcement Conditioning and behaviour
Gordon Allport (1937, 1950, 1954, 1955, 1961); Meyers Briggs (1980); Carl Jung (1971); Raymond Cattell (1950, 1952, 1957, 1978); Hans Eysenck (1947, 1957,1979,1985); Coasta & McCrae (1987, 1997)	**Trait Theories**	Trait categories Personality inventories/dimensions/factors The big five personality dimensions

Source: Developed for this study

People who are highly neurotic tend to have irrational ideas and exhibit poor emotional adjustment in the form of anxiety, depression, anger, embarrassment and stress (Judge, & Ilies, 2002). Individuals who score high in neuroticism tend to experience social problems in the work place and they tend to be habitually unhappy in their jobs (Barrick & Mount, 1991).

Neuroticism has been found to negatively correlate with job performance (Barrick & Mount, 1991; Thoresen & Barrick, 1999). However, a study by Hormann and Maschke (1996) found neuroticism to be a predictor of job performance in various professions. A study done by Dunn, Mount, Barrack and Ones (1993), found emotional stability (the opposite of neuroticism) to be an important characteristic that positively affects job performance as well the employability of candidates.

2.7.2 Extraversion

Extraversion refers to the quantity and strength of interpersonal interactions within social settings (Costa & McCrae, 1992). Extroverts are predisposed to experience positive emotions and are therefore more likely to contribute to greater team satisfaction and take on leadership roles than introverts (Costa & McCrae, 1992; Watson & Clark, 1984). Extraversion is mostly associated with individuals who have the tendency to be sociable, gregarious, assertive, active and positive (Barrick & Mount, 1991; Judge, & Ilies, 2002). Extraverts tend to be spontaneous, optimistic, energetic, positive and enthusiastic (Waston & Clark, 1997; Jude et al., 1999). This personality dimension consists of two primary components, ambition and sociability (Barrick & Mount, 1991).

Extraversion is associated with positive feelings and experiences and is therefore viewed as a positive affect (Clark & Watson, 1991, 1988). Extraversion has been found to be a valid predictor of overall job performance, particularly for jobs that require and involve social interaction such as sales personnel and managers (Barrick & Mount, 1991; Salgado, 1997).

2.7.3 Openness to experience

Openness to experience refers to the actively pursuing and appreciating new experiences (Piedmont & Weinstein, 1994). This personality trait is related to intellect or intellectance (Barrick & Mount, 1991). Individuals who score high on openness to experience tend to be creative, imaginative, cultured, curious, intelligent and artistically sensitive (Barrick & Mount, 1991; Judge, & Ilies, 2002; Yahaya et al., 2012). Individuals who score low on openness to experience tend to be conventional and conservative in their behaviour and outlook (Rothmann & Coetzer, 2003).

Research by Barrick and Mount (1991) found a positive relationship between openness to experience and job performance for training proficiency criterion. According to *ibid (*1991), this suggests that these individuals have an optimistic approach towards training and learning and are innovative, caring and insightful (Awadh & Wan Ismail, 2012). A study by Tett, Jackson and Rothstein (1991) found openness to experience to be a valid predictor for job performance. Another study done by Hamilton (1998) found openness to experience to be positively related to success in consulting. However, openness to experience is not considered to be a valid indicator of job performance (Rothmann & Coetzer, 2003), for openness to experience is ambiguous and therefore debatable (Coasta & McCrae, 1997).

2.7.4 Agreeableness

Agreeableness or likability refers to the quality of the interpersonal interactions that an individual has which range from compassion to hostility (Piedmont & Weinstein, 1994). It includes traits such as courteous, flexible, gentle, kind, trusting, good-natured, forgiving, soft hearted and tolerant (Barrick & Mount, 1991). Agreeable people tend to be likable, cooperative, altruistic, and sympathetic to others and tend to be successful in occupations where teamwork and customer service are relevant (Rothmann & Coetzer, 2003).

Research has found agreeableness to influence job performance when collaboration and cooperation among workers is essential (Teh, Yong, Chong & Yew, 2011). Tett et al. (1991) also found agreeableness to be an important predictor of job performance. However, Barrick and Mount (1991) found the correlation between agreeableness and job performance to be very weak, though they found agreeableness to be a predictor of success in specific occupations and work tasks. Salgado (1997) found a significant correlation between agreeableness with police and skilled labour performance.

2.7.5 Conscientiousness

Conscientiousness is also referred to as Conformity or Dependability, is the level of persistence, organisation and motivation that is directed towards a goal (Piedmont & Weinstein, 1994). It is the most wildly researched trait of the big five personality traits (Barrick & Mount, 1991). Conscientious individuals tend to be achievement oriented, dependable, efficient, and responsible and risk adverse. Conscientiousness has been found to be consistent and positively related to overall job performance (Barrick, Mount & Judge, 2001; Judge, Higgins, Thoresen & Barrick, 1999; Matzler, Renzl, Müller, Herting & Mooradian, 2008; Hurtz & Donovan, 20001; Tett et al., 1991; Barrick & Mount, 1991; Saldado, 1997) and

satisfaction (Judge et al., 2002) than any of the other personality traits. The positive relationship between conscientiousness and job performance may be related to the abstract relationship between conscientiousness and integrity (Rothmann & Coetzer, 2003). Individuals who score highly on conscientiousness, should also have higher performance scores (Barrick, Mount & Judge, 2001).

2.8 THE BIG- FIVE PERSONALITY TRAITS AND JOB PERFORMANCE

Over the years traditional industrial psychologists have questioned the validity of personality measures a predictor of job performance and other job related criteria and behaviour (Barrick & Mount, 1991; Rothmann & Coetzer, 2005). However, recent studies have indicated that personality measures are valid predictors of job performance (Hurtz & Donovan, 2000; Rothmann & Coetzer, 2005). A meta- analysis of 86 studies carried out by Tett, Jackson and Rothsteins (1991) identified a positive relationship between the big five personality traits and job performance with a correlation of 0.24.

A meta-analysis by Barrick and Mount (1991) indicated that personality traits are a valid predictors of job performance. According to their findings, conscientiousness emerged as the most predictive and consistent personality dimension of job performance across all occupations (Barrick & Mount, 1993). Another meta-analysis study done by Hurtz and Donovan (2000) found the big five personality traits to be a good predictor of job performance. Their findings also found conscientiousness to be the strongest predictor of job performance (Hurtz & Donovan, 2000). A more recent meta-analysis by Neubert (2004) found a correlation between job performance and the five factor model of personality however, Neubert (2004) concluded that the correlation between job performance and personality traits was most likely due to the social aspects of the work place rather than the actual ability that one has.

Most of the meta-analyses have found conscientiousness and emotional stability (opposite of neuroticism) to be positively correlated to job performance across virtually all occupations (Barrick and Mount, 1991; Saldado, 1997; Hurtz & Donovan, 2000; Barrick, Mount & Judge, 2001; Matzler, Herting & Matzler, 2008). This suggests that out of the big five personality traits, consciousness is the most valid predictor of job performance across virtually all occupations. Individuals who score highly on consciousness should perform highly as well.

2.9 MOTIVATION

Motivation can be described as a psychological process that occurs as a result of the interaction between an individual and the environment (Latham and Ernst, 2006). This interaction

influences individual behaviour, direction, effort and purpose towards achieving particular goals (Latham and Ernst, 2006; Latham and Pinder, 2005; Lindner, 1998). Motivation can also be described as the willingness to exert a high degree of effort towards accomplishing specific personal goals as well as organisational goals (Ramlall, 2004). Linder (1998) describes motivation as an internal force that drives individuals to achieve personal and organisational goals. The internal force in this context refers to a dynamic internal state that is influenced by personal and situational factors that make particular outcomes seem more desirable (Ramlall, 2004; Wiley, 1997).

According to Kumar (2012) motivation is a psychological force that determines the level of effort, persistence and behaviour of individuals in an organisation. According to Ryan and Deci (2005) motivation is the key predictor of human behaviour, which can be categorised into extrinsic and intrinsic motivation. These distinctions are based on the different goals or reasons that produce or lead to an action (Ryan and Deci, 2005). Research has indicated that the quality of experience can vary when an individual is performing for intrinsic versus extrinsic reasons (Ryan & Deci, 2000). It has been argued that intrinsic and extrinsic motivation influence individual intensions, actions and responses to perform an activity (Lin, 2007). Additionally, Covington and Müeller (2001) argue that these two processes of motivation are not only distinct but they are incompatible, implying that the two processes cannot co-exist together.

Intrinsic motivation can be defined as the motivation to perform an activity which is inherently interesting or pleasurable (Ryan & Deci, 2000). According to Ryan and Deci (1992) intrinsic motivation is associated with increased performance, enhanced conceptual and creative thinking, elevated memory recall, positive affect and overall improved psychological and physical wellbeing in comparison to other forms of motivation. Intrinsic motivation has been linked to increased productivity and has emerged as an important aspect in knowledge work because it results in high quality learning and creativity, two important aspects of knowledge work (Kuvaas, 2008; Langevelde, 2013). Additionally, majority of the literature on technical professions, "suggests that individuals cannot be motivated to create; instead, they can only be encouraged and enabled through the development of the environment in which they work" (Petroni & Colacino, 2008:22). This implies that motivating creativity is mainly intrinsic in nature and managers just need to create the right environment in which creativity can thrive (*ibid*, 2008). Knowledge workers therefore rely on intrinsic motivation to accomplish complex tasks, enable learning as well as create new knowledge (Langevelde, 2013).

Extrinsic motivation on the other hand refers to the act of performing an activity or a task in order to derive some sort of benefit (Ryan & Deci, 2000). Employees are extrinsically motivated when they are able to satisfy their needs indirectly (Osterloh & Frey, 2007). Extrinsic motivators such as monetary rewards have been linked to employee motivation and performance (Taylor, 1942; Bellenger et al, 1988; Meyer, 2002). However, extrinsic motivators have proven counterproductive in motivating knowledge workers due the complex nature of knowledge work (Langevelde, 2013; Drucker, 1999; Tampoe, 1999; Badawy, 1982, 1988; Kuvaas & Dysvik, 2009). Badawy (1982) argues that intrinsic motivation is motivational to technical professions than extrinsic motivation, for technical professionals "money for what it can buy is not as important as money for what it can do" (Petroni & Colacino, 2008:22). However, monetary rewards have been found to have to have a motivational impact depending on the personal characteristics of an individual which influence behaviour (Nohrita, Groysberg & Lee, 2008). Further, a person's response to motivators has been linked to their genetic dispositions and their environment or the context in which they function (Storesund & Rasmussen, 2014). Therefore, what motivates a person is determined by the interaction between personality and contextual factors that influences their response to motivators (Corr, DeYoung & McNaughton, 2013).

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Table 6: Definitions of Motivation

Author(s)	Definitions
Vroom 1964:6	A process governing choice made by persons
Atkinson 1964:2	Motivation is the contemporary (immediate) influence on direction, vigour, and persistence of action
Pritchard, 1976:63	Motivation has to do with a set of interdependent/dependent variable relationships that explain the direction, amplitude and persistence of an individual's behaviour, holding constant the set of effects of amplitude, skill and understanding of the task and constraints operating in the environment.
Campbell & Pritchard, 1976:76	A label for the determinants of choice to initiate effort on a certain task; the choice to expend a certain amount of effort; and the choice to persist in expending effort over a period of time
Mitchell 1982: 81	Those psychological processes that cause the arousal, direction and persistence of voluntary actions that are goal oriented
Turne 1995:413	Voluntary uses of high-level self-regulated learning strategies, such as paying attention, connection, planning and monitoring
Graham & Weiner 1996:63	The study of why people think and behave the way they do
Pintrich & Schunk 1996:4	Motivation is the process whereby goal-directed activity is instigated and sustained
Dörnyei, 1998:118	Process whereby a certain amount of instigation force rises, initiates action, and persistence of voluntary actions that are goal oriented
Gredler, Broussard and Garrison 2004:106	The attribute that moves us to do or not to do something
Guay, Chanal, Ratelle, Marsh, Larose & Boivin, 2010:712	Reasons underlying behaviour

Source: Developed for this study

2.10 KNOWLEDGE WORKER MOTIVATION

Increasing the productivity of knowledge workers is described as one of the biggest challenges facing organisations today (Druker, 1999). In order to successfully exploit their primary source of competitive advantage, organisations need to know how motivate their knowledge workers (Storesund & Rasmussen, 2011, Hendricks & Sousa, 2006). Motivation plays an important role in knowledge work and it determines the quality of knowledge work (Hendriks & Sousa, 2006). Organisations that are able to motivate their knowledge workers while still able to keep a certain level of managerial control and at the same time encourage creativity and autonomy; will be the most successful (Wang, & Ahmed, 2003).

Traditional theories and strategies rooted in bureaucratic and scientific management for motivating, attracting and retaining workers have proven counterproductive in regards to knowledge workers (Chen, 2009). Additionally, in motivating knowledge workers, there is no universally accepted model for motivation nor is there one grand theory of motivation (Frick, 2010). Instead, to motivate knowledge workers, organisations need to know the specific characteristics of knowledge workers and they must be able to identify and address the factors that influence their productivity (Wang, & Ahmed, 2003).

According to Tampoe (1993) the key motivators for knowledge workers are personal growth, operational autonomy and task achievement. In his research findings Tampoe (1993), found that monetary rewards were not effective in motivating knowledge workers. However, a study done by Kubo and Saka (2002) found monetary incentives to be an effective motivator for Japanese knowledge workers. A study by Horwitz, Heng and Quazi (2003) found strategies such as: freedom to plan and work independently, a challenging working environment, support from top management and leading- edge technology to be highly effective in motivating knowledge workers. Their research findings found monetary incentives not to be a key motivator for knowledge workers (Horwitz, Heng & Quazi, 2003).

Amar (2004), Drucker (1999) and Kelloway and Barling (2000) identify job design as a key factor in motivating knowledge worker productivity. Job design has a direct impact on attitudinal, motivational and behavioural outcomes of workers (Hernaus & Mikulić, 2013). The role of job design in motivating knowledge workers corresponds with Hackman and Oldham's (1976) job design theory represented by the job characteristics model (Hendriks &

Sousa, 2006). Hackman and Oldham's (1976) job characteristics model identifies five core characteristics (skill variety, task identity, task significance, autonomy and feedback) that

create a critical psychological state that produces high work motivation, satisfaction and productivity.

2.11 MOTIVATION AND PERSONALITY

Although there is a consensus among researchers that individual differences in motivation exist, and that these differences can be traced to personality traits, trait theory does not play much of a role in motivational studies and theories (Judge & Ilies, 2002). Personality is thought to influence job performance mainly through motivational processes however, research is hindered due to the lack of an acceptable framework for studying motivational constructs (Parks & Guay, 2009). According to Austin and Klien (1996) a considerable amount of research is needed before precise statements can be made about the role of dispositional tendencies in motivational theories.

Despite the sporadic and fragmented research on personality and motivation, there is strong evidence that links the big five personality traits to motivation (Barrick, Mount & Judge; 2001; Judge & Ilies, 2002; Parks & Guay, 2009). A meta analytical study by Judge and Ilies (2002) examining the relationship between the big five personality traits and motivation, in particular goal setting theory, expectancy and self-efficacy, found conscientiousness to be positively correlated to all motivational criteria. While neuroticism to be negatively associated to all motivational criteria. They found the relationship between conscientiousness and motivation to be p= .28 for goal setting, p=.22 for expectancy and p=.22 self-efficacy theory. These findings are consistent with findings by Barrick, Mount and Strauss (1993) who found conscientiousness to be linked to goal setting theory and Gellatly (1996) found conscientiousness to be correlated to the expectancy theory of motivation.

Judge and Ilies (2002), found the correlation between neuroticism and motivation to be p=-.29 for goal setting theory, p=-.29 for expectancy and p=-.35 for self-efficacy theory. They attributed the poor correlation to the anxious tendencies of neurotic individuals, which hinders the self-regulating process of goal striving motivation (Judge and Ilies, 2002; Parks & Guay, 2009). Judge and Ilies (2002) meta- analysis found weaker and less reliable correlations with the other three personality traits-openness to experience, extroversion, agreeableness and motivation. They attributed the weak correlations and inconsistencies to second order sampling.

Table 7: Motivation theories and knowledge themes

Motivation Theories	Knowledge Development, Creativity	Knowledge sharing, cooperation, participation in communities, knowledge teams
Self-Determination Theory (Deci & Ryan), Two-Factor Theory (Herzberg)	Amabile, 1997; Amabile et al., 2004; Wilkesmann & Rascher, 2002	Hendriks, 1999; Huber, 2001; Wilkesmann & Rascher, 2002
Job Characteristics Theory (Hackman & Oldham)	Amabile, 1988, 1997	Janz, 1999; Janz et al., 1997; Wilkesmann & Rascher, 2002
Goal-Setting Theory (Locke & Latham)	Carson & Carson, 1993; Gambill et al., 2000	Durham et al., 1997; Reinig, 2003
Self-Efficacy Theory (Bandura)	Janssen, 2000; Shalley & Gilson, 2004; Spreitzer, 1995; Tierney & Farmer, 2002, 2004	Cheng, 2000; McClough & Rogelberg, 2003

Source: Hendriks & Sousa (2006:65)

"*Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker".*

Paul Krugman, (1994:11)

2.12 PRODUCTIVITY

The standard of living of any nation is dependent upon its natural resources and the productivity of its people (Aggarwal, 1980). Productivity is considered to be a vital source of economic growth, profitability, competitiveness and assessment (Stam, 2007; OCED, 2001). According to Drucker (1993, 1994) productivity is not only the ultimate source of competitive advantage, but it is also the key to economic and social stability of any nation.

Conceptually, the concept of productivity is objective and quantifiable (Sullivan, Baird & Donn, 2013). It is traditionally defined as the ratio of input to output for a given production system (Erne, 2011; Haynes, 2008; Hung & Jim Wu, 2010; Rogers, 1998; Tangen, 2002). Productivity can also be defined as "the real output per unit of work" (Steindel & Stiroh, 2001:1) or the "the efficiency in production" (Syverson, 2011: 322). Increasing productivity implies that either more quantities of output are produced with the same amount of inputs, or less inputs are required to produce the same quantity of outputs (Rogers, 1998).

The notion of productivity is also closely linked to the issue of "efficiency" and "effectiveness" (Rogers, 1998; Bosch-Sijtsema et al., 2009). A firm is said to be efficient when it is operating on the production frontier (i.e. achieving the best practice). Therefore, increasing efficiency implies increasing productivity (Rogers, 1998). Productivity can therefore be said to be the overall efficiency required to transformed inputs into outputs, which is generally associated with technology (Steindel & Stiroh, 2001).

2.13 PRODUCTIVITY AND KNOWLEDGE WORK

Improving the efficiency and effectiveness of knowledge work provides the utmost opportunities to increase productivity (Mohanta, Kannan & Thooyamani, 2006, 2010). Yet, understanding, capturing and measuring knowledge productivity has shown little improvement over the past decades (Efimova, 2003; Davenport, 2005; Ramírez & Nembhard, 2004; Mohanta, 2010). On the whole, "we have so far, mainly judgements rather than measures regarding the quality of a great deal of knowledge work" (Drucker, 1999:146).

Knowledge productivity refers to the way in which "individuals, teams and units across organisations achieve knowledge-based improvements and innovations" (Stam, 2007:3). The concept of knowledge productivity is subjective and therefore opens itself to many interpretations and approaches. Some authors have adopted a macro-economic approach to knowledge productivity which focuses on measurement the aspect (Machulp, 1972), while others have adopted a managerial perspective to knowledge productivity (Drucker, 1993; 1999; Huangi & Jim Nu, 2010).

Historically, work productivity measurements have followed Fredrick Taylor's principles of scientific management (Erne, 2011; Brand, 2005; Ramírez & Nembhard, 2004). According to these principles used to measure manual work productivity, all jobs can be simplified and broken down or segmented into simpler tasks that would optimise the way work was done (Ramírez & Nembhard, 2004; Brand, 2005). "Problems arise, because unlike manufacturing work, knowledge work does not break easily into constituent behavioural components that can be timed to ensure the best segmentation and integration of task components" (Brand, 2005:3). Another related problem is that knowledge work does not lend its self to traditional measures of productivity: ratio of outputs to inputs (Ramírez & Nembhard, 2004). Given the complex nature of knowledge work (e.g employees whose tasks are not fixed, the lack of production standard times and tasks that can be performed differently by and among the workers), this narrow view of productivity is highly limited and does not take into account important aspects that apply to knowledge work such as quality (Bosch-Sijtsema et al., 2009; Drucker, 1999; Mäki, 2008; Ramírez & Nembhard, 2004; Scarbrough, 1999; Ramírez & Nembhard, 2004; Mohanta et al., 2006, 2010). Quality is the primary output when it comes to knowledge work, for knowledge work is qualitative, intangible and interpersonal (Vuolle, Palvalin & Lonngvist, 2014). Unlike quantity, the concept of quality is difficult to define and it is highly subjective, thus not readily countable (Sullivan, Baird & Donn, 2013). Additionally, objective measurement and quantification require raw data to be recorded in an accurate and timely manner. This would either require an additional employee layer (e.g. clerical, data entry) or knowledge workers themselves spending time documenting work activities, which does not contribute to knowledge worker productivity (Brand, 2005).

According to Davenport (2005) when it comes to productivity in knowledge work, the term productivity should not be used but rather the focus should be on 'performance and results'. Davenport (2005) thus puts forward the 'social approach' as an alternative method to measuring productivity in knowledge work. The social approach is subjective and it advocates

for the use of a "peer review" approach (Davenport, 2005). The peer review approach takes in to consideration the quality of knowledge work. However, this approach is universal and therefore to ensure quality and quantity, more specific metrics need to be developed (Davenport, 2005).

Alternative measures such as subjective methods, have been recommended as an alternative way to capture the 'soft and multidimensional' facets of knowledge work (Vuolle, Palvalin & Lonngvist, 2014). These measures are considered to be an important pragmatic way to record complex and intangible phenomena (*ibid,* 2014). Additionally, subjective measures are convenient to use (Sullivan, Baird & Donn, 2013). Simple, relatively cheap and quick surveys can be used to measure subjective productivity and large samples of data can be analysed across different contexts (*ibid,* 2013). The general lack of any objective measures for knowledge work productivity has resulted in the generally accepted argument that "a self-assessed measure of productivity is better than no measure of productivity" (Haynes, 2008: 2).

2.14 KNOWLEDGE WORKER PRODUCTIVITY

According to Drucker (1999) the most significant contribution that managers need to make in the 21st century, is to increase the productivity of knowledge work and knowledge workers. Drucker (1995, 1999, 2001, 2002) argues that increasing the productivity of knowledge workers is not only crucial to the competitive performance of organisations, but it is also the "first survival requirement" (Drucker, 1999:92) for any developed economy. Drucker (1995:37), further stressed that, increasing the productivity of knowledge workers "will determine the very fabric of society and the quality of life in every industrial nation." Davenport (2005:7) echoes this sentiment by stating that: "if our companies are going to be more profitable, if our strategies are going to be more successful, if our society is going to be more advanced- it will be because our knowledge workers did their work in a more productive and effective manner". The productivity of knowledge workers has dominated management literature over the last four decades and yet increasing knowledge worker productivity continues to be an elusive task (Davenport, 2005; Davenport et al., 2002). Much of this has been mainly attributed to the lack of a cohesive definition for the term knowledge work and to the ever changing and complex nature of knowledge work (Bosch-Sijtsema et al., 2009; Drucker, 1999; Mäki, 2008; Ramírez & Nembhard, 2004; Scarbrough, 1999). Furthermore, knowledge work is difficult to quantify and there are currently no universally accepted or effective methods to measure knowledge worker productivity (Ramírez & Nembhard, 2004). Additionally, existing measurement indicators are grounded in principles of Taylorism, which

try to standardise knowledge work processes with the intension of making 'best practices' in work productivity that can be generally applicable to everyone (Erne, 2011). However, for knowledge work there is not necessarily a direct link between the amount of input applied and the units of output produced (Ramírez & Nembhard, 2004). Instead quality of output rather than quantity of output is important to knowledge workers and productivity just addresses it indirectly (Drucker, 1999; Steyn & Du Toit, 2009). Therefore, when it comes to knowledge worker productivity, quality should be first used to judge performance (Drucker, 1999). A study by Ramírez and Nembhard (2004) however found that 71% of the methodologies used to measure knowledge worker productivity used quantitative measures and only 21% used qualitative measures.

Additionally, most knowledge workers themselves are resistant to management initiatives to design more productive work environments (Davenport et al., 2002). This has been attributed to the fact that knowledge workers themselves resist the idea of their productivity being measured in the traditional way- by quantity of output rather than quality (Davenport et al., 2002). Hence, Davenport's (2002:3) recommendation, "organisations should hire smart people and leave them alone."

According to Kessel and Van der weff (2002) knowledge worker productivity requires conditions that foster a good learning environment. The assumption behind this concept is that the nature of work is ever changing: routine work is now automated or out sourced (Kessels & Keursten, 2002). The work that remains requires autonomy and creative thinking that engages employees in more mental and social activities rather than physical activities (Stam, 2007). As these changes take place, it is important that the workplace turns into a learning environment that fosters constant improvements, cultivates innovation and ultimately increases knowledge worker productivity (Kessels & Keursten, 2002; Stam, 2007).

Drucker (1999:83) list the following six major factors that determine knowledge worker productivity:

- Knowledge worker productivity demands we ask the question:

"*What is the task?"*

- It demands that we impose the responsibility for productivity on the individual knowledge workers themselves. Knowledge workers *have* to manage themselves. They have to have *autonomy.*

- Continuing innovation has to be a part of the work, the task and the responsibility of knowledge workers.
- Knowledge work requires continuous learning on part of the knowledge worker, but equally continuous teaching on the part of the knowledge worker.
- Productivity of the knowledge worker is not-least not primarily a matter of the *quantity* of output. Quality is at least as important.
- Finally, knowledge worker productivity requires that the knowledge worker is both seen and treated as an "asset" rather than a "cost" it requires that knowledge workers *want* to work for the organisation in preference to all other opportunities.

2.15 CONCLUSION

In this chapter, the literature that is associated with knowledge, knowledge work and knowledge workers was reviewed. The concept of personality and motivation was introduced and the relationship between personality and job performance was discussed. The topic of productivity was then discussed in relation to knowledge work and knowledge worker productivity.

This section addressed the key components of the research: personality, motivation and knowledge worker productivity. The next chapter will discuss the methodology employed to investigate and validate the theoretical frame for the study.

CHAPTER 3
RESEARCH METHODOLOGY

3. METHODOLOGY

3.1 INTRODUCTION

The aim of the research was to investigate the relationship between personality and knowledge worker productivity with the mediating effect of motivation. The purpose of the study is to provide a more comprehensive understanding of knowledge worker productivity. This chapter extends on the work discussed in the previous chapter and it provides a justification for the research methodology employed to investigate the relationship between personality, motivation and knowledge worker productivity. In this chapter the research methodology, research design, the sampling method and the data collection method and data analysis methods will be discussed.

3.2 RESEARCH QUESTIONS

The following research questions derived from the theoretical framework in chapter two guided the selection of the research methodology for this study:

1. To what extent is personality related to knowledge worker productivity?
2. To what extent is personality related to motivation?
3. To what extent does intrinsic and extrinsic motivation mediate the relationship between personality and knowledge worker productivity?

3.3 RESEARCH DESIGN

The research design is the overall plan or structure for executing the study (Groenewald, 1986). A research design connects "the conceptual research problem to relevant and practicable empirical research" (Ghauri & Gronhaug, 2010:54). It articulates the type of research (e.g. exploratory, descriptive or casual), the data collection method, the analysis of the data and the priorities of the researcher *(ibid,* 2010).

The proposed study will follow a cross-sectional associative research design. Cross- sectional research refers to research that is carried out at one point in time or over a short period of time without manipulating the environment or the participants (Ghauri & Gronhaug, 2010). Associative research is based on statistics that deal with associations, relationships or correlations between variables but does not indicate causality between the variables (Portwood, 2006; Upton & Cook, 2014). Associative statistics are a subsection of both classical statistics and Bayesian statistics, depending on the definition of probability that is used (Portwood,

2006). The aim of associative statistics is to make generalisations of measurable variables (Rogers, Sharp &Jennifer, 2011).

3.4 RESEARCH METHODOLOGY: QUANTITATIVE APPROACH

The proposed study employed a quantitative approach. Quantitative research places emphasis on the objective measurement and empirical analysis of data gathered by questionnaires and surveys that can be generalised across different groups of people (Babbie, 2012). This approach to research is generally associated with deductive reasoning, and it employs the use of experiments, surveys and the collection of data using predetermined instruments that yield statistical data (Creswell, 2013).

The quantitative approach to research is used when a theory and/or hypothesis is first conceptualised and then tested to confirm or disconfirm it (Neuman, 2006). Mukherji and Albon (2009) refer to this as the confirmatory stages of the research cycle, that is, firstly the development of the hypothesis, then the collection of statistical data to test the hypothesis. Thus, quantitative research "aims to measure, quantify or find the extent of a phenomenon, as opposed to qualitative methodology, which is usually more concerned with describing experiences, emphasising meaning and exploring the nature of an issue" (Mukherji & Albon, 2009: 14). The analysis and measurement of data to determine whether meaningful relationships exist between variables is therefore an important aspect of quantitative research (Sukamolson, 2007). The differences between quantitative and qualitative research are discussed in Table 8.

According to Johnson and Christensen (2008:34) quantitative research has the following characteristics:

- The confirmatory part of the research is emphasised.
- Behaviour is seen to be predictable and regular.
- Common aims of research are to explain and predict.
- The researcher is interested in understanding the general laws that apply to whole populations rather than particular groups.
- There is an attempt to study behaviour under controlled conditions with an attempt to isolate the effect of single variables.
- An objective approach is taken, that is, different observers should be able to agree to what is being observed.

- Data is based upon precise measurements using structured and validated data collection instruments.
- Data analysis aims to look at statistical relationships.

A quantitative approach to research has philosophical roots in a positivist paradigm (Neuman, 2006; Jablin & Putnam, 2000). A positivist paradigm is based on the assumption that all theories can and must be reduced to observable phenomena that can be explained (Jablin & Putnam, 2000). This requires objectivity from the researcher to ensure that the problem investigated is not manipulated but rather it reveals itself through the data collected (Bettis & Gregson, 2001).

Table 8: Reasons for selecting a qualitative or quantitative paradigm

Criteria	Quantitative Paradigm	Qualitative Paradigm
Researcher's world view	A researcher's comfort with ontological, epistemological, axiological, rhetorical and methodological assumptions of the quantitative paradigms	A researcher's comfort with ontological, epistemological, axiological, rhetorical and methodological assumptions of the qualitative paradigms
Training and experience of the researcher	Technical writing skills, computer statistical skills, library skills	Literary writing skills, computer text analysis skills, library skills
Researcher's psychological attributes	Comfort with rules and guidelines for conducting research; low tolerance for ambiguity; time for a study of short duration	Comfort with lack of specific rules and procedures for conducting research; high tolerance for ambiguity; time for lengthy study
Nature of the problem	Previously studied by others so that body of knowledge exists; known variables, existing theories	Exploratory research; variables unknown; context important; may lack theory base for study
Audience for the study	Individuals accustomed to be supportive of quantitative studies	Individuals accustomed to be supportive of qualitative studies

Source: Creswell (2003:9)

3.5 PLACEMENT OF THE RESEARCH METHODOLOGY: POSITIVIST PARADIGM

This research is based on certain assumptions and philosophical perspectives that guide the research approach and framework. As mentioned in the previous section, the philosophical assumption underlying this research is mainly grounded in a positivist paradigm which stems from ontological principles and doctrine (Racher & Robinson, 2002; Callaghan, 2013). According to this perspective, "knowledge stems from the human experience. It has an atomistic, ontological view of the world as comprising discrete, observable elements and events that interact in an observable determined and regular manner" (Collins, 2011:38). The positivist paradigm uses a scientific, systematic approach to research, which lends its self to the use of quantitative analysis (Mukherji & Albon, 2009). It adheres to the view that the world is made up of facts and truth, and reality is free and independent of the viewer and the researcher (Golafshani, 2003; Aliyu, Bello, Kasim & Martin, 2014). This view is based on the assumption that the world is founded on unchanging universal laws and everything that happens around us can be explained by the knowledge of these universal laws (Mukherji & Albon, 2009; Kasim & Martin, 2014).

As a general rule, positivist studies typically adopt a rational deduction approach (Crowther & Lancaster, 2012). Deductive reasoning refers to the process of drawing conclusions about something based on prior knowledge that is known or considered to be true (Mukherji & Albon, 2009). A deductive quantitative analysis of the relationship between personality traits, motivation and knowledge worker productivity was therefore deemed appropriate for this research based on the work and findings in the previous chapter. The other methodologies that are commonly used in positivist studies include confirmatory analysis, nomothetic experiments and laboratory experiments (Kasim & Martin, 2014).

According to Creswell (2003), the quantitative approach to research also falls into a post positivist paradigm for developing knowledge (Callaghan, 2013). Postpositivism is considered "an empirical, explanatory approach that maintains beliefs in observations" (Racher & Robinson, 2002: 464). This paradigm holds the view that a single true reality is not straightforward, that the objective and subjective realities cannot occur at the same time, that there is no universal source of knowledge, that findings cannot be confirmed to be true, and that inquiry is not purely objective (*ibid*, 2002). According to Guba and Lincoln (1994), postpositivism takes a realist perspective where imperceptibility have an existence and the

ability to explain how observable phenomena functions. Table 9 explains the difference between the different paradigms.

Compared to the other paradigms (see Table 9), the positivist perspective relates more to business studies, because business relationships are seen as the accumulation of the relationships between individual within and between organisations and positivism is one of the most suitable perspectives for studying the nature of relationships (Dudovskiy, 2013).

Table 9: The nature and extent of research paradigms

Issue	Positivism	Post positivism	Critical Theory et al.	Constructivism	Participatory
Ontology	Naïve realism-"real" Reality but apprehendable	Critical realism- "real" Reality but only imperfectly and probabilistically apprehendable	Historical realism-virtual reality shaped by social, political, cultural, economic, ethnic and gender values crystallized over time	Relativism- local and specific constructed realities	Participative reality-subjective- objective reality, co-created by mind and given cosmos
Epistemology	Dualist/objectivist: findings true	Modified dualist/objectivist; critical tradition/community; findings probably true	Transactional/subjective; value mediated findings	Transactional/subjective; created findings	Critical subjectivity in participatory transaction with cosmos; extended epistemology of experiential propositional and practical knowing; cocreated findings
Methodology	Experimental/manipulative; verification of hypothesis; chiefly quantitative methods	Modified experimental/ Manipulative; critical, multiplism; falsification or hypotheses; may include qualitative methods	Dialogic/dialectical	Hermeneutic/dialectical	Political participation in collaborative action inquiry; primacy of practical; use of language grounded in shared experimental context
Axiology	Propositional knowing about the world as an end in itself, is intrinsically valuable	Propositional knowing about the world as an end in itself, is intrinsically valuable	Propositional, transactional knowing is instrumentally valuable as a means to social emancipation, which is an end in itself, is intrinsically valuable	Propositional transactional knowing is instrumentally valuable as a means to social emancipation, which is an end in itself, is intrinsically valuable	Practical knowing how to flourish with a balance of autonomy, co-operation and hierarchy in a culture is an end in itself, is intrinsically valuable

Source: Aliyu, Bello, Kasim & Martin (2014:81)

3.6 POPULATION

The population of the study consisted of knowledge workers working in the legal, information technology and the engineering industry within South Africa. Knowledge workers are defined as workers that have high degrees of expertise, education or experience and whose primary task is to create, distribute or apply knowledge (Davenport, 2005). These groups of workers therefore fall within this category.

Drucker (2001) referred to these groups of knowledge workers as 'Knowledge Technologists'. These knowledge workers do not like to identify themselves as workers, but rather as professionals – "thus as equals, deserving of respect, rather than the derogatory 'master/servant' relationship implied in so many employment contracts" (Graves, 2002:4). Knowledge technologists have portable skills that are embedded in themselves rather than in equipment or machines that are controlled by someone else (Graves, 2002; Amar, 2004; Mäki, 2008). Additionally, knowledge technologists are likely to owe their loyalty to their disciplines and communities of practice (e.g. the law society, computer society of South Africa), rather than to an organisation (Graves, 2002). Consequently, organisations have to work harder to build and maintain relationships with highly skilled knowledge technologists, and not the other way around *(ibid*, 2002).

The work that these knowledge workers perform is based on a substantial amount of theoretical knowledge which can only be gained through formal education (Drucker, 2001). "Just as unskilled manual workers in manufacturing were the dominant social and political force of the 20th century, knowledge technologists are likely to become the dominant social and perhaps also political force over the next decades" (Drucker, 2001: 3).

Previous studies on knowledge worker productivity have mainly examined single-profession knowledge workers (Sutherland, 2004; Storesund & Rasmussen, 2011; Petroni & Colacino, 2008) with a main focus on information technology employees (Scarbrough & swan, 1999; Brown & Eisenhardt, 1998; Swart et al, 2003). This has limited the generalisability of the findings. Thus, using different groups of knowledge workers revealed boundary conditions to tested theory that relates to industry-related contextual influences which is hoped to greatly increase the generalisability of the findings. Additionally, not all knowledge workers are the same (Hammer, Leonard & Davenport, 2004). The complexities of knowledge work vary greatly in the amount and kind of formal knowledge required depending on the industry and the job requirements (Drucker, 1994). Using different groups of knowledge workers enabled the researcher to segment and to identify and compare whether different factors cultivated or

hindered knowledge worker productivity in the different industries. This provided a more comprehensive understanding of knowledge worker productivity.

3.7 SAMPLING TECHNIQUE

The participants of the study were 136 knowledge workers from the legal (11%), information technology (59%) and engineering industry (30%) within South Africa. As indicated in Table 12, the sample was predominantly male (65%), held a bachelor's degree (52%) and were primarily in their twenties (65%). The demographic characteristics of the sample are reported in Chapter 4.

In order to achieve the desired sample size, the snowball sampling method was employed (Atkinson & Flint, 2001; Sutherland, & Jordaan, 2004; Biernacki & Waldorf, 1981). Snowball sampling, also referred to as referral sampling is a non-probability sampling technique that "yields a study sample through referrals made among people who share or know of others who possess some characteristics that are of research interest" (Biernacki & Waldorf, 1981: 141). This sampling technique is often used when members of the target population are concealed and hard to locate or when a sampling frame is not available, which makes it impossible or impractical to use probability sampling (Atkinson & Flint, 2001; Katz, 2006; Handcock & Gile, 2011). Snowball sampling takes advantage of the social networks identified by the researcher and initial respondents, which provides the researcher with an increasing set of potential contacts (Atkinson & Flint, 2004).

The snowballing technique was employed by the researcher identifying initial knowledge workers within the target population that work within the legal, information technology and engineering industry. These knowledge workers were asked to take part in the research by filling in an online questionnaire. The researcher then asked the initial knowledge workers who agreed to fill in the online questionnaire to help identify other knowledge workers that may be willing to participate in the study. The initial knowledge workers provided the names and contact details (specifically email addresses) of other knowledge workers that fit the criteria of the study (knowledge workers working within the legal, IT and engineering industry). The researcher then followed up with the referrals. In this respect, the initial sample of knowledge workers helped identify additional units that made up the sample for the study. This process was repeated until the desired sample size was reached (Goodman, 1961; Atkinson & Flint, 2001, 2004). Participation was completely voluntary and all the participants were ensured anonymity and confidentially. Because snowball sampling does not use a sampling frame to

identify sample members, snowball samples are liable to biases (Katz, 2006). Snowball sampling nonetheless is considered to be an effective sampling method depending on the research design and the choice of the research method (Atkinson & Flint, 2001). Additionally, snowball sampling is an economical, efficient, and effective technique for collecting data (*ibid*, 2001).

Snowball sampling was the most viable method for gathering data for this study given the researcher's limited access to the target population, the difficulty in populating a sampling frame, and the general lack of public research databases in South Africa (Atkinson & Flint, 2001; Goodman, 1961; Biernacki & Waldorf, 1981). This method provided comprehensive findings in a short time frame given the nature of the research design of the study i.e. cross-sectional research design (Atkinson & Flint, 2001). Snowball sampling can therefore be considered as an alternative or complementary strategy for collecting comprehensive data *(ibid*, 2001).

3.8 DATA COLLECTION METHOD

The study employed a survey technique to collect the data. Survey research involves the researcher systematically asking a large number of people a set number of questions and then capturing their responses (Neuman, 2006). Questionnaires were used to collect the data. Questionnaires are printed self-reported forms that are used to collect demographic data and participant's opinions (Rogers, Sharp & Jennifer, 2011). Survey questionnaires provided a cheap, quick, efficient and accurate technique for collecting and analysing data statistically about the target population (Nguyen, 2010). There are four basic types of surveys: face to face interviews, telephone interviews, self-administered questionnaires and web surveys (Neuman, 2006). Table 10 highlights the advantages and disadvantages of the different survey methods indicated by Neuman (2006).

This study employed the use of web surveys. Web surveys are either distributed via email or web-site questionnaires, which required the respondents to either return the questionnaire via email or to fill in the questionnaire online (Nguyen, 2010). An online questionnaire method was used to collect the data. This method required the researcher to obtain the contact details of the initial identified knowledge workers within the target population (legal, information technology and engineering industry) by employing the snowball sampling method (Atkinson & Flint, 2001; Sutherland, & Jordaan, 2004; Biernacki & Waldorf, 1981). This involved the researcher leveraging the social networks that existed between members of the target

population that were either known to or identified by the researcher (Goodman, 1961). These known or identified members of the target population were requested to complete the online questionnaire and then electronically distribute the link to the questionnaire along with a cover letter explaining the nature of the research study via email to other knowledge workers within the target population. Participants were informed in the cover letter and email that clicking the link to the questionnaire would be taken as an indication of consent to participate in the research. This method was employed until the desired number of questionnaires was reached. This process guaranteed the anonymity and confidentially of the participants at all times. The questionnaire with the link to the survey and the cover letter are included in the Appendix.

Online questionnaires provided an acceptable means of collecting data because an increasing number of people have access to the internet and electronic communication has now become the primary source of communication (Wright, 2006; Couper, 2000). Additionally, using online questionnaires eliminated the geographical boundaries that would have limited the study sample to only Johannesburg, where the researcher is situated (Wright, 2006). Furthermore, online questionnaires were used because they are a quick and cost-effective means of collecting data compared to the other survey methods discussed in Table 10 (Neuman, 2006; Szolnoki & Hoffmann, 2013; Wright, 2006). Additionally, online questionnaires allow for verification and automatic capture of data and direct data entry for real time data analysis, which minimised potential administrative errors (Nguyen, 2010). According to Neuman (2006), the biggest disadvantage of using online questionnaires, is the prospect of limited access to the internet. Access to the internet was not a concern for this study, given that the participants were all knowledge workers who have access to and use information communication technologies (ICTs) in the course of their daily work tasks (Subashini & Vivek, 2012; Palvalin, Lönnqvist & Vuolle, 2013).

Table 10: Types of surveys and their characteristics

Features	Mail questionnaire	Telephone interview	Face-to face interview	Web-page survey
Administrative issues				
Cost	Cheap	Moderate	Expensive	Cheapest
Speed	Slowest	Fast	Slow to moderate	Fastest
Length (number of questions)	Moderate	Short	Longest	Moderate
Response rate	Lowest	Moderate	Highest	Moderate
Research control				
Probes possible	No	Yes	Yes	No
Specific respondent	No	Yes	Yes	No
Question sequence	No	Yes	Yes	Yes
Only one respondent	No	Yes	Yes	No
Visual observation	No	No	Yes	Yes
Sources with different questions				
Visual aids	Limited	None	Yes	Yes
Open-ended question	Limited	Limited	Yes	Yes
Contingency questions	Limited	Yes	Yes	Yes
Complex questions	Limited	Limited	Yes	Yes
Sensitive questions	Some	Limited	Limited	Yes
Sources of bias				
Social desirability	No	Some	Worse	No
Interview bias	No	Some	Worse	No
Respondent's reading skills	Yes	No	No	Some

Source: Neuman (2006:300)

3.9 MEASUREMENT INSTRUMENT

An exploratory factor analysis (EFA) was applied to the raw data to ensure that the structure of the constructs conformed to that predicted by the theoretical framework of the study. This process was scientifically applied to all the scales to ensure that the scales measured what they are supposed to measure.

3.9.1 Personality

The revised Neo Personality Inventory (NEO-PI-R) was used to measure the individual personality traits of the knowledge workers (Costa & McCrae, 1992). The NEO-PI-R provides a comprehensive measure of the big five personality dimensions (McCrae & Costa, 1992, 2003). The big five personality dimensions: Neuroticism, Extraversion, Agreeableness, Openness to experience and Conscientiousness are measured using six subfactors of each of the five personality traits (Renner, 2002; Costa & McCrae, 1992). The questions consist of 240 items that are measured using a five point Likert scale (ranging from *1= strongly agree to 5=strongly disagree*) (Rosellini & Brown, 2011; McCrae & Costa, 2003).

The NEO-FFI is the most widely used measure of the big five personality dimensions (Renner, 2002; Rosellini & Brown, 2011). The measure has been translated into a number of different languages and it has consistently shown validity and utility in different contexts (McCrae & Costa, 2003; Rosellini & Brown, 2011).

A total of 240 items were used to measure personality. The cronbach alpha coefficient for the scale in this study was 0.91 (α= .91). Sample items included 'I believe that laws and social policies should change to reflect the needs of a changing world' and 'I consider myself broad-minded and tolerant of other people's lifestyles'.

3.9.2 Extrinsic and Intrinsic motivation

The work Extrinsic and Intrinsic motivation scale (WEIMS) was used to measure motivation (Taylor & Pelletier, 2009). The WEIMS scale has 18 items that measure work motivation grounded in Deci and Ryan's Self-determination theory framework (Taylor & Pelletier, 2009). A study by Maxime, Blanchard, Taylor, Sara, Pelletier, Villeneuve and Martin (2009) on the WEIMS scale found the measure to applicable to an organisational setting and the results indicated adequacy of both the scale's construct validity and external consistency. Motivation will be measured using a five point Likert scale (*ranging from 1= does not correspond at all to 5= corresponds exactly).*

3.9.3 Knowledge worker productivity

Productivity measures have been examined in various fields of study including economics, accounting, management, psychology, human resource management and industrial engineering (Phusavat, 2013). There are different measures of productivity and the choice between them is dependent on the either the purpose of the productivity measure and/or the availability of the data (OCED, 2001). Additionally, due to the lack of simple measures for productivity, the various methods employed measure several factors that are considered to affect the productivity of people (Sullivan, Baird & Donn, 2013).

The concept of productivity can be mainly divided into two factors: performance and financial measures (Mohanta & Thooyamani, 2010). Performance is an important concept in work, industrial and organisational psychology (Roe, 1999; Awadh & Wan Ismail, 2012). Performance based research "covers a wide array of topics, including the analysis of environmental factors (noise, temperature), the study of task characteristics, the assessment of personality in personnel selection, the analysis of human error, the study of work team effectiveness, and so on" (Roe, 1999: 231). Financial factors on the other hand focus on the value of output in monetary terms (Mohanta & Thooyamani, 2010). Given the complex nature and characteristics of knowledge work and knowledge workers, knowledge worker productivity was measured subjectively as employee job performance. Job performance was selected because "job performance has always been reported as a significant indicator of organisational performance regardless of how it is conceptualised" (Johari & Yaya, 2012: 17). Previous productivity measures used to measure knowledge productivity have often concentrated on quantifiable measures (Erne, 2011; Mohanta & Thooyamani, 2010). These measures however are often highly limited and inappropriate for measuring knowledge work (Sullivan, Baird & Donn, 2013). Job performance measures on the other hand take into account the aspects of knowledge work that are not quantifiable such as quality, attributes of behaviour and task-related aspects (Sullivan, Baird & Donn, 2013; Awadh & Wan Ismail, 2012; Roe, 1999). Thus, job performance was considered to be appropriate to analyse the construct of productivity for this research.

Job performance can be defined as "a multi-dimensional construct which indicates how well employees perform their work tasks, the initiative they take and the resourcefulness they show in solving problems" (Rothmann & Coetzer, 2003:68). Furthermore, job performance indicates the extent to which employees complete their assigned tasks, how they utilise the available resources and the time and energy they spend on completing a task (*ibid*, 2003). Job

performance can be categorised into 'can do' and 'will do' (Johari & Yahya, 2012). '*Can do*' refers to the knowledge, skills and the ability that one must have to perform a specific job. On the other hand, *'will do'* refers to motivation that an individual has to perform his or her work duties (Johari & Yahya, 2012). Job performance will be measured using two dimensions, task performance/ in-role- performance (*'can do'*) and organisational citizenship behaviour (OCB) *('will do').* Task performance refers to the effectiveness with which employees perform activities or actions that contribute to the technical core of the organisation either directly or indirectly by providing the materials and services it needs (Borman & Motowidlo, 1997; Hernaus & Mikulic, 2014). Task performance also measures an employee's level of achievement at assigned job duties (William & Anderson, 1991). The dimension of task performance tends to be theoretical and it is determined by procedural knowledge (knowledge about how to do something or how to perform), declarative knowledge (knowledge based on facts that describes how things are), and one's ability and job experience (Johari & Yahya, 2012). Task performance will be measured using a seven item measure adapted from William and Anderson (1991). Using a 5 point Likert scale, (ranging from 1=does not correspond at all to 5= corresponds exactly) knowledge workers were asked to rate their work performance on work related tasks. An example of items includes "I adequately complete assigned work duties".

OCB (*'will do'*) on the other hand refers to individual discretionary behaviour that encourages the effective and efficient functioning of the organisation through the realisation of organisational goals (William & Anderson, 1991; Johari & Yahya, 2012; Coldwell & Callaghan, 2013). OCBs are seen as extra role behaviours beyond the expected or required scope of an employee's job design that demonstrate conscientious behaviour that supports the organisation (Podsakoff et al., 1990, Kim, 2006; Borman & Motowidlo, 1997). The definitions of OCB are associated with behavioural traits that are not explicitly specified in the job description or enforced by the employment contract and therefore a matter of personal choice (Johari & Yahya, 2012; Kumar, Bakhshi & Rani, 2009; Singh & Singh, 2009).

According to Organ (1990) individual differences provide the most valuable explanation of OCBs. Furthermore, the "antecedents (individual characteristics, task characteristics, organisational characteristics and leadership characteristics) to OCB can better be understood as individual dispositions related to conscientiousness and to any dispositions that can be confidently and empirically tied to the characteristic level of morale in the work place" (Coldwell & Callaghan, 2013: 4). The relationship between personality and OCB is based on

the same assumption that draws associations between general attitudes and behaviour (Organ, 1994). Personality however, only has predictive power in what Mischel (1977) calls "weak situations". Weak situations refer to situations "that are devoid of compelling external incentives and lacking in demand characteristics for behaviour" (Organ, 1994:466). OCB is considered to be behaviour that occurs in 'weak situations', where personality traits are likely to manifest themselves within behaviour (Aykler, 2010).

Organ (1994) describes the relationship between personality and OCB as somewhat elusive and unclear despite his own findings that link personality to OCB. A taxonomy by Borman & Motowidlo (1997) of contextual performance which has elements of OCB, found personality to be a successful predictor of contextual performance. Borman and Motowidlo (1997) argue that personality or dispositional variables predict the contributions that individuals make to support the social and psychological context in which the technical core or task performance functions. However, unlike OCB, contextual performance "does not require that the behaviour be extra role nor that it be non-reward" (Organ, 1997:91). Consequently, the motives behind contextual performance "might well lie within the explicit expectations of what constitutes appropriate role behaviour and some could well earn emoluments from the formal reward system via the effect on performance appraisals" (*ibid*, 1997:91). Other studies (Organ & Ryan, 1995; Elanain, 2007; Kumar, Bakhshi & Rani, 2009; Ilies, Fulmer, Spitzmuller & Johnson, 2009; Singh & Singh, 2009; Chiaburu, Oh, Berry, Li, & Gardner, 2010) also found individual differences to be a predictor of OCB behaviour. These findings support the dispositional foundation of OCB. A scale adapted from Podsakoff et al (1990) was used to measure OCB. The scale consists of five factors identified by Bateman and Organ (1988) used to measure OCB (Podsakoff et al 1990: 115):

- Altruism- Discretionary behaviour that has the effect of helping a specific other person with an *organisationally relevant* task or problem.
- Conscientiousness- Discretionary behaviours on the part of the employee that go well *beyond the minimum role requirements* of the organisation, in the areas of attendance, obeying rules and regulations, taking breaks and so forth.
- Sportsmanship- Willingness of employee to tolerate less than ideal circumstances without complaining –to avoid complaining, petty grievances, railing against real or imagined slights, and making deferral cases out of small potatoes.
- Civic virtue- Behaviour on the part of an individual that indicates that he/she responsibly participates in, is involved in, or is concerned about life of the company.

- Courtesy- Discretionally behaviour on the part of an individual aimed at *preventing* work-related problems with others from occurring.

Task performance and organisational citizenship behaviour were integrated to measure knowledge worker productivity, firstly, because task performance and OCB are behavioural aspects of job performance that are closely intertwined and difficult to differentiate from another (Vey & Campbell, 2004; Johari & Yahya, 2012). Secondly, OCB contributes to the maintenance and/or enhancement of the social and psychological environment that supports task performance (Organ, 1997; Coldwell & Callaghan, 2013). Additionally, these two dimensions of performance measure different aspects of job performance, but when integrated they provide a more holistic measure of job performance that takes into account the psychological and technical aspects of job performance (Johari & Yahya, 2012). These two dimensions of job performance therefore complement each other, and both items are important in determining the quality of work that is responsible for enhancing the performance of an individual (Hernaus & Mikulic, 2013). Quality rather than quantity is the "essence of output" when it comes to knowledge work (Drucker, 1999: 84). Further, studies have found that broad measures of performance enhance its reliability (Kim, 2006).

In conclusion, after cleaning and transforming the data, a total of 29 items (α= 0.85) adapted from William and Anderson (1991) and Podsakoff et al (1990) were used to measure knowledge worker productivity. The alpha coefficient for job performance was 0.85. Sample items include 'I adequately complete assigned tasks' and 'I help others who have heavy work loads'.

3.10 DATA ANALYSIS

This study sought to investigate the relationship between personality and knowledge worker productivity with the mediating effect of motivation. This section will provide a description of how the data was analysed and how each hypothesis was rejected or failed to be rejected.

Once the data collected process was completed, the data was subjected to a process of cleaning and transformation to ensure the accuracy of the data and to account for any missing values. Descriptive statistics were employed to provide a description and explanation of the data. The data was then analysed using SAS software, version 9.3.

Using SAS, multiple linear regression was employed to test the theoretical model (Figure 1). Multiple linear regression analysis is a flexible system that is used to analyse the relationship

between a collection of independent variables or predictor variables (X) and a dependent variable (Y) (Aiken, West & Pitts, 2003; Brant, 2007). The purpose of multiple linear regression is to predict, explain and build theory (Orloy, 1996). Multiple linear regression was employed to ensure the soundness of the data analysis process and to increase the confidence in the results (Brant, 2007). The multiple linear regression model equation is expressed as follows (Aiken, West & Pitts, 2003; Brant, 2007):

$$y_i = \beta_0 + \beta_1 X_i + \beta_2 X^2_i + \varepsilon_i$$

The regression equation for the predictor variable is given as (Aiken, West & Pitts, 2003; Brant, 2007):

$$y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots\ldots\ldots + \beta_p X_{pi} + \varepsilon_i$$

3.11 ANALYSIS OF THE HYPOTHESES

The following multiple linear regression analyses were used to analyse the hypotheses represented in the theoretical model in Figure 1.

3.11.1 Stepwise or Statistical Regression

Linear regression was used to analyse the associations between the big five personality traits and knowledge worker productivity reflected in Hypothesis 1: Personality is significantly associated with knowledge worker productivity. Stepwise regression was used to evaluate the most useful set of personality traits (independent variables) that are the most effective in predicting knowledge worker productivity. The analysis involved analysing the data first with all the covariates in the regression model. Each personality trait was then added to the model one at a time (on top of the covariates), and the change in the R squared value after the personality variable had been added was noted. This was done with all the raw data and then the process was repeated once all the outliers were removed and the dependent variable had been transformed. The purpose of the analysis was to determine the overall fit of the model (Lewis, 2007). This process was repeated for the remaining variables to see which variables gave the best improvement in the fit of the regression equation. When the additional variables could no longer make a statistically significant improvement in the R squared value, the analysis was concluded (Lewis, 2007).

3.11.2 Generalised Linear Model

Generalised linear models (GLM) were used to analyse the following hypotheses:

H2: *Personality is significantly associated with extrinsic motivation.*

H3: *Personality is significantly associated with intrinsic motivation.*

H4: *Extrinsic motivation mediates the relationship between personality and knowledge worker productivity.*

H5: *Intrinsic motivation mediates the relationship between Personality and knowledge worker productivity.*

H6: *Industry, education and gender significantly moderate the relationship between the big five personality traits and knowledge worker productivity*.

H7: *Industry, education and gender significantly moderate the relationship between the personality traits and intrinsic motivation.*

H8: *Industry, education and gender significantly moderate the relationship between personality and extrinsic motivation.*

General linear models are an extension of the traditional linear models that allow all the predictive variables to be analysed in the regression model at the same time (McCullagh & Nelder, 1989). The advantage of using GLM is that it (Jack, 2007:1):

- Provides a general theoretical framework for many commonly encountered statistical models and it;
- Simplifies the implementation of these different models in statistical software, since essentially the same algorithm can be used for estimation, inference and assessing model adequacy for all GLMs.

3.12 RELIABILITY

Reliability refers to the extent to which a measure is consistent and stable over time (Ghauri & Gronhaug, 2010). It is concerned with the question or the idea of whether the results of the study can be replicated or repeated (Bryman & Bell, 2011). Reliability is "therefore the consistency of a measure of a concept and a reliable measure needs to display stability, internal reliability and inter-observer consistency" (Callaghan, 2013: 187). This is a fundamental requirement of any measure. There are three types of reliability in quantitative research (Golafshani, 2003:589):

1. The degree to which a measurement, given repeatedly, remains the same,
2. The stability of a measurement over time; and

3. The similarity of measurements within a given time period.

Reliability was addressed in this study by:

- Ensuring that the questionnaire was constructed and worded in a manner that was clearly understood by all participants (Williams, 2008).
- Using statistical procedures such as the Cronbach alpha test, which was used to measure the internal reliability of the items (Roberts, Priest & Traynor, 2006)? The coefficient alpha measure (α) is used to estimate the correlation between the items used to capture the underlying construct represented in the theoretical model in Figure 1 (Ghauri & Gronhaug, 2010). The reliability of results that relate to each hypothesis is discussed in the next chapter.

3.13 VALIDITY

Validity refers to the extent to which the test instrument truly measures what it intended to measure (Golafshani, 2003). Validity "is concerned with the integrity of the conclusions that are generated from a piece of research" (Bryman & Bell, 2011: 42). According to Bryman and Bell (2011: 42), there are three main types of validity that are usually distinguished:

1. **Measurement validity** is often referred to as construct validity. Essentially, it is to do with the question of whether or not a measure that is devised of a concept really does reflect the concept that it is supposed to be denoting. Construct validity was achieved by carefully considering the theory that underlined the constructs that were measured.
2. **Internal validity** mainly relates to the issue of causality. It is concerned with the question of whether a conclusion that incorporates a causal relationship between two or more variables holds water. This study did not infer any causality between the variables; therefore internal validity was not applicable in this context.
3. **External validity** is concerned with the question of whether the results of the study can be generalised beyond the specific research context. It is in this context that the issue of how people and organisations are selected to participate in the research becomes crucial. External validity is one of the main reasons why quantitative researchers are so keen to generate representative's samples. External validity was achieved by using a selective technique such as snowball sampling, which ensured that various knowledge workers were adequately represented (Lowhorn, 2007).

3.13 LIMITATIONS OF STUDY

The following are the limitations of the research that had to be taken into consideration and addressed by the researcher during the course of the research.

3.13.1 Self-reported data

The data collected using the questionnaires was self-reported. This raised the issue of potential common method bias in the findings (Polkinghorne, 2005). This is due to the assumption that common method bias inflates the relationship between variables that are measured by self-reported data (Conway & Lance, 2010). However, Chan (2009) and Conway and Lance (2010) argue against what they consider to be the misconception that self-reports yield poor quality data. This is not to say that common method bias does not affect research findings. Instead, researchers should be able to provide a strong rationale for choosing self-reports as a method of data collection (Conway & Lance, 2010). Thus, for the purpose of this research self-reports of knowledge worker productivity, personality traits and motivation were used because knowledge workers are better suited to describe their own personalities as well as explain what factors they perceive influence and motivate their productivity in a working environment.

3.13.2 Social desirability bias

Another limitation associated with self- reports, is the issue of social desirability bias. Social desirability "refers to the tendency to respond to self-report items in a manner that makes the respondent look good rather than to respond in an accurate and truthful manner" (Holtgraves, 2004:161). Knowledge workers in this study may have underreported personality traits that they assumed to be negative or deviant behaviour in regards to OCB that may have made them look bad. This may account for the high skewness and kurtosis in measuring knowledge worker productivity.

3.13.3 Longitudinal effects

The research design for the study is cross-sectional, which presents a limitation. In order to mitigate this limitation to a certain extent, theory was used to test and specify the relationships between the variables. Additionally, quantitative research cannot provide causal understanding of the relationship between personality, motivation and knowledge worker productivity. But rather, it can only test the theory in a specific context. Therefore, it was not possible to infer whether a causal relationship existed between the factors that influence knowledge worker

productivity and increase in performance (Ghauri & Gronhaug, 2010; Sutherland, & Jordaan, 2004). Results were therefore taken to either support or contend theoretical predictions.

3.14 ETHICAL CONSIDERATIONS

Researchers have the moral responsibility to ensure that their research is based on sound ethical standards that protect the rights of the research participants and the integrity of the research findings (Aguinis & Henle, 2002). Ethics in research refers to moral principles or values that guide the researcher during the course of the research (Ghauri & Gronhaug, 2010). For the purpose of this research, ethical issues were upheld in the following ways:

- Before the researcher started the data collection process, a research proposal was submitted to the university's ethical committee for approval.
- Full disclosure of the study was made available to all the participants (Aguinis & Henle, 2002).
- Participation was completely voluntary and there was no risk or harm involved during the course of the research (Saunders et al., 2011; Berg & Lune, 2004).
- Consent was obtained from all participants before they took part in the research (Berg & Lune, 2004; Aguinis & Henle, 2002; Ghauri & Gronhaug, 2010).
- Only questions relevant to the research were asked and the researcher exercised full discretion to ensure that the confidentially of all the participants was maintained. This was done by ensuring that no private information was disclosed by the participants and the responses were securely stored (Aguinis & Henle, 2002; Ghauri & Gronhaug, 2010; Berg & Lune, 2004).
- Anonymity of the participants was maintained by not requesting the participants to disclose their names or any other information that would compromise their identity (Berg & Lune, 2004; Saunders et al., 2011). This required the use of self-reports, which raised the issue of common method bias. However, in order to maintain anonymity, this was considered to be necessary.

3.15 CONCLUSION

The purpose of this research was to investigate the relationship between personality and knowledge worker productivity with the mediating effect of motivation. This chapter described and discussed the methodology applied to the study. The research design and the quantitative component of the research was discussed in relation to the research paradigms of positivist and postpositivist. The sampling technique, the study population, the data collection method, and

the issues of reliability and validity were considered. The process used to formulate the measurement scales was explained as well as the ethical considerations and limitations of the study. The next chapter will report and discuss the results and analysis of the research findings.

CHAPTER 4

RESEARCH RESULTS AND DISCUSSION

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

4.1 INTRODUCTION

The previous chapter discussed the research methodology that provided the basis for testing the theoretical model and hypotheses discussed in Chapter 1. This chapter will provide the analysis and discussion of the statistical research findings. In the quantitative analysis, three key notions of work and organisational psychology, namely Personality, Motivation and Job performance were tested empirically to provide a holistic understanding of knowledge worker productivity. The results that relate to each hypothesis, which were derived from the theoretical framework discussed in Chapter 2, are described in this chapter. In the following sections, the multiple linear regression analyses are discussed and reported by the hypotheses tested. Firstly, the descriptive statistics that describe the profile of the target population are reported. Secondly, the normal distribution of the data in regards to skewness and kurtosis is examined and discussed for the purpose of the multiple linear regression analyses. Thirdly the results of the multiple linear regression analyses are reported and discussed, and the tests of assumptions for the statistical method are also reported, relating to each hypothesis tested. This chapter therefore provides the basis for the discussions and conclusions provided in Chapter 5. The reporting of the descriptive statistics is under taken as follows.

4.2 THE PROFILE OF THE TARGET POPULATION

The participants were classified according to their gender, age, level of education, occupation, job position and the number of years that they have been employed.

As showed in Table 11, and Figure 3, approximately two thirds (65.44%) of the respondents were male and approximately one third were female (34.56%). The majority of the respondents (38.24%) were between the age of 26-30 years (see Table 12 and Figure 4). Majority of the participants (26.47%) were below the age of 25years, 25.74% were between the ages of 31 to 40 years old. The respondents above the age of 40 were 9.5%. Based on the figures, we can conclude that majority of the respondents (64.71%), were in there twenties. Table 13 and Figure 4, demonstrate that the highest level of education achieved by the majority of the respondents was a bachelor's degree (51.88%), followed by a masters (17.29%), and a certificate or diploma (14%).

Table 11: The gender of the participants

Gender		
Gender	Frequency	Percent
Male	89	65.44
Female	47	34.56

Figure 3: The gender of the participants

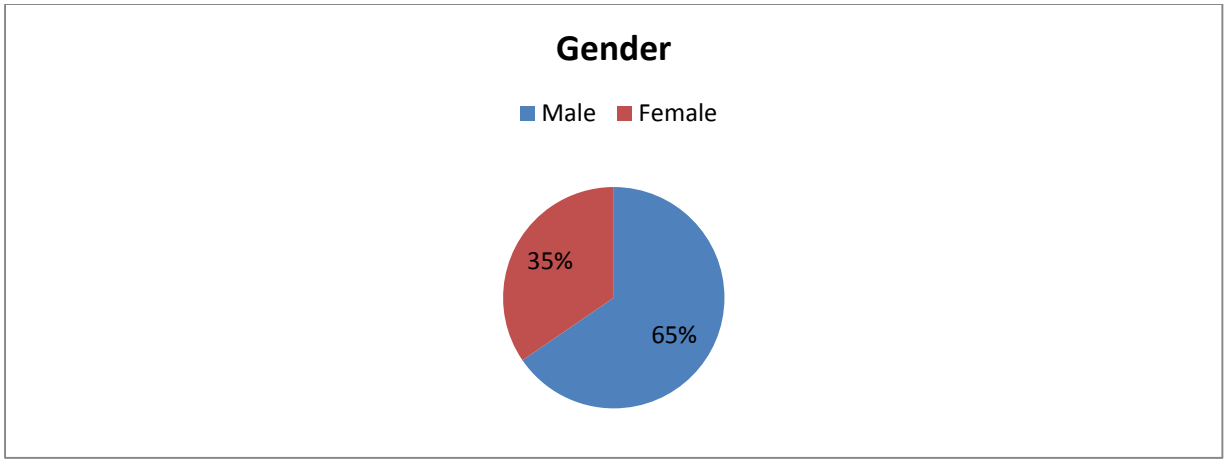


Table 12: The age of the respondents

Age		
	Frequency	**Percent**
Less Than 25 Years Old	36	26.47
26 - 30 Years Old	52	38.24
31 - 40 Years Old	35	25.74
More Than 40 Years Old	13	9.56

Table 13: Level of education

Education Level		
	Frequency	Percent
Honours	13	9.77
Certificate/Diploma	18	13.53
Bachelor Degree	69	51.88
Masters	23	17.29
Other	10	7.52
Frequency Missing = 3		

Figure 4: Education level

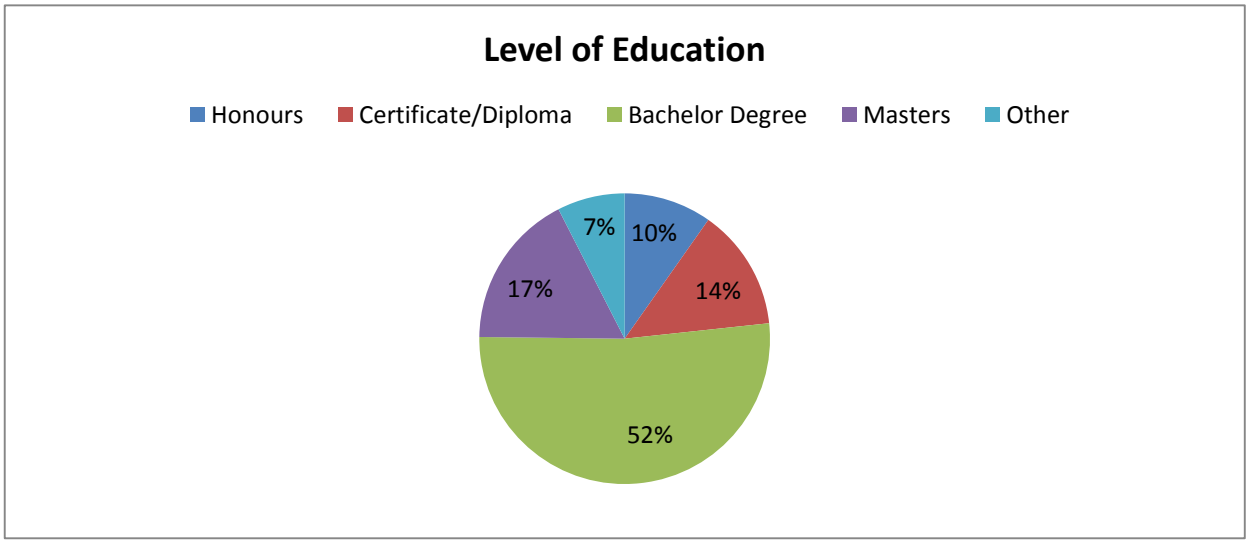


Table 14: Industry

Industry		
Industry	Frequency	Percent
IT	80	59.26
Engineering	39	28.89
Legal	16	11.85
Frequency Missing = 1		

Table 14 shows that majority of the respondents worked in the IT industry (59.26%), followed by engineering (28.89%) and legal (11.85%). Majority of the respondents did not hold

managerial roles (64%), while 33% held managerial roles. The remaining 3% did not know whether they held a managerial role or not.

Figure 5: Industry

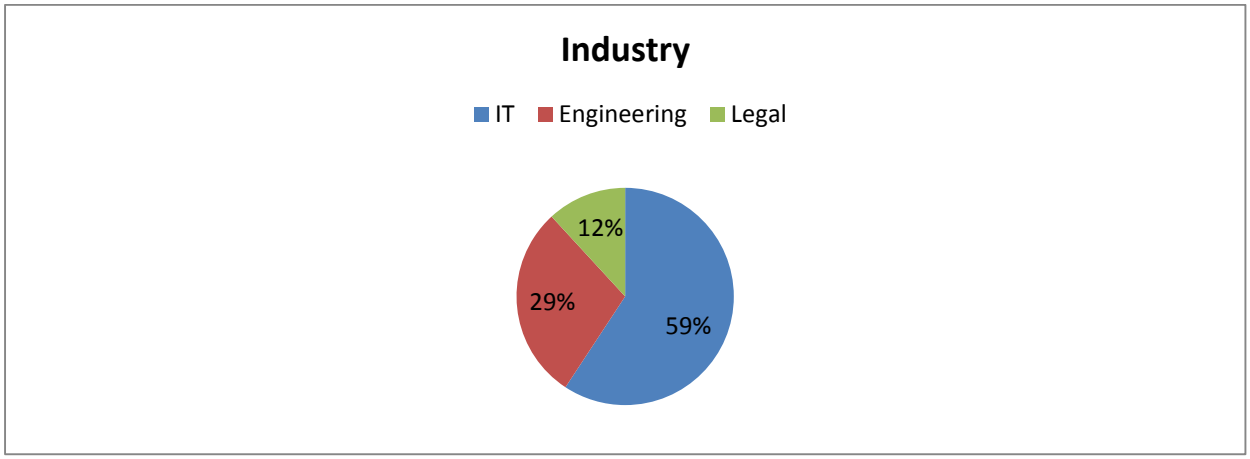


Table 15: Job position/Function

Manager or Not		
	Frequency	Percent
Yes	45	33.09
No	87	63.97
I Do Not Know	4	2.94

Figure 6: Job/Function

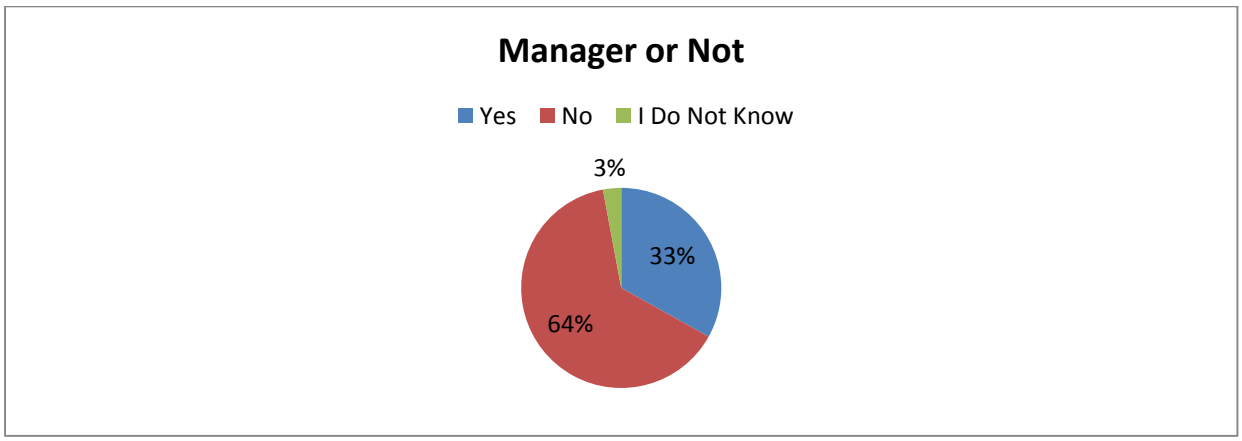
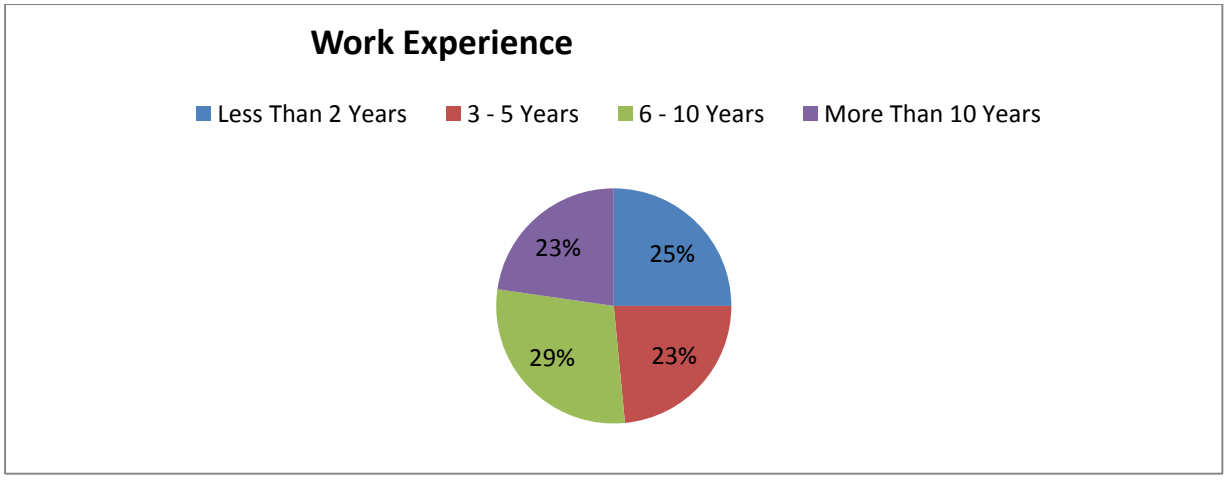


Table 16: Work experience

Work Experience		
	Frequency	**Percent**
Less Than 2 Years	33	25
3 - 5 Years	31	23.48
6 - 10 Years	38	28.79
More Than 10 Years	30	22.73
Frequency Missing = 4		

As shown in Table 16 and Figure 7, majority (28.79%) of the respondents have between 6-10 years' work experience. 25% of the respondents have less than 2 years' work experience, 23.48% have 3-5 years' work experience and 22.73% have more than 10 years' work experience. The few years of working experience can be accounted for by the fact that majority of the respondents (64.71%) are in their twenties and most likely entering the job market for the first time.

Figure 7: Work experience



4.3 NORMALITY ASSESSMENT

The assumption of normality is of great concern in studies that use regression or liner models (Field, 2009). The skewness of a distribution refers to the lack of symmetry (Brown, 2011). If skewness is positive, the data is considered to be positively skewed or skewed to the right (Brown, 2011). On the other hand if skewness is negative, the data is considered to be negatively skewed or skewed to the left (Brown, 2011). A normal distribution has skewness of about zero (Brown, 1997; Fields, 2009). Therefore values closer to zero are considered to have normal or symmetrical distribution. On the other hand, if values of skewness are greater than 2, the data is considered not to be normally distributed (Field, 2009; Brown, 1997). Based on these assumptions, the absolute values of skewness in this study, represented in Table 17, were between -2 and 2, which is an acceptable range for skewness. Therefore the assumption of normality was satisfied for this study.

The measure of kurtosis on the other hand refers to "the standardised fourth population moment about the mean" (Decarlo, 1997:292). Kurtosis measures the height and sharpness of the peak of the data relative to the rest of the data (Brown, 2011). A normal distribution has a kurtosis of three, while a kurtosis greater than three (β_2-3>0) refers to a positive kurtosis (leptokurtic) and a kurtosis less than three (β_2-3<0) refers to a negative kurtosis (Decarlo, 1997; Balanda & MacGillivray, 1988). The kurtosis values for this study are less than three (β_2-3<0), therefore the data has a negative kurtosis (platykurtic) which indicates a higher shaper peak with a longer flatter tail (Decarlo, 1997; Balanda & MacGillivray, 1988; Brown, 2011).

Table 17: Skewness and Kurtosis

Descriptive Statistics and Analysis of Location after outliers				
Variable	**Mean**	**Std. Deviation**	**Skewness**	**Kurtosis**
Knowledge worker Productivity	3.348	0.317	0.074	-0.049
Intrinsic Motivation	3.440	0.829	-0.717	0.638
Extrinsic Motivation	2.845	0.557	-0.666	-0.085
Neuroticism	3.006	0.601	0.142	-1.001
Extraversion	3.017	0.504	0.409	-0.957
Openness	2.850	0.516	0.221	-0.762
Conscientiousness	3.019	0.531	-0.059	-0.823
Agreeableness	3.027	0.694	-0.227	-0.964

4.4 PEARSON CORRELATION COEFFICIENT

Table 18 shows the inter-correlations between personality, motivation and knowledge worker productivity. The results in the table indicate the strength of the linear relationships between the predictive variables, X (the big five personality traits and intrinsic and extrinsic motivation) and the dependent variable, Y (job performance). The correlation between the variables does not infer causality. The study aimed to investigate the relationship between personality, motivation and knowledge worker productivity. Therefore no causality is inferred by these results.

Table 18: Inter-correlations among the variables

Variables	Knowledge Productivity1	Personality	Neuroticim	Extraversion	Openness	Conscientiousness	Agreeableness	Intrinsic Motivation	Extrinsic Motivation	Task Performance	Altruism	Conscientious	Courtesy	Civic	Sportmanship
Knowledge Productivity1	1														
Personality	0.29158	1													
Neuroticim	-0.04855	-0.62968	1												
Extraversion	0.28242	0.89801	-0.51756	1											
Openness	0.30799	0.89434	-0.46588	0.73788	1										
Conscientiousness	0.22007	0.83162	-0.59339	0.60903	0.67883	1									
Agreeableness	0.20033	0.90531	-0.67601	0.68853	0.7913	0.77513	1								
Intrinsic_Motivation	0.38971	0.149	0.14624	0.26367	0.1511	0.04275	-0.0149	1							
Extrinsic_Motivation	0.3807	0.15801	0.11086	0.14975	0.1703	0.16356	0.07765	0.44394	1						
Task_performance	0.66589	-0.13081	0.16606	-0.05246	-0.14109	-0.17329	-0.15212	0.31124	0.19634	1					
Altruism	0.79298	0.17243	-0.01019	0.15163	0.19331	0.17182	0.09714	0.29976	0.27033	0.44054	1				
Conscientious	0.64631	0.31271	-0.16569	0.32315	0.28718	0.27945	0.19457	0.26676	0.24325	0.34716	0.51903	1			
Courtesy	0.74734	0.36417	-0.17534	0.33581	0.3331	0.29129	0.31077	0.25609	0.24415	0.35212	0.6091	0.52898	1		
Civic	0.7421	0.32193	-0.06417	0.30185	0.32008	0.23758	0.2629	0.34942	0.1425	0.43954	0.55418	0.32324	0.50813	1	
Sportmanship	0.37782	0.17075	-0.05534	0.11053	0.25241	0.13908	0.13693	0.02619	0.38415	0.08925	0.0505	-0.01936	0.08038	0.16273	1

Notes: Positive values= positive linear correlation; Negative values = negative linear correlation; 0= no linear correlation; The closer the value is to 1or -1 the stronger the correlation (Moore & McCabe, 1989).

4.5 HYPOTHESIS TESTING

After cleaning and analysing the data using SAS to assess the fit of the model, a series of regression analyses were carried out to investigate the relationship between personality, motivation and knowledge worker productivity. Based on the results of the linear regression analyses, the hypotheses were tested and the findings discussed to address the main assumptions of this study. The following section provides a discussion of the results in relation to each hypothesis.

4.5.1 Hypothesis1: Personality is significantly associated with knowledge worker productivity

To test the first hypothesis, a total of six models were used to analyse the relationship between personality and knowledge worker productivity (see Table 19 for a summary of the models). The first model contains only the covariates. The model shows that 20.2% (R-squared = 0.2021) of variability in knowledge worker productivity is explained by intrinsic motivation and extrinsic motivation. Despite the low R-square score both extrinsic and intrinsic motivation were found to be significant in predicting knowledge worker productivity. Intrinsic motivation predicted knowledge worker productivity at 90% significance level and extrinsic motivation predicted knowledge worker productivity at 95% significance level.

Extraversion was added in the second model. The R-square improved to 0.2341 but no significant relationship was found between extraversion and job performance. Therefore extraversion was not found to predict job performance. However other studies (Barrick & Mount, 1991; Salgado, 1997; Johnson, 1997; Bing & Lounsbury, 2000) found extraversion to be a predictor of job performance in occupations that require high social interaction such as managers, sales and police personnel. Another study (Barrick et al., 2001) on the other hand found no significant association between extraversion and job performance. These findings are supported by the results in the present study. Nonetheless, extraversion has been found to be a predictor of job performance where social interaction and teamwork is involved (Barrick & Mount, 1991; Salgado, 1997).

In the third model neuroticism was added to the analysis. R-square improved to 0.2209. Neuroticism was not found to be significant in predicting knowledge productivity. These findings are supported by other studies (Barrick & Mount, 1991; Thoresen & Barrick, 1999) that found no significant relationship between neuroticism and job performance. A study by Hormann and Maschke (1996) on the other hand found neuroticism to predict job performance

in various occupations. Other studies (Dunn et al., 1993; Salgado, 1997) have found emotional stability (the opposite of neuroticism) to positively affect job performance.

The next personality trait added to the model was openness to experience. The R-square improved slightly (0.2551). Openness to experience was found to be significantly related to job performance (β=0.15, p=0.04). We can conclude that openness to experience predicts job performance. Studies by Barrick and Mount (1991), Barrick, Mount and Judge (2001) and Salgado (1997) have consistently found no significant relationship between openness to experience and job performance. On the other hand, several studies (Bing & Lounsbury, 2000; Hamilton, 1998; Tett, Jackson & Rothstein, 1991) have found openness to experience to predict job performance in occupations characterised by complexity. Despite the convincing evidence, openness to experience is not considered to be a valid predictor of job performance (Rothmann & Coetzer, 2003).

In the fifth model conscientiousness was added to the analysis. The R-square value decreased slightly accounting for 23% of the variance in job performance. Conscientiousness was found not to predict job performance. These findings contradict previous studies that have found conscientiousness to be the most important predictor of job performance across all occupations (Barrick & Mount, 1991; Saldado, 1997; Hurtz & Donovan, 2000; Barrick, Mount & Judge, 2001; Griffin & Hesketh, 2004; Matzler, Herting & Matzler, 2008).

In the sixth model agreeableness was added to the regression analysis. There was no improvement in the R-square value. Agreeableness was not found to predict job performance. These findings are consistent with previous studies (Barrick & Mount, 1991; Barrick, Mount & Judge, 2001) that have found no significant correlation between agreeableness and job performance.

Table 19: Summary of Models - The relationship between personality and knowledge worker productivity

Item	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dependent	KWP	KWP	KWP	KWP	KWP	KWP
Intercept	2.435***	2.105***	2.675***	2.064***	2.088***	2.132***
Mediating Variables						
Intrinsic Motivation	0.125**	0.102	0.13374***	0.114**	0.12868***	0.131***
Extrinsic Motivation	0.191***	0.185***	0.196***	0.170**	0.168**	0.177**
Independent Variables						
Extraversion		0.137				
Neuroticism			-0.095			
Openness				0.158***		
Conscientiousness					0.129	
Agreeableness						0.102
Model F	7.47	5.91	5.48	6.62	5.87	6.04
R-Square	0.202	0.234	0.220	0.255	0.233	0.238

Notes: KWP= Knowledge worker productivity

*** Significant at 95% level

** Significant at 90% level

4.5.2 Hypothesis 2 & 3: Personality is significantly associated with intrinsic and extrinsic motivation

To test the second and third hypothesis, Personality is significantly associated with extrinsic motivation and Personality is significantly associated with intrinsic motivation, two different types of model were analysed. The first model tested the association between intrinsic motivation and big five personality traits and the second model tested the association between extrinsic motivation and the big five personality traits. In both models, each personality trait was evaluated against the extrinsic and intrinsic motivation separately. The findings (see Table 20) demonstrated that neuroticism (β=0.3678, p=0.05) and agreeableness (β= -0.31147, p=0.01) were significant in predicting intrinsic motivation at 90% significance level. The results found neuroticism to predict high intrinsic motivation (β=0.3678), on the other hand agreeableness predicted low intrinsic motivation (β= -0.31147). We can conclude that neuroticism and agreeableness are significantly associated with intrinsic motivation. A comparison of the analyses between extrinsic motivation and personality (Table 21) found conscientiousness to be significantly associated with extrinsic motivation (β=0.2218, p=0.0067033). No other personality trait was found to have a significantly association with extrinsic motivation.

4.5.3 Hypothesis 4 & 5: Mediating effect of Intrinsic and Extrinsic Motivation

In this section, a Sobel test was administered. A Sobel test is carried out to determine whether the mediating variable carries the influence of the independent variable to the dependent variable (MacKinnon Warsi & Dwyer, 1995; Preacher & Hayes, 2004). The Sobel test provide an estimate of the standard error of ab which equals to the square root of (Kenny, 2014:1):

$b^2S_a^2+a^2S_b^2$

This test involves three models evaluating the relationship between the dependent variable knowledge worker productivity, the mediating variables, extrinsic and intrinsic motivation and the personality traits. Three statistics are generated in this analysis to measure the effect that the mediating variables have on the independent variable in predicting the dependent variable. The first statistic is the sobel statistic which tests "whether the indirect effect of the independent variable (personality traits) on the dependent variable (knowledge worker productivity) via the mediator is significant at zero" (Preacher & Leonardelli, 2011:1). The second statistic is the total effect that is mediated and the third statistic is the ratio of indirect to the direct effect.

Generally speaking, mediation can be said to occur when (1) the independent variable significantly affects the mediator, (2) the independent variable significantly affects the dependent variable in the absence of the mediator, (3) the mediator has a significant unique effect on the dependent variable, and (4) the effect of the independent variable on the dependent variable shrinks upon the addition of the mediator to the model (Preacher & Leonardelli, 2001: 1). Based on the analysis of these tests and the steps followed to establish mediation, neither intrinsic nor extrinsic motivation was found to have any effect on personality in predicting knowledge productivity. See Tables 20 and 21. This is expected since the second condition of mediation, the independent variable significantly affects the dependent variable in the absence of the mediator, was not satisfied for any of the analyses (Baron & Kenny, 1989). Hypothesis H4 and H5 are therefore not supported by the results.

Table 20: Regression results for intrinsic motivation

Coefficient	Estimate	Standard error	Pr > |t|
Neuroticism and Intrinsic Motivation	0.367	0.189	0.058
Intrinsic Motivation on Knowledge worker Productivity	0.128	0.053	0.020
Neuroticism and Knowledge worker Productivity	0.083	0.074	0.266
Sobel	1.505		0.132
Toteff	-1.286		
Ratio	0.562		
Extraversion and Intrinsic Motivation	0.240	0.232	0.305
Intrinsic Motivation on Knowledge Productivity	0.133	0.052	0.013
Extraversion and Knowledge Productivity	0.048	0.089	0.588
Sobel	0.959		0.337
Toteff	-1.924		
Ratio	0.658		
Openness and Intrinsic Motivation	-0.039	0.229	0.862
Intrinsic Motivation on Knowledge Productivity	0.135	0.051	0.011
Openness and Knowledge worker Productivity	0.026	0.087	0.761
Sobel	-0.173		1.137
Toteff	0.167		
Ratio	-0.201		
Conscientiousness and Intrinsic Motivation	-0.100	0.222	0.653
Intrinsic Motivation on Knowledge worker Productivity	0.136	0.051	0.011
Conscientiousness and Knowledge worker Productivity	0.016	0.085	0.847
Sobel	-0.445		1.343
Toteff	0.454		
Ratio	-0.833		

Table 21: Results for extrinsic motivation

Coefficient	Estimate	Standard error	Pr > |t
Neuroticism and Extrinsic Motivation	0.127	0.131	0.336
Extrinsic Motivation on Knowledge Productivity	0.204	0.076	0.010
Neuroticism and Knowledge Productivity	0.083	0.074	0.266
Sobel	0.913		0.361
Toteff	-0.453		
Ratio	0.311		
Extraversion and Extrinsic Motivation	0.240	0.154	0.125
Extrinsic Motivation and Extraversion on Knowledge worker Productivity	0.213	0.078	0.008
Extraversion and Knowledge Productivity	0.048	0.089	0.588
Sobel	1.355		0.175
Toteff	20.334		
ratio	1.051		
Openness and Extrinsic Motivation	0.239	0.150	0.117
Extrinsic Motivation on Knowledge Productivity	0.218	0.078	0.007
Openness and Knowledge Productivity	0.026	0.087	0.761
Sobel	1.385		0.165
Toteff	2.048		
ratio	1.953		
Conscientiousness and Extrinsic Motivation	0.244	0.145	0.099
Extrinsic Motivation-Knowledge Productivity	0.221	0.078	0.006
Conscientiousness-Knowledge Productivity	0.016	0.085	0.847
Sobel	1.444		0.148
Toteff	1.434		
Ratio	3.299		
Agreeableness and Extrinsic Motivation	0.094	0.113	0.412
Extrinsic Motivation on Knowledge Productivity	0.223	0.075	0.004
Agreeableness and Knowledge Productivity	-0.050	0.064	0.441
Sobel	0.796		0.425
Toteff	0.294		
Ratio	-0.418		

4.5.4 Hypothesis 6: Industry, education and gender significantly moderate the relationship between the big five personality traits and knowledge worker productivity.

The study controlled for three demographic variables, industry, education and gender all which may affect the relationship between personality and job performance (Ng & Feldman, 2009; McNeilly & Goldsmith, 1991; Larson, Hunt & Osborn, 1974). The results of the analysis (see

Table 22) found industry, education and gender not to have an effect or interaction on personality predicting knowledge worker productivity. The R-square values are very poor in all the models explaining less than 10% of variability in knowledge worker productivity. We can conclude that industry, education and gender do not affect the strength or direction of the relationship between personality and knowledge worker productivity. Therefore H6 was not supported by the findings.

Table 22: Industry, education and gender significantly moderate the relationship between the big five personality traits and knowledge worker productivity

Dependent	Predicting *Moderation	F Value	Pr > F
KWP	Extraversion*Gender	0.02	0.879
KWP	Neuroticism*Gender	0.09	0.766
KWP	Openness*Gender	0.03	0.866
KWP	Conscientiousness*Gender	1.11	0.297
KWP	Agreeableness*Gender	0	0.989
KWP	Extraversion*Education Level	0.37	0.826
KWP	Neuroticism*Education Level	0.35	0.843
KWP	Openness*Education _Level	0.37	0.831
KWP	Conscientiousness*Education Level	0.3	0.876
KWP	Agreeableness*Education Level	1.25	0.305
KWP	Extraversion*Industry	1.43	0.249
KWP	Neuroticism*Industry	0.21	0.813
KWP	Openness*Industry	1.46	0.241
KWP	Conscientiousness*Industry	0.72	0.490
KWP	Agreeableness*Industry	0.88	0.421

Notes: KWP- knowledge worker productivity, * Product term multiplied by the independent variable

4.5.5 Hypothesis 7: Industry, education and gender significantly moderate the relationship between the personality and intrinsic motivation.

The results (see Table 23) show that industry significantly moderates the relationship between intrinsic motivation and agreeableness at 95% significance level (F = 5.56, P=0.0069). The results in Table 23 also show that industry moderates the relationship between neuroticism, conscientiousness and intrinsic motivation at 90% significance level. Gender and education were found not to moderate the relationship between any of the big five personality traits and intrinsic motivation. We can conclude that industry moderates the relationship between agreeableness, neuroticism, conscientiousness and intrinsic motivation. These results provide partial support for H7.

Table 23*:* Industry, education and gender significantly moderate the relationship between the personality and intrinsic motivation

Dependent	Predictor*Moderation	F Value	Pr > F
IM	Extraversion*Gender	0.51	0.477
IM	Neuroticism*Gender	0.44	0.512
IM	Openness*Gender	0	0.982
IM	Conscientiousness*Gender	0.63	0.433
IM	Agreeableness*Gender	0.09	0.765
IM	Extraversion*Education Level	0.98	0.430
IM	Neuroticism*Education Level	1.14	0.353
IM	Openness*Education Level	1.65	0.18
IM	Conscientiousness*Education Level	0.21	0.932
IM	Agreeableness*Education Level	0.9	0.471
IM	Extraversion*Industry	1.62	0.209
IM	Neuroticism*Industry	2.93	0.063**
IM	Openness*Industry	1.79	0.179
IM	Conscientiousness*Industry	2.64	0.082**
IM	Agreeableness*Industry	5.56	0.006***

Notes:
IM- Intrinsic Motivation
* Product term multiplied by the independent variable
** 90% Significance level
*** 95% Significance level

4.5.6 Hypothesis 8: Industry, education and gender significantly moderate the relationship between personality and extrinsic motivation.

The results (see Table 24) show that gender moderates the relationship between one of the big five personality traits (conscientiousness) and extrinsic motivation. Gender therefore moderates the relationship between conscientiousness and extrinsic motivation. The results show that industry and education (see Table 24) were found not to moderate the relationship between personality and extrinsic motivation. Industry and education therefore do not moderate the relationship between personality and extrinsic motivation. The results provide partial support for H8.

Table 24: Industry, education and gender significantly moderate the relationship between personality and extrinsic motivation

Dependent	Predictor*Moderation	F Value	Pr > F
EM	Extraversion*Gender	0.63	0.432
EM	Neuroticism*Gender	1.91	0.173
EM	Openness*Gender	1.71	0.197
EM	Conscientiousness*Gender	2.9	0.095**
EM	Agreeableness*Gender	0.59	0.445
EM	Extraversion*Education Level	0.35	0.839
EM	Neuroticism*Education Level	0.53	0.717
EM	Openness*Education Level	0.54	0.708
EM	Conscientiousness*Education Level	1.13	0.356
EM	Agreeableness*Education Level	0.58	0.679
EM	Extraversion*Industry	1.98	0.150
EM	Neuroticism*Industry	0.57	0.571
EM	Openness*Industry	0.42	0.661
EM	Conscientiousness*Industry	0.32	0.729
EM	Agreeableness*Industry	0.37	0.691

Notes:
EM – Extrinsic Motivation
* Product term multiplied by the independent variable
** 90% Significance level
*** 95% Significance level

4.6 CONCLUSION

This chapter provided a discussion of the results for this study. The descriptive statistics that describe the target population were first analysed. Next, the quantitative analysis provided the empirical evidence to either support or contest the relationship between personality, motivation and knowledge worker productivity. Multiple linear regression was used to test each hypothesis. The mediating process recommended by Baron and Kenny (1986) was used to test the mediating effect of motivation on the relationship between personality and knowledge worker productivity. Studies have found motivation to have a central role in job performance. The results of this present study found neither extrinsic nor intrinsic motivation to mediate the relationship between personality and knowledge worker productivity. The moderating effect of industry, education and gender on the relationship between personality, knowledge worker productivity and motivation was also analysed. The results found industry to moderate the relationship between personality (agreeableness, neuroticism and conscientiousness) and intrinsic motivation. Gender was found to moderate the relationship between personality and extrinsic motivation. The findings further revealed that openness to experience was the most significant personality trait in predicting knowledge worker productivity. A more detailed discussion of the findings is offered in the next chapter as well as the conclusion and the recommendations for industry and further research.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The purpose of this study was to investigate the relationship between personality, motivation and knowledge worker productivity. This chapter concludes the research by providing a summary and discussion of the findings, its objectives and the quantitative findings of the study. Recommendations are then made for industry and further research. The objectives for this chapter are:

i. To summarise the research findings and discussions
ii. To discuss the implications of this study
iii. To make recommendations based on the findings

The core research question that was addressed in this study by the following: "*what is the relationship between individual personality traits, motivation and knowledge worker productivity?"*

Form the core research question, the following sub-questions were derived, which provided the basis for the hypotheses:

1. *To what extent is personality related to knowledge worker productivity?*
2. *To what extent is personality related to motivation?*
3. *To what extent does intrinsic and extrinsic motivation mediate the relationship between personality and knowledge worker productivity?*

This section provides a summary of the research findings and the basis for answering each research question.

5.2 SUMMARY OF THE RESEARCH FINDINGS

Psychology literature has stressed the importance of individual differences in predicting job performance and other job related outcomes (Furnham, Eracleous & Chamorro-Premuzic, 2009). Research has showed that personality traits predict and explain job performance in different occupations (Latham & Pinder, 2005).

Knowledge worker productivity refers to the ability of knowledge workers to effectively collect, create and use inherent knowledge to produce goods and services (Kessels & Keursten, 2002). Knowledge is inherently personal and therefore it that cannot be separated from the person who holds it nor can it be manipulated like sophisticated machines (Amar, 2004; Mäki,

2008; Smith, 2013; Nonaka, 1994). Instead, if organisations want to increase the productivity of their knowledge workers, they need to leverage the knowledge embedded in the minds of knowledge workers (Amar, 2004). Despite the vast literature on knowledge productivity, in particular tacit knowledge, the relationship between personality and knowledge worker productivity has received little or no attention so far. This study sought to investigate this gap in the literature by providing a theoretical framework that links personality to knowledge worker productivity. This research also sought to provide a better understanding of knowledge worker productivity.

The theoretical framework for the study discussed in Chapter 2 provided the theory that was tested in this context; quantitative research provided the empirical evidence to support the relationship between personality, motivation, and knowledge worker productivity.

The quantitative analysis found openness to experience to be the most significant predictor of job performance. The findings of this study are contradictory to previous findings that found openness to experience to consistently yield poor correlations with job performance (Griffin & Hesketh, 2004; Rothmann & Coetzer, 2003, Tett et. al, 1991; Barrick, Mount & Judge, 2001; Barrick & Mount, 1991; Salgado, 1997). These findings appear illogical; after all it is reasonable to assume that employees that are able to adapt to change, promote personal learning and development, and solve complex problems should have high performance (Griffin & Hesketh, 2004). Despite this logical argument for openness to experience to be a valid predictor of job performance, it has been found to be the most controversial, least understood and researched of all the big five personality traits (Coasta & McCrae, 1997; Griffin & Hesketh, 2004).

Despite the lack of support from the literature, this study found openness to experience to have a highest correlation with job performance. An explanation that could be offered for the findings is that majority of the respondents (59.26%) were IT professionals and a study by Lounsbury, Studham, Steel, Gibson, Drost, Dwivedi and Wade (2009), on 'Personality Traits and Career Satisfaction of Information Technology Professionals' found openness to experience to be highly correlated with satisfaction and performance. High levels of openness to experience have been found to enable IT professionals to adapt to change, facilitate personal growth and professional development (Lounsbury, Studham, Steel, Gibson, Drost, Dwivedi and Wade, 2009). The IT industry is constantly changing due to the vast pace of technological advancements and innovation and openness to experience enables IT professionals to succeed in such environments (Lounsbury et al., 2009). Therefore, the large number of IT respondents

may have influenced the research findings. It is argued that the findings of this study are important for they suggest that openness to experience is a critical success factor for IT professionals (Lounsbury et al., 2009). However this may not be the case for lawyers and engineers.

The findings also found extrinsic motivation and intrinsic motivation not to mediate the relationship between personality and job performance. These findings do not support the literature that found knowledge workers to be more intrinsically motivated (Langevelde, 2013; Kuvaas, 2006a; Kuvaas, 2008). The findings may be attributed to the mediation tests employed mainly the Sobel test. The Sobel test is a conservative measure that is suitable for large sample sizes (Mackinnon, Wars, Dwyer, 1995). It is therefore recommended for future research that other methods be employed to measure the mediating effect of motivation.

5.3 SUMMARY OF THE RESEARCH OBJECTIVES

The aim of this research was to investigate the relationship between personality and knowledge worker productivity with the mediating effect of motivation. The study sought to provide a holistic understanding of knowledge worker productivity that might contribute to an improved understanding of knowledge worker productivity and ultimately enable managers to motivate knowledge worker to superior performance. The overall aim of the research is to help generate and provide new insight that will enable organisations to better understand and effectively manage, communicate, motivate and increase knowledge worker productivity, which according to Drucker (1999) is crucial to the economic growth and survival of organisations and the economy as a whole. The objective of this research was therefore to develop and test theory that relates personality and motivation, to knowledge worker productivity.

5.4 SUMMARY OF THE QUANTITATIVE FINDINGS

This study provided empirical evidence in the form of statistical analyses and testing to provide statistical correlations that either reinforced or contested the theory discussed in chapter 2. The research questions were answered through the quantitative analysis of the results. Though no causality can be inferred from the findings, it is argued that the results provide a comprehensive analysis that is sufficient to support the arguments made by this research. The research questions are answered in the following sections in relation to the quantitative results.

5.4.1 Question 1: To what extent is personality related to knowledge worker productivity?

Based on the research findings, it was concluded that the relationship between personality and knowledge worker productivity was inconclusive. Openness to experience was the only personality trait that was significantly associated with knowledge worker productivity. These findings therefore do not support or contest the validity of the relationship between personality and job performance found in previous studies (Barrick and Mount, 1991; Saldado, 1997; Hurtz & Donovan, 2000; Barrick, Mount & Judge, 2001; Matzler, Herting & Matzler, 2008; Rothmann & Coetzer, 2005; Hurtz & Donovan, 2000). Instead, further research is recommended to explore the causal mechanisms that may influence how and why personality may interact with motivation to influence behaviour, which in turn influences job performance.

5.4.2 Question 2: To what extent is personality related to motivation?

The analysis found neuroticism and agreeableness to be significantly associated with intrinsic motivation and conscientiousness to be significantly associated with extrinsic motivation. This is consistent with other research findings that found conscientiousness to be positively correlated with motivation (Judge & Ilies, 2002; Barrick, Mount and Strauss, 1993). This suggests that conscientious knowledge workers are extrinsically motivated. The other personality traits, openness to experience and extroversion were not significantly associated with either intrinsic or extrinsic motivation.

The findings do not provide an undisputable argument that associates personality to motivation, for not all the personality traits were associated with either intrinsic or extrinsic motivation. Therefore, further research is needed to provide a framework that can be used to study the relationship between motivation and personality. The present relationship at best is ambiguous and therefore needs a strong empirical foundation to build on.

5.4.3 Question 3. To what extent does intrinsic and extrinsic motivation mediate the relationship between personality and knowledge worker productivity?

To answer this research question the mediation process recommended by Baron and Kenny (1986) and the Sobel test were used to test the mediating effect of motivation on the relationship between personality and knowledge worker productivity. Extrinsic motivation and intrinsic motivation were found not to mediate the relationship between personality and knowledge worker productivity. Both mediating variables did not satisfy all the four requirements for mediation and therefore it was concluded that extrinsic and intrinsic motivation had no effect on personality in predicting productivity. Given that inherent knowledge used to produce goods

and services is intrinsic (Nonaka, 1994) these findings contradict other studies that found a strong correlation between intrinsic motivation and knowledge worker productivity (Kuvaas, 2006a).

To provide clarity, further research efforts should be directed at studying the relationship between personality and motivation to provide a holistic understanding of how personality influences motivation which in turn influences knowledge workers responses to motivational behaviour. Additionally factors such as age and level of income need to be taken into consideration.

5.5 CONCLUSION

The objectives for this chapter were:

i. To summarise the research findings and discussions.

ii. To discuss the implications of this study

iii. To make recommendations based on the findings.

A summary of the research objectives and findings were provided, together with the recommendations. The following are the main conclusions of this research.

- The main argument of the research; personality is significantly associated with knowledge worker productivity was partially supported by the research findings. On the basis of these findings, it is not possible to support or contest the relationship between personality and knowledge worker productivity.
- The relationship between personality and motivation was supported. Neuroticism and agreeableness were found to be significantly associated with intrinsic motivation. Conscientiousness was found to be significantly associated with extrinsic motivation. These findings suggest that conscientious employees are extrinsically motivated while neurotic and agreeable employees are intrinsically motivated.
- Extrinsic motivation and intrinsic motivation were not found to mediate the relationship between personality and performance.

In conclusion, the main aim of the study was to provide evidence that supports the relationship between personality and knowledge worker productivity. The results from the multiple linear regression analyses provided partial support for the theoretical model that personality predicts knowledge worker productivity. The findings however did not provide support for the ability

of motivation to mediate the relationship between personality and knowledge worker productivity. Contrarily to other research findings, openness to experience was found to be the strongest predictor of job performance.

The major conclusion of the study is that personality does influence knowledge worker productivity; however the extent to which personality influences knowledge worker productivity is unclear. Therefore, further research is needed to understand the relationship between personality and knowledge worker productivity. In the absence of this knowledge, it is recommended that managers need to firstly acknowledge that individual differences influence job related outcomes and behaviour. Secondly, organisations need to tailor their policies, work environments and reward systems to support sociocultural factors such as personality that influence motivation, performance and behaviour. It is also recommended that managers need to understand the individual needs and motivators of their knowledge workers and address these needs and motivators individually rather than collectively.

In order to provide a more detailed and robust understating of the relationship between personality, motivation and knowledge worker productivity, further research is needed to investigate the causal mechanisms that underlie these relationships. This will provide a better understanding of knowledge worker productivity and the foundation for developing models seeking to explain knowledge worker productivity and the tools needed to measure the productivity of knowledge workers.

APPENDIX
AND
REFERENCES

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6. APPENDIX

6.1 REPORTING OF FURTHER STATISTICAL RESULTS

Further statistical analyses are provided in this section to provide a better understanding of the methodological process applied and the results of the study.

6.2 ASSESSING THE RELIABILITY OF THE SCALES

The Cronbach alpha coefficient was used to test the internal reliability of the three scales: personality, motivation and job performance. Cronbach alpha ranges between 0 to1 (Santos, 1999). Values higher than 0.7 are considered to an acceptable reliability coefficient (Nunnally, 1978). The cronbach alpha for all three scales was > 0.7, therefore all the items in the scales measured the same construct (Tavakol & Dennick, 2011).

Table A: The alpha Coefficient for measuring personality

Personality Dimension		
Construct	Cronbach Coefficient Alpha	Number of Items
Neuroticism	0.893154	48
Extroversion	0.920524	48
Openness	0.904538	48
Conscientiousness	0.880627	48
Agreeableness	0.923714	48
Personality	0.919383	240

Table B: Cronbach Coefficient Alpha reliability for Motivation

Motivation		
Construct	Cronbach Coefficient Alpha	Number of Items
Extrinsic	0.751959	9
Intrinsic	0.887629	9

Table C: Cronbach Coefficient Alpha reliability for Job performance

Job Performance		
Construct	Cronbach Coefficient Alpha	Number of Items
Task Performance	0.704558	7
Altruism	0.773932	5
Conscientiousness	0.672224	4
Courtesy	0.691814	4
Civic Virtue	0.693419	4
Sportsmanship	0.85099	5
Knowledge Productivity	0.85924	29

6.3 DATA CLEANING AND SPOTTING OF OUTLIERS WITH UNIVARIATE ANALYSIS

A SAS Univariate data test was used to test the location of the data. The analyses indicated (see Table D & E) outliers in the observations. Outliers refer to data points that differ greatly from the other observations (Osborne, 2004). Statistically, outliers occur when the distance between the 95th percentile and the maximum value is greater than the distance between the rests of the quantiles (Auld, 2011). To investigate the possible occurrence of outliers in the data, minimum and maximum values were created. This step involved calculating the nth percentile by subtracting 5th percentile from 95th percentile, then dividing by 90. This process created a mid-value between the minimum/maximum value and the 5th/95th percentile respectively based on the distribution of the data between those percentiles. If the projection exceeded the observed minimum or maximum values then the projection was reset to the observed value. Next, statistical tests were carried out using SAS eliminate the values that exceeded the newly created minimum/maximum values. (Auld, 2011). (See Table E).

Table D: Detection of Outliers

Quantiles and Outlier Detections								
Quantile	Knowledge Productivity	Intrinsic Motivation	Extrinsic Motivation	Neuroticim	Extraversion	Openness	Conscientiousness	Agreeableness
100% Max	5	5	4.22222	4.34043	4.47917	4.27083	4.4375	4.66667
0.99	5	5	4.22222	4.34043	4.47917	4.27083	4.4375	4.66667
0.95	4.10714	4.77778	3.66667	4.02128	4.06383	4.10417	4.02083	4.22917
0.9	4	4.55556	3.66667	3.91489	3.8125	3.83333	3.77083	4.125
75% Q3	3.71429	4.22222	3.33333	3.38298	3.52083	3.35417	3.52083	3.77083
50% Median	3.39286	3.66667	3	2.97917	3.08333	2.87345	3.04255	3.21875
25% Q1	3.14286	2.88889	2.55556	2.5	2.63043	2.48936	2.65957	2.38298
0.1	3	2.55556	2	2.18182	2.45833	2.21277	2.42553	2.17778
0.05	2.89286	2.22222	1.88889	2.10417	2.34783	2.10638	2.25532	2
0.01	2.57143	1	1.33333	1.97917	2	1.89362	1.89362	1.44681
0% Min	2.57143	1	1.33333	1.97917	2	1.89362	1.89362	1.44681

Notes: The highlighted portions indicate extreme outliers.

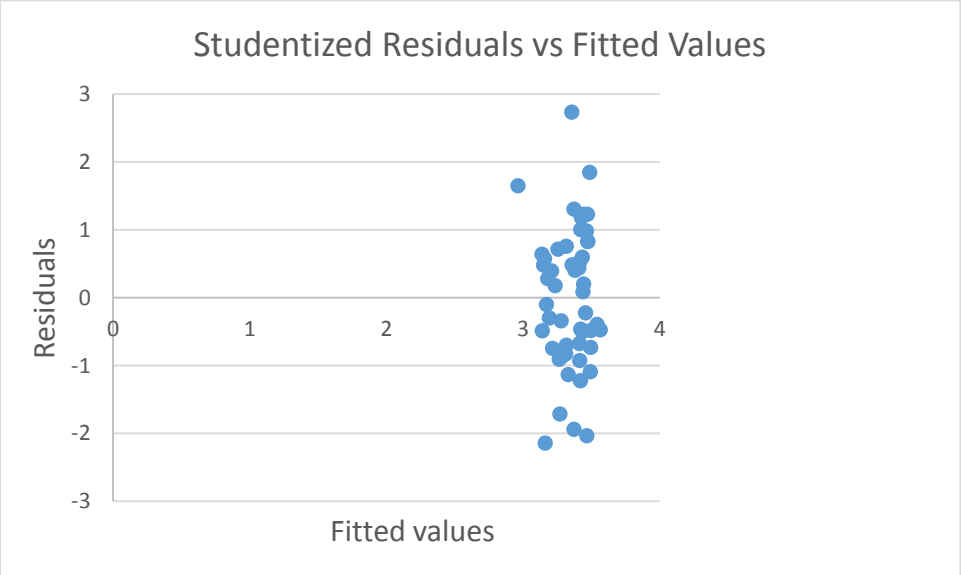
Table E: Data after the removal of outliers

Quantiles and Outlier Detections After initial Outliers were removed								
	Knowledge Productivity	Intrinsic Motivation	Extrinsic Motivation	Neuroticism	Extraversion	Openness	Conscientiousness	Agreeableness
100% Max	4.10714	4.77778	3.66667	4.10638	4.06383	3.89583	4.02083	4.1875
0.99	4.10714	4.77778	3.66667	4.10638	4.06383	3.89583	4.02083	4.1875
0.95	3.82143	4.66667	3.66667	4.02128	3.97917	3.75	3.8125	3.97917
0.9	3.75	4.33333	3.44444	3.91489	3.70833	3.58333	3.70213	3.875
75% Q3	3.53571	4	3.22222	3.5	3.45833	3.22917	3.47917	3.60417
50% Median	3.32143	3.55556	3	3.06383	2.875	2.77083	2.95745	3.0625
25% Q1	3.11111	2.88889	2.55556	2.5	2.52174	2.46809	2.61702	2.34043
0.1	3	2.55556	2	2.25	2.45833	2.21277	2.42553	2.21277
0.05	2.82143	2.11111	1.88889	2.10417	2.34783	2.08511	2.23404	2
0.01	2.57143	1	1.33333	1.97917	2.28261	1.89362	1.89362	1.44681
0% Min	2.57143	1	1.33333	1.97917	2.28261	1.89362	1.89362	1.44681

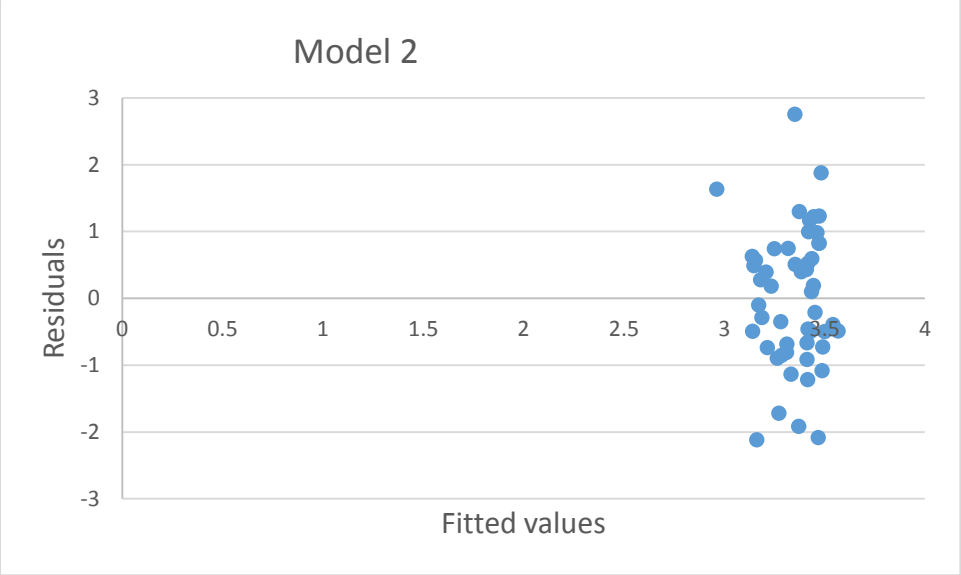
Notes: All outliers were removed from this data set

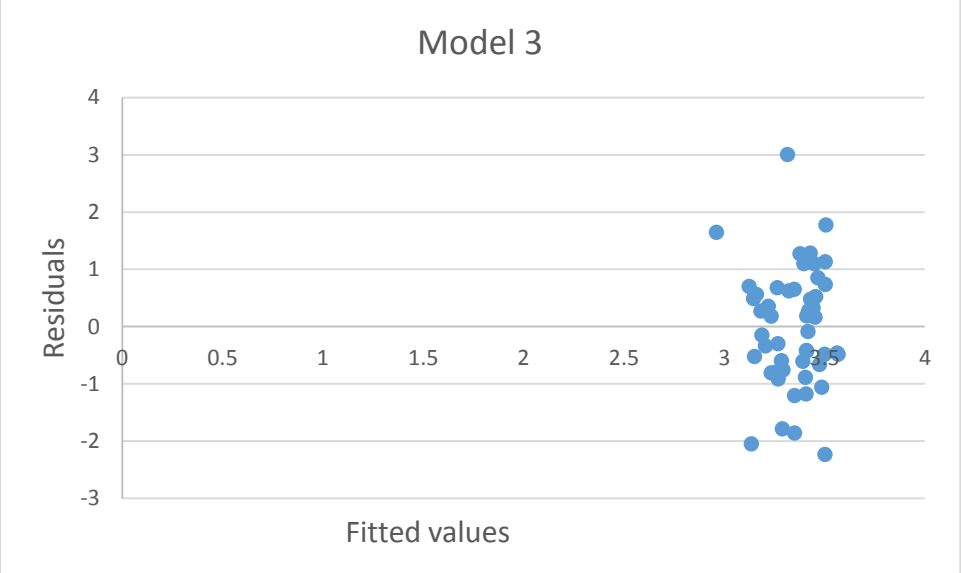
6.4 RESIDUAL PLOTS

Linear regression models are not always appropriate or adequate for a given set of data (Gonzalez, 2013). Residuals plots are used to show the inadequacies of the regression models (Tsai, Cia & Wu, 2013). The term residual refers to the distance between the observed value of the independent variable and the independent variable (Tsai, Cia & Wu, 2013). Residual plots are used to support the quality of the regression analysis by graphically showing no obvious defects in the model (Tsai, Cia & Wu, 2013).

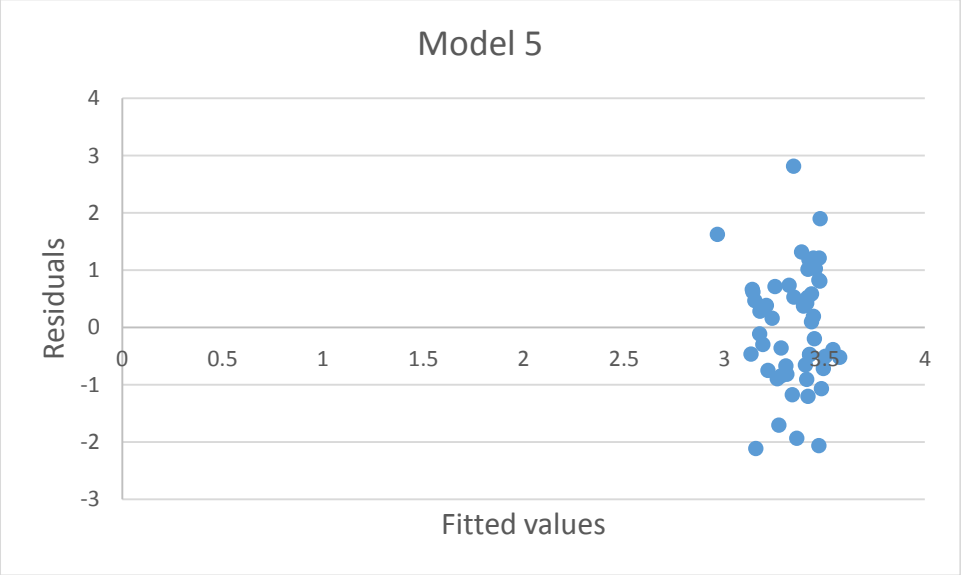


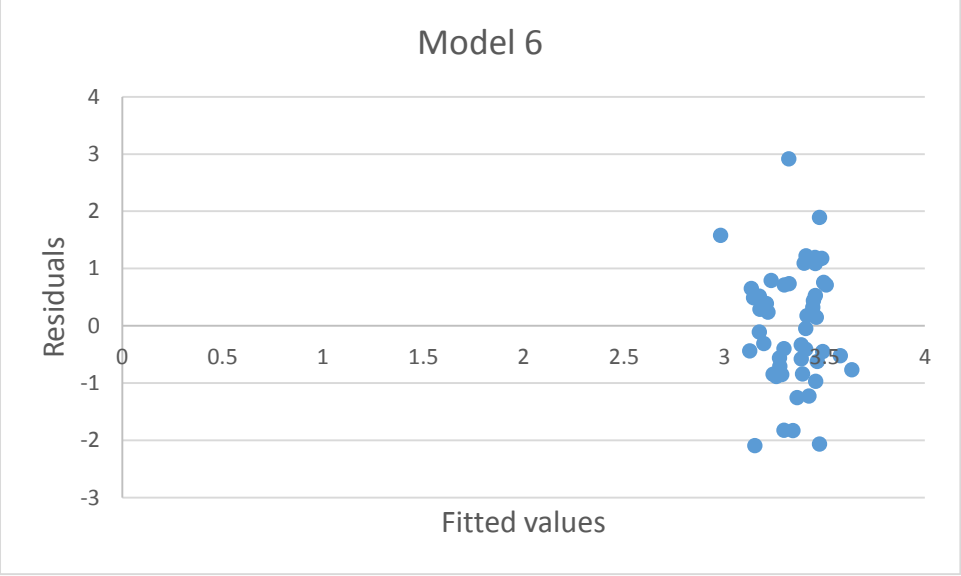
There should not be a systematic pattern in the residuals vs. the fitted values. The data sets should be spread along the zero but not too high. We can observe that one variable is an outlying value (that is the point above 3). However, overall, all the values are spread within the range of -2 to 2 as further confirmed by the kurtosis and kurtosis and skewness.


Model 2
Residuals
Fitted values
3
2
1
0
-1
-2
-3
0
0.5
1
1.5
2
2.5
3
3.5
4


Model 3
Residuals
Fitted values
4
3
2
1
0
-1
-2
-3
0
0.5
1
1.5
2
2.5
3
3.5
4


Model 4
Residuals
Fitted values
4
3
2
1
0
-1
-2
-3
0
0.5
1
1.5
2
2.5
3
3.5
4


Model 5
Residuals
Fitted values
4
3
2
1
0
-1
-2
-3
0
0.5
1
1.5
2
2.5
3
3.5
4


Model 6
Residuals
Fitted values
4
3
2
1
0
-1
-2
-3
0
0.5
1
1.5
2
2.5
3
3.5
4

6.5 MEASURING SCALES

The following scales were used to investigate the relationship between personality, motivation and knowledge worker productivity.

6.5.1 Personality

Personality was measured using The Neo Personality Inventory (NEO-PI-R) scale (Costa & McCrae, 1992). The Neo- PI-R scale was not included in the appendix because it is contrary to both the law and professional ethics to use any of the scale without the authorisation of the Psychology Assessment Resources (PAR).

6.5.2 Motivation

The work Extrinsic and Intrinsic motivation scale (WEIMS) was used to measure motivation (Taylor & Pelletier, 2009).

Extrinsic motivation

Because I chose this type of work to attain my career goals.

Because this is the type of work I chose to do to attain a certain lifestyle.

Because it allows me to earn money.

For the income it provides me.

Because this type of work provides me with security.

Because it is the type of work I have chosen to attain certain important objectives

I don't know why, we are provided with unrealistic working conditions.

I ask myself this question, I don't seem to be able to manage the important tasks related to this work.

I don't know, too much is expected of us.

Intrinsic Motivation

Because I derive much pleasure from learning new things.

Because it has become a fundamental part of who I am.

Because I want to succeed at this job, if not I would be very ashamed of myself.

For the satisfaction I experience from taking on interesting challenges.

Because it is part of the way in which I have chosen to live my life.

Because I want to be very good at this work, otherwise I would be very disappointed.

Because I want to be a "winner" in life.

For the satisfaction I experience when I am successful at doing difficult tasks.

Because this job is a part of my life.

6.5.3 Job Performance

Job performance is measured using task performance and OCB. The scales were adapted from William and Anderson (1991) and Podsakoff et al (1990).

Task Performance

1. I adequately complete assigned tasks.

2. I engage in activities that directly affect my performance evaluation.

3. I fail to perform essential work tasks ®

4. I fulfil the responsibilities specified in my job description.

5. I meet the formal performance requirements of my job.

6. I neglect tasks that are expected of me. ®

7. I perform tasks that are expected of me.

Organisational Citizenship Behaviour (OCB)

Altruism

I help others who have heavy work loads

I am always ready to lend a helping hand to those around me.

I help others who have been absent.

I am willingly to help others who have work related problems

I help orient new employees even though it is NOT required

Conscientiousness

I believe in giving an honest day's work for an honest day's pay.

My attendance at work is above the norm.

I do not take extra breaks.

I obey company rules and regulations even when no one is watching

Courtesy

I try to avoid creating problems for co-workers.

I consider the impact of my actions on other co-workers.

I take steps to try to prevent problems with other workers.

I am mindful of how my behaviour affects other people's jobs.

Civic Virtue

I Keep abreast of changes in the organisation.

I attend meetings that are NOT mandatory, but are considered important.

I attend functions that are NOT required, but help the company image.

I read and keep up with organisation announcements, memos, and so on.

Sportsmanship

I am a classic “squeaky wheel” that always needs greasing. ®

I consume a lot of time complaining about trivial matters ®

I tend to make "mountains out of molehills." ®

I always focus on what's wrong, rather than the positive side. ®

I always find fault with what the organization is doing. ®

***Note: Items marked with (R) are reverse-score**

6.6 PERSONALITY, MOTIVATION AND KNOWLEDGE WORKER PRODUCTIVITY QUESTIONNAIRE

The following questionnaire was used collect information used to analyse the relationship between personality, motivation and knowledge worker productivity.

Questionnaire:

Thank you for taking the time to fill this in questionnaire. The purpose of this research is to learn about how individual personality traits and motivation influence the productivity of knowledge workers. The questionnaire that you are asked to complete will take about fifteen to twenty minutes of your time.

The information that this research will provide will be useful for knowledge workers, managers and organisations. It is also hoped that it will contribute to a greater understanding of knowledge worker productivity.

In the following questions, you will be given a choice of different statements that relate to values. There are also questions that relate to demographic factors. There are no right or wrong answers. Your responses will be kept completely confidential. No individual that completes this questionnaire will be identified to anyone else in any manner whatsoever.

Section 1 – Demographic Questions

Please answer all questions by marking (with an X) the appropriate box.

Gender	☐ Male ☐ Female
Age	
In which industry do you work in?	☐ Information Technology (IT) ☐ Engineering ☐ Legal
What is the highest level of education you have attained?	☐ Certificate ☐ Diploma ☐ Bachelor's Degree ☐ Honours Degree ☐ Master's Degree ☐ Doctor of Philosophy (PHD) ☐ MBA ☐ Other (Please specify)
How many years of working experience do you have within your industry?	
In your current role, would you describe your work as managerial?	☐ Yes ☐ No ☐ I don't know

Section 1.2- Personality Traits

Personality Traits The following statements describe different personality traits that may or may not apply to you. Please read each statement carefully and select a number next to each statement to indicate the extent to which you strongly agree, agree, neither agree or disagree, disagree or strongly disagree with each statement.	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
1. I am not a worrier	1	2	3	4	5
2. I am easily frightened	1	2	3	4	5
3. I rarely feel fearful or anxious	1	2	3	4	5
4. I often feel tense and jittery	1	2	3	4	5
5. I am seldom apprehensive about the future	1	2	3	4	5
6. I often worry about things that might go wrong	1	2	3	4	5
7. I have few fears than most people	1	2	3	4	5
8. Frightening thoughts sometimes come into my head	1	2	3	4	5
9. I often get angry at the way people treat me	1	2	3	4	5
10. I'm an even-tempered person	1	2	3	4	5
11. I am known as hot-blooded and quick tempered	1	2	3	4	5
12. I am not considered a touchy or temperamental person	1	2	3	4	5
13. I often get disgusted with people I have to deal with	1	2	3	4	5
14. It takes a lot to get me mad	1	2	3	4	5
15. At times I have felt bitter and resentful	1	2	3	4	5
16. Even minor annoyances can be frustrating to me	1	2	3	4	5
17. I rarely feel lonely or blue	1	2	3	4	5
18. Sometimes I feel completely worthless	1	2	3	4	5
19. I am seldom sad or depressed	1	2	3	4	5
20. I have sometimes experienced a deep sense of guilt or sinfulness	1	2	3	4	5
21. I tend to blame myself when anything goes wrong	1	2	3	4	5
22. I have a low opinion of myself	1	2	3	4	5
23. Sometimes things look pretty bleak and hopeless to me	1	2	3	4	5
24. Too often when things go wrong, I get discouraged and I feel like giving up	1	2	3	4	5
25. In dealing with other people, I dread making a social blunder (wrong)	1	2	3	4	5
26. I seldom feel self-conscious when I'm around people	1	2	3	4	5
27. At times I have been so ashamed I just wanted to hide	1	2	3	4	5
28. It doesn't embarrass me too much if people ridicule and tease me	1	2	3	4	5
29. I often feel inferior to others	1	2	3	4	5
30. I feel comfortable in the presence of my bosses or other authorities	1	2	3	4	5
31. If I have said or done the wrong thing to someone, I can barely bare to face the again	1	2	3	4	5
32. When people I know do foolish things, I get embarrassed for them	1	2	3	4	5
33. I rarely over indulge in anything	1	2	3	4	5
34. I have trouble resisting my cravings	1	2	3	4	5
34. I have little difficulty resisting temptation					
35. When I am having my favourite foods, I tend to eat too much	1	2	3	4	5
36. I seldom give into my impulses	1	2	3	4	5
37. I sometimes eat myself sick	1	2	3	4	5
38. Sometime I do things on impulse that I later regret	1	2	3	4	5
40. I am always able to keep my feelings under control	1	2	3	4	5
41. I often feel helpless and I want someone else to solve my problems	1	2	3	4	5
42. I feel I am capable of coping with most of my problems	1	2	3	4	5
43. When I'm under a great deal of stress, sometimes I feel like I'm going to pieces	1	2	3	4	5
44. I keep a cool head in emergencies	1	2	3	4	5
45. It's often hard for me to make up my mind	1	2	3	4	5

Personality Traits The following statements describe different personality traits that may or may not apply to you. Please read each statement carefully and select a number next to each statement to indicate the extent to which you strongly agree, agree, neither agree or disagree, disagree or strongly disagree with each statement.	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
46. I can handle myself pretty well in a crisis	1	2	3	4	5
47. When everything seems to be going wrong, I can still make good decisions	1	2	3	4	5
48. I'm pretty stable emotionally	1	2	3	4	5
49. I really like most people I meet	1	2	3	4	5
50. I don't get much pleasure from chatting with people	1	2	3	4	5
51. I'm known as a warm and friendly person	1	2	3	4	5
52. Many people think of me as somewhat cold and distant	1	2	3	4	5
53. I really enjoy talking to people	1	2	3	4	5
54. I find it easy to smile and be outgoing with strangers	1	2	3	4	5
55. I have strong emotional attachments to my friends	1	2	3	4	5
56. I take personal interest in the people I work with	1	2	3	4	5
57. I shy away from crowds of people	1	2	3	4	5
58. I like to have a lot of people around me	1	2	3	4	5
59. I usually prefer to do things alone					
59. I really feel the need for other people if I am by myself for long	1	2	3	4	5
60. I prefer jobs that let me work alone without being bothered by other people	1	2	3	4	5
61. I'd rather vacation at a popular beach than an isolated cabin in the woods	1	2	3	4	5
62. Social gatherings are usually boring to me	1	2	3	4	5
63. I enjoy parties with lots of people	1	2	3	4	5
64. I am dominant, forceful and assertive	1	2	3	4	5
65. I sometimes fail to assert myself as much as I should					
65. I have often been a leader of groups I have belonged to	1	2	3	4	5
66. In meetings, I usually let others do the talking	1	2	3	4	5
67. Other people often look to me to make decisions	1	2	3	4	5
68. I would rather go my own way than be a leader of others	1	2	3	4	5
69. In conversations, I tend to do most of the talking	1	2	3	4	5
70. I don't find it easy to take charge of a situation	1	2	3	4	5
71. I have a leisurely style in work and play	1	2	3	4	5
72. When I do things, I do them vigorously	1	2	3	4	5
73. My work is likely to be slow but steady	1	2	3	4	5
74. I often feel as if I'm bursting with energy	1	2	3	4	5
75. I'm not quick and lively as other people	1	2	3	4	5
76. I usually seem to be in a hurry	1	2	3	4	5
77. My life is usually fast-paced	1	2	3	4	5
78. I am a very active person	1	2	3	4	5
79. I often crave excitement	1	2	3	4	5
80. I wouldn't enjoy vacationing in Las Vegas	1	2	3	4	5
81. I have sometimes done things just for "kicks" or "thrills"	1	2	3	4	5
82. I tend to avoid movies that are shocking or scary	1	2	3	4	5
83. I like to be where the action is	1	2	3	4	5
84. I love the excitement of roller coasters	1	2	3	4	5
85. I'm attracted to bright colours and flashy styles	1	2	3	4	5
86. I like being part of the crowd in sporting events	1	2	3	4	5
87. I have never literally jumped for joy	1	2	3	4	5
88. I have sometimes experienced intense joy or ecstasy	1	2	3	4	5
89. I am not a cheerful optimist	1	2	3	4	5
90. Sometimes I bubble with happiness	1	2	3	4	5
91. I don't consider myself especially "light-hearted"	1	2	3	4	5

Personality Traits The following statements describe different personality traits that may or may not apply to you. Please read each statement carefully and select a number next to each statement to indicate the extent to which you strongly agree, agree, neither agree or disagree, disagree or strongly disagree with each statement.	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
92. I am a cheerful, high –spirited person	1	2	3	4	5
93. I rarely use words like “fantastic!” or “Sensational!” to describe my experiences	1	2	3	4	5
94. I laugh easily	1	2	3	4	5
95. I have a very active imagination	1	2	3	4	5
96. I try to keep all my thoughts directed along realistic lines and avoid flights of fancy	1	2	3	4	5
97. I have an active fantasy life	1	2	3	4	5
98. I don’t like to waste my time daydreaming	1	2	3	4	5
99. I enjoy concentrating on fantasy or daydreaming and exploring all possibilities, letting it grow and develop	1	2	3	4	5
100. If I feel my mind starting to drift off into daydreams, I usually get busy and start concentrating on some work or activity instead	1	2	3	4	5
101. As a child I rarely enjoyed games of make believe	1	2	3	4	5
102. I would have difficulty just letting my mind wander without control or guidance	1	2	3	4	5
103. Aesthetics and artistic concerns aren’t very important to me	1	2	3	4	5
104. I am sometimes completely absorbed in the music I am listening to	1	2	3	4	5
105. Watching ballet or modern dance bores me	1	2	3	4	5
106. I am intrigued by the patterns I find in art and nature	1	2	3	4	5
107. Poetry has little or no effect on me	1	2	3	4	5
108. Certain kinds of music have an endless fascination for me	1	2	3	4	5
109. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement	1	2	3	4	5
110. I enjoy reading poetry that emphasizes feelings and images more than story lines	1	2	3	4	5
111. Without strong emotions life would be uninteresting to me	1	2	3	4	5
112. I rarely experience strong emotions	1	2	3	4	5
113. How I feel about things is important to me	1	2	3	4	5
114. I seldom pay much attention to my feelings of the moment	1	2	3	4	5
115. I experience a wide range of emotions or feelings	1	2	3	4	5
116. I seldom notice the moods or feelings that different environments produce	1	2	3	4	5
117. I find it easy to empathise (to feel myself what others are feeling)	1	2	3	4	5
118. Odd things – like certain scents or the names of distant places- can evoke strong moods in me	1	2	3	4	5
119. I’m pretty set in my ways	1	2	3	4	5
120. I think it’s interesting to learn and develop new hobbies	1	2	3	4	5
121. Once I find the right way to do something, I stick to it	1	2	3	4	5
122. I often try new and foreign foods	1	2	3	4	5
123. I prefer to spend my time in familiar surroundings	1	2	3	4	5
124. Sometimes I make changes around the house just to try something different	1	2	3	4	5
125. On vacation, I prefer going back to a tired and true spot	1	2	3	4	5
126. I follow the same route when I go someplace	1	2	3	4	5
127. I often enjoy playing with theories and abstract ideas	1	2	3	4	5
128. I find philosophical arguments boring	1	2	3	4	5
129. I enjoy solving problems or puzzles	1	2	3	4	5
130. I sometimes lose interest when people talk about very abstract theoretical matters	1	2	3	4	5
131. I enjoy working on “mind-twister”-type puzzles	1	2	3	4	5
132. I have very little interest in speculating on the nature of the universe or the human condition	1	2	3	4	5
133. I have a lot of intellectual curiosity	1	2	3	4	5
134. I have wide range of intellectual interests	1	2	3	4	5

Personality Traits The following statements describe different personality traits that may or may not apply to you. Please read each statement carefully and select a number next to each statement to indicate the extent to which you strongly agree, agree, neither agree or disagree, disagree or strongly disagree with each statement.	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
135. I believe letting students hear controversial speakers can only confuse and mislead them	1	2	3	4	5
136. I believe that laws and social policies should change to reflect the needs of a changing world	1	2	3	4	5
136. I believe we should look to religious authorities for decisions on moral issues					
137. I believe that the different ideas of right and wrong that people in other societies have may be valid for them	1	2	3	4	5
138. I believe that loyalty to one's ideas and principles is more important than "open-mindedness"	1	2	3	4	5
139. I consider myself broad-minded and tolerant of other peoples lifestyles	1	2	3	4	5
140. I think that if people don't know what they believe in by the time they are 25, there is something wrong with them	1	2	3	4	5
141. I believe that the "new morality" of permissiveness is no morality at all	1	2	3	4	5
142. I tend to be cynical and sceptical of other's intentions	1	2	3	4	5
143. I believe that most people are basically well-intentioned	1	2	3	4	5
144. I believe that most people take advantage of you if you let them	1	2	3	4	5
145. I think that most of the people I deal with are honest and trustworthy	1	2	3	4	5
146. I'm suspicious when someone does something nice for me	1	2	3	4	5
147. My first reaction is to trust people	1	2	3	4	5
148. I tend to assume the best of people	1	2	3	4	5
149. I have a good deal of faith in human nature	1	2	3	4	5
150. I'm not crafty or sly	1	2	3	4	5
151. If necessary, I am willing to manipulate people to get what I want	1	2	3	4	5
152. I couldn't even deceive anyone even if I wanted to	1	2	3	4	5
153. Being perfectly honest is a bad way to do business	1	2	3	4	5
154. I would hate to be thought of as a hypocrite	1	2	3	4	5
155. Sometimes I trick people into doing what I want	1	2	3	4	5
156. At times I bully or flatter people into doing what I want them to	1	2	3	4	5
157. I pride myself on my shrewdness in handling people	1	2	3	4	5
158. Some people think I'm selfish and egotistical	1	2	3	4	5
159. I try to be courteous to everyone I meet	1	2	3	4	5
160. Some people think of me as cold and calculating	1	2	3	4	5
161. I generally try to be thoughtful and considerate	1	2	3	4	5
162. I'm not known for my generosity	1	2	3	4	5
163. Most people I know like me	1	2	3	4	5
164. I think of myself as a charitable person	1	2	3	4	5
165. I go out of my way to help others if I can	1	2	3	4	5
166. I would rather cooperate with others than compete with them	1	2	3	4	5
167. I can be sarcastic and cutting when I need to be	1	2	3	4	5
168. I hesitate to express my anger even when it's justified	1	2	3	4	5
169. If I don't like people, I let know it	1	2	3	4	5
170. When I've been insulted, I just try to forgive and forget	1	2	3	4	5
171. If someone starts a fight, I'm ready to fight back	1	2	3	4	5
172. I'm hard-headed and stubborn	1	2	3	4	5
173. I often get into arguments with my family and co-workers	1	2	3	4	5
174. I don't mind bragging about my talents and accomplishments	1	2	3	4	5
175. I'd rather not talk about myself and my achievements	1	2	3	4	5
176. I'm better than most people, and I know it	1	2	3	4	5

Personality Traits The following statements describe different personality traits that may or may not apply to you. Please read each statement carefully and select a number next to each statement to indicate the extent to which you strongly agree, agree, neither agree or disagree, disagree or strongly disagree with each statement.	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
177. I try to be humble	1	2	3	4	5
177. I have a very high opinion of myself					
178. I feel that I am no better than others, no matter what their condition	1	2	3	4	5
179. I would rather praise others than be praised myself	1	2	3	4	5
180. I'm a superior person	1	2	3	4	5
181. Political leaders need to be more aware of the human side of their policies	1	2	3	4	5
182. I'm hard-headed and tough-minded in my attitudes	1	2	3	4	5
183. We can never do too much for the poor and elderly	1	2	3	4	5
184. I have no sympathy for panhandlers	1	2	3	4	5
185. Human need should always take priority over economic considerations	1	2	3	4	5
186. I believe all human beings are worthy of respect	1	2	3	4	5
187. I have sympathy for others less fortunate than me	1	2	3	4	5
188. I would rather be known as "merciful" than as "just"	1	2	3	4	5
189. I'm known for my prudence and common sense	1	2	3	4	5
190. I don't take civic duties like voting very seriously	1	2	3	4	5
191. I keep myself informed and usually make intelligent decisions	1	2	3	4	5
192. I often come into situations without being fully prepared	1	2	3	4	5
193. I pride myself on my sound judgment	1	2	3	4	5
194. I don't seem to be completely successful at anything	1	2	3	4	5
195. I'm a very competent person	1	2	3	4	5
196. I am efficient and effective at my work	1	2	3	4	5
197. I would rather keep my options open than plan everything in advance	1	2	3	4	5
198. I keep my belongings neat and clean	1	2	3	4	5
199. I am not a very methodological person	1	2	3	4	5
200. I like to keep everything in its place so I know just where it is	1	2	3	4	5
201. I never seem to be able to get organised	1	2	3	4	5
202. I tend to be somewhat fastidious or exacting	1	2	3	4	5
203. I'm not compulsive about cleaning	1	2	3	4	5
204. I spend a lot of time looking for things I have misplaced	1	2	3	4	5
205. I try to perform all the tasks assigned to me conscientiously	1	2	3	4	5
205. Sometimes I am not as dependable or reliable as I should be					
206. I pay my debts promptly and in full	1	2	3	4	5
207. Sometimes I cheat when I play solitaire	1	2	3	4	5
208. When I make a commitment, I can always be counted on to follow through	1	2	3	4	5
209. I adhere strictly to my ethical principles	1	2	3	4	5
210. I try to do jobs carefully, so they that won't have to be done again	1	2	3	4	5
211. I'd really have to be sick before I miss a day at work	1	2	3	4	5
212. I am easy-going and lackadaisical	1	2	3	4	5
213. I have a clear set of goals and work toward them in an orderly fashion	1	2	3	4	5
214. When I start a self-improvement program, I usually let it slide after a few days	1	2	3	4	5
215. I work hard to accomplish my goals	1	2	3	4	5
216. I don't feel like I'm driven to get ahead	1	2	3	4	5
217. I strive to achieve all I can	1	2	3	4	5
218. I strive for excellence in everything I do	1	2	3	4	5
219. I'm something of a "workaholic"	1	2	3	4	5
220. I'm pretty good about pacing myself so as to get things done on time	1	2	3	4	5
221. I waste a lot of time before settling down to work	1	2	3	4	5
222. I am a productive person who always gets the job done	1	2	3	4	5

Personality Traits The following statements describe different personality traits that may or may not apply to you. Please read each statement carefully and select a number next to each statement to indicate the extent to which you strongly agree, agree, neither agree or disagree, disagree or strongly disagree with each statement.	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
223. I have trouble making myself do what I should	1	2	3	4	5
224. Once I start a project, I almost always finish it	1	2	3	4	5
225. When a project gets too difficult, I'm inclined to start a new one	1	2	3	4	5
226. There are so many little jobs that need to be done that I sometimes just ignore them all	1	2	3	4	5
227. I have a lot of self-disciplined	1	2	3	4	5
228. Over the years I've done some pretty stupid things	1	2	3	4	5
229. I think things through before coming to a decision	1	2	3	4	5
330. Occasionally I act first and think later	1	2	3	4	5
331. I always consider the consequences before I take action	1	2	3	4	5
332. I often do things on the spur of the moment	1	2	3	4	5
333. I rarely make hasty decisions	1	2	3	4	5
334. I plan ahead carefully when I go on a trip	1	2	3	4	5
335. I think twice before I answer a question	1	2	3	4	5

Section 3 – Work Motivation

Using the scale below, please indicate to what extent each of the following statements corresponds to the reasons why you are presently involved in your work.

Why Do You Do Your Work?

Does not correspond at all	**Corresponds a little**	**Corresponds moderately**	**Corresponds a lot**	**Corresponds exactly**		
1	2	3	4		5	
	1. Because this is the type of work I chose to do to attain a certain lifestyle.	1	2	3	4	5
	2. For the income it provides me.	1	2	3	4	5
	3. I ask myself this question, I don't seem to be able to manage the important tasks related to this work.	1	2	3	4	5
	4. Because I derive much pleasure from learning new things.	1	2	3	4	5
	5. Because it has become a fundamental part of who I am.	1	2	3	4	5
	6. Because I want to succeed at this job, if not I would be very ashamed of myself.	1	2	3	4	5
	7. Because I chose this type of work to attain my career goals.	1	2	3	4	5
	8. For the satisfaction I experience from taking on interesting challenges.	1	2	3	4	5
	9. Because it allows me to earn money.	1	2	3	4	5
	10. Because it is part of the way in which I have chosen to live my life.	1	2	3	4	5
	11. Because I want to be very good at this work, otherwise I would be very disappointed.	1	2	3	4	5
	12. I don't know why, we are provided with unrealistic working conditions.	1	2	3	4	5
	13. Because I want to be a "winner" in life.	1	2	3	4	5
	14. Because it is the type of work I have chosen to attain certain important objectives.	1	2	3	4	5
	15. For the satisfaction I experience when I am successful at doing difficult tasks.	1	2	3	4	5
	16. Because this type of work provides me with security.	1	2	3	4	5
	17. I don't know, too much is expected of us.	1	2	3	4	5
	18. Because this job is a part of my life.	1	2	3	4	5

Section 4 – Job Performance

This section measures your perceptions about your work productivity**.** The important thing to remember is that there are no right or wrong answers to any question. All responses are confidential and the information gathered is only for research purposes to determine what motivates knowledge workers. Please indicate the answer that best describes how you perform your work tasks/duties as actually required now (and not how you plan to do so in the future). On a scale of 1 to 5, please indicate to what extent each of the following statements corresponds to how you approach your work duties/tasks.

Does not correspond at all	**Corresponds a little**	**Corresponds moderately**	**Corresponds a lot**	**Corresponds exactly**
1	2	3	4	5

I adequately complete assigned tasks.	1	2	3	4	5
2. I engage in activities that directly affect my performance evaluation.	1	2	3	4	5
3. I fail to perform essential work tasks.	1	2	3	4	5
4. I fulfil the responsibilities specified in my job description.	1	2	3	4	5
5. I meet the formal performance requirements of my job.	1	2	3	4	5
6. I neglect tasks that are expected of me.	1	2	3	4	5
7. I perform tasks that are expected of me	1	2	3	4	5
8. I help others who have heavy work loads	1	2	3	4	5
9. I am a classic “squeaky wheel” that always needs greasing.	1	2	3	4	5
10. I believe in giving an honest day's work for an honest day's pay.	1	2	3	4	5
11. I consume a lot of time complaining about trivial matters.	1	2	3	4	5
12. I try to avoid creating problems for coworkers	1	2	3	4	5
13. I Keep abreast of changes in the organization.	1	2	3	4	5
14. I tend to make "mountains out of molehills."	1	2	3	4	5
15. I consider the impact of his or her actions on coworkers	1	2	3	4	5
16. I attend meetings that are NOT mandatory, but are considered important.	1	2	3	4	5
17. I am always ready to lend a helping hand to those around me.	1	2	3	4	5
18. I attend functions that are NOT required, but help the company image	1	2	3	4	5
19. I read and keep up with organisation announcements, memos, and so on.	1	2	3	4	5
20. I help others who have been absent.	1	2	3	4	5
21. I Help others who have been absent	1	2	3	4	5
22. I am willingly to help others who have work related problems	1	2	3	4	5
23. I always focus on what's wrong, rather than the positive side.	1	2	3	4	5
24. I take steps to try to prevent problems with other workers.	1	2	3	4	5
25. My attendance at work is above the norm.	1	2	3	4	5
26. I always find fault with what the organization is doing.	1	2	3	4	5
27. I am mindful of how his or her behavior affects other people's jobs.	1	2	3	4	5
28. I do not take extra breaks.	1	2	3	4	5
29. I Obey company rules and regulations even when no one is watching.	1	2	3	4	5
30. I help orient new employees even though it is NOT required	1	2	3	4	5

Thank you for taking the time to fill in this questionnaire. Your participation is greatly appreciated.

6.7 CONSENT TO PARTICIPATE

Consent form for participation

Please read the following, and sign in the space below should you agree to complete the questionnaire. If you have any questions relating to the consent form, please contact the principal researcher, Peace Akure, on 0725714373.

I, on this date……, state that I voluntarily choose to participate in this study. I understand that participation is my choice. I do so knowing that my identity will be protected, and my name is not to be part of the information I give. I understand that this form will be kept separate from the information collected.

Respondent's signature……

Researcher's signature…….

6.8 COVER LETTER

University of the Witwatersrand

School of Economic and Business Sciences

STUDENT RESEARCH

Good Day,
My name is Peace Akure and I am currently studying towards my Masters degree in Business Management at the University of Witwatersrand, Johannesburg, School of Economics and Business Sciences. I am conducting research on the relationship between knowledge worker productivity, personality traits and motivation. I would like to invite you to take part in this survey. The survey research will entail the distribution of questionnaires to knowledge workers in the legal, engineering and information technology industries.

The following questionnaire will require approximately fifteen to twenty minutes complete. There is no compensation for participating nor is there any known risk. This research will attempt to contribute to an improved understanding of knowledge worker productivity, a challenge every organisation faces today.

The study is for academic publication purposes only. The results of the study will be reported in my thesis, which will be published by the University of the Witwatersrand. Confidentiality is ensured at all times, and details that might specifically identify an individual are not required at any stage. The questionnaires will be safely stored for further data analysis and will thereafter be destroyed after a period of five years. I undertake to conduct myself and my research in a manner that reflects the professional ethics of the university.

Clicking the link to the survey will be taken as an indication of consent to participate in the study.
Any queries regarding the questionnaire or any other aspect of the study can be directed to me or to my supervisor, Professor Chris Callaghan on the email addresses or telephone numbers listed below.

Survey link: https://www.surveymonkey.com/s/YXHKKCS

Yours sincerely

Peace Akure

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