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The effect of fixed and mobile broadband usage on entrepreneurial competencies and intentions among individuals within Gauteng

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The effect of fixed and mobile broadband usage on entrepreneurial competencies and intentions among individuals within Gauteng

A research proposal submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in Entrepreneurship and New Venture Creation

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ABSTRACT

Broadband internet is one of the most important information and communication technologies available today, with the capability of providing a fertile environment for entrepreneurship to flourish in South Africa. International literature suggests that broadband can enhance entrepreneurial activities within developed economies, but little research has been conducted on this topic in a South African context. There has been a distinct lack of empirical evidence concerning broadband internet in South Africa and more specifically the differences between the type of broadband (mobile or fixed) used.

The purpose of this study was to identify the relationship between the type of broadband people use, and their entrepreneurial competencies and intentions, within the province of Gauteng. Entrepreneurial competencies included in this study were entrepreneurial self-efficacy, creative problem-solving ability, and networking ability. Data was collected using an electronically distributed survey to people within the province of Gauteng. A final number of 150 respondents were used as the sample for the quantitative analysis.

The findings from the study reveal that the type of broadband people use has no relationship to their entrepreneurial competencies or intentions. The exploratory analysis, however, identified that the amount of broadband people have access to positively correlates to their entrepreneurial intentions. This suggests that broadband internet can positively impact on entrepreneurship in Gauteng.

Key words: Broadband internet, Entrepreneurship, Entrepreneurial competencies, Entrepreneurial self-efficacy, Creative problem-solving ability, Networking ability, Entrepreneurial intentions, Gauteng.

DECLARATION

I, Brett Hudson, declare that this research report is my own work, except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in Entrepreneurship and New Venture Creation (MMENVC) at the University of Witwatersrand Business School, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Brett Hudson

_____

Brett Hudson

Signed at _____Benoni_____

On the _____15th_____ day of _____October_____ 2020

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CHAPTER 1 INTRODUCTION

1.1 Purpose of the study

According to the National Development Plan (NDP) report, creating fertile conditions for entrepreneurship can contribute significantly to alleviating the socio-economic challenges currently faced by South Africa (National Development Plan 2030, Our Future - make it work, 2012). Information and Communication Technology (ICT) can underpin the development of a more inclusive society and will play a key role in realising poverty reduction goals set out in the National Development Plan (National Integrated ICT Policy White Paper, 2016). Broadband is an example of an ICT in which the national, provincial, and local governments of South Africa spend a substantial amount of their budgets developing. In their study of Broadband performance in South Africa, Muckaden, Sundaresan, Calandro, Feamster, and Chetty (2014) measure fixed and mobile broadband connections and suggest that there is a distinct lack of empirical data concerning the use of broadband internet in South Africa. They further suggest that this imposes a severe limitation on innovation in the country.

The purpose of this study was therefore to examine the differences in entrepreneurial competencies between users of mobile internet and users of fixed-line internet services and, secondly, to investigate the differences in entrepreneurial intentions between mobile and fixed-line users.

1.2 Context of study

1.2.1 Broadband internet in South Africa

The internet is regarded as one of the greatest achievements in science and technology of the 20th century and has brought with it countless economic opportunities to societies all over the world (Balachandran & Sakthivelan, 2013). Broadband development has been cited as a key technology allowing citizens to transition into smart societies (Manda & Backhouse, 2016). Lack of high-speed, high-

quality broadband infrastructure has negatively impacted on South Africa's development and global competitiveness (South Africa Connect: Creating opportunities, ensuring inclusion South Africa's Broadband Policy, 2013). The report further states that the lack of adequate fixed broadband infrastructure has forced people and businesses to use more expensive mobile options to access the internet. In their study of obstacles to the growth of new SMEs in South Africa, (Olawale & Garwe, 2010) identified that SME's rank lack of information technology at 13 of 30 in terms of being an inhibitor to growth. Muckaden, Sundaresan, Calandro, Feamster and Chetty suggest that mobile broadband may be outperforming fixed broadband in terms of speed and affordability within South Africa (Muckaden et al., 2014). There has been limited empirical evidence concerning broadband internet's impact on entrepreneurial competencies within South Africa.

1.2.2 Entrepreneurship in South Africa

South Africa has a stagnating economic growth rate and one of the highest unemployment rates in the world (Quarterly Labour Force Survey, 2018). Unemployment has been stubbornly high at approximately 27% and economic growth has been chronically low at approximately 1.5% (*Quarterly Labour Force Survey, Quarter 4: 2017*, 2018). The South African government has acknowledged these issues and has been actively pursuing solutions. Entrepreneurship is regarded as a key tool of the South African government in poverty alleviation and unemployment and can furthermore create new competitive businesses and markets (Muofhe & Du Toit, 2011). The formal and public sector has been unable to absorb the growing number of unemployed citizens within South Africa, leading to increased attention on entrepreneurship and new venture creation as a means of stimulating economic growth and reducing unemployment (Olawale & Garwe, 2010). According to the Global Entrepreneurship Monitor report, South Africa is characterised by a high degree of entrepreneurial activity (Slavica, Herrington, & Menipaz, 2017). The Total Early-Stage Entrepreneurial Activity (TEA) Index for South Africa was 11% in 2017 compared with 20.3% and 9.9% recorded by Brazil and China, respectively. This would normally be viewed as an encouraging indicator for the economy; however, the public should bear

in mind that this high level of entrepreneurial activity in the context of South Africa could be driven by necessity rather than by the more desirable opportunity creation.

1.2.3 Connecting entrepreneurship to broadband

Advancements in ICT are continuously creating new opportunities for digital entrepreneurship (Ngoasong, 2017). For an entrepreneur to venture into the digital realm he/she requires only an internet-enabled device and a connection to the internet. Digital entrepreneurs differ from traditional entrepreneurs in the business models they utilise and can pursue business activities using digital platforms (Hair, Wetsch, Hull, Perotti, & Hung, 2012). The internet provides an important gateway for the entrepreneur to reach and operate in this digital environment. Broadband internet has been a catalyst for economic growth in various sectors of the economy and prior literature suggests a positive relationship between broadband internet speed and GDP growth (Rohman & Bohlin, 2012). The role of the government in the digital economy should be to nurture a digital transformation ecosystem and build an innovative and inclusive digital economy (Hanna, 2018). Initiatives designed to ensure the access to internet can help improve the socio-economic status of communities and provide equal opportunities for education, helping to stimulate the economy of communities via business activities (Aziz, Razak, Malek, Fariza, & MN, 2009).

1.2.4 Entrepreneurial competencies

A competency can be described as the knowledge, skills and behaviours of people, which are needed to complete a certain activity (Brophy & Kiely, 2002). Action regulation theory (ART), along with personality theory suggests that entrepreneurial competencies provide a bridge between entrepreneurial intentions and entrepreneurial actions (Botha, Carruthers, & Venter, 2019). A study conducted by Morris, Webb, Fu and Singhal (2013), sought to distinguish between entrepreneurial competencies and management competencies with the purpose of isolating and then measuring entrepreneurial competencies. The authors used a Delphi technique to identify a core group of entrepreneurial competencies. According to Chan, Yung, Lam,

Tam and Cheung (2001), a Delphi technique is a highly formalised method of gaining consensus from experts in a particular field of interest. The results from the Delphi study identified thirteen entrepreneurial competencies including self-efficacy, creative problem-solving ability and networking ability (Morris et al., 2013). Prior literature suggests that entrepreneurial competencies are critical for achieving business growth and success (Siwan & Jennifer, 2010), which could go a long way in helping South Africa achieve its future economic targets.

1.3 Motivation for the study and problem statement

The Fourth Industrial Revolution (FIR) has been viewed by the South African government as an opportunity to correct the structural issues present within the South African economy, leftover from the Apartheid system. The FIR refers to the symbiosis of humans and machines through artificial intelligence, big data and algorithms with the ability to self-learn (Schäfer, 2018). Although the government believes that the FIR will be an opportunity, it will also bring with it many threats to the way that the traditional economy operates. According to Ślusarczyk (2018), the FIR may bring multiple negative consequences for management teams, future jobs and business models; suggesting that governments around the globe are preparing for this at varying rates. For the South African government to prepare the country for the consequences of the FIR and to monitor the progress of the digital revolution, research must be conducted to understand the effects of broadband internet on entrepreneurial competencies among its citizens. According to Ngoasong (2017), there have been a limited number of studies investigating the role of digital entrepreneurship in emerging economies when compared to developed economies. This Illustrates a need for further research into digital phenomena within an emerging economy like South Africa.

The South African government has been excessively slow to migrate from analogue to digital terrestrial television, which absorbs most of the available bandwidth to transmit signal. Once the migration has been completed, more spectrum will become available for mobile broadband use, thus potentially increasing the access to broadband internet within South Africa (Mbatha & Lesame, 2014). The lack of political

will to digitally migrate television and release more bandwidth for internet connectivity should encourage the reader to research the impact this has had on entrepreneurial competencies in South Africa.

Limited access to broadband internet negatively impacts entrepreneurial activity in developed economies (Rohman & Bohlin, 2012). The reader cannot simply assume that this will be the case in emerging economies as well, as there has been limited empirical evidence to support this view. It appears that a gap in the literature exists when considering the relationship between broadband usage and entrepreneurial competencies in South Africa. Being uncertain of this relationship leaves an opening for further research. To increase entrepreneurial competencies, it will be important to empirically identify the factors enhancing or inhibiting this development. This study attempts to identify the relationship between fixed and mobile broadband usage and entrepreneurial competencies and intentions in Gauteng. A study into the impact of broadband on entrepreneurial competencies could assist policymakers in prioritising investment in areas that could stimulate entrepreneurship. This study will be relevant because it undertakes to analyse the lack of empirical evidence concerning broadband internet's effects on entrepreneurship in emerging economies.

1.4 Research purpose, research question and aims of study

This study aims to establish the extent to which fixed and mobile broadband usage enhance perceived entrepreneurial competencies and intentions within the province of Gauteng. A positive relationship was discovered between broadband internet development and Total Entrepreneurial Activity in developed nations (Rohman et al., 2012). Due to the lack of empirical evidence concerning this topic within emerging economies, it was important to identify whether similar relationships exist between broadband adoption and entrepreneurial competencies and intentions within an emerging economy like South Africa. Although broadband penetration has been increasing in South Africa, there has been a lack of information concerning the performance of mobile or fixed broadband (Muckaden et al., 2014). Furthermore, there appears to be a lack of literature concerning this topic in Africa (Seymour & Naidoo, 2013). The secondary purpose of this research was to add to the body of knowledge

within the entrepreneurial field of study by investigating previously unrelated constructs from an ICT perspective, namely; entrepreneurial self-efficacy, creative problem-solving, networking ability and entrepreneurial intentions. Combining entrepreneurship with ICT is an area requiring more research to better understand how we can use ICT to enhance entrepreneurship, and more specifically, which components of ICT we can focus on (Alderete, 2017).

This study also intended to answer the following research questions:

- What effect does fixed, and mobile broadband have on entrepreneurial self-efficacy among people in Gauteng?
- What effect does fixed, and mobile broadband have on the creative problem-solving ability of people in Gauteng?
- What effect does fixed, and mobile broadband have on the networking ability of people in Gauteng?
- What effect does fixed, and mobile broadband have on the entrepreneurial intentions of people in Gauteng?
- Does capped or uncapped access to broadband have a moderating effect on the relationship between fixed or mobile broadband and entrepreneurial self-efficacy, creative problem-solving ability, networking ability and entrepreneurial intentions of people in Gauteng?

1.5 Definition of terms

Digital entrepreneurship

New ventures derived from ICT's.

Entrepreneur

The entrepreneur is someone who demonstrates initiative and creative thinking and can organise mechanisms to transform resources into opportunities for profit while accepting the risk of failure (Hisrich, 1990).

Entrepreneurship

Entrepreneurship is the process or practice of starting new organisations or ventures in response to identified opportunities (Eroglu & Picak, 2011).

Entrepreneurial Competencies

Individual characteristics that include knowledge, skills, attitudes, and behaviours which enable the entrepreneur to achieve and sustain business success (Ahmad, 2007; Brophy & Kiely, 2002).

General Purpose Technology

For this study, the definition used for GPT's was derived from (Bresnahan & Trajtenberg, 1995) which states that GPT's are revolutionary technologies that facilitate and spur on the creation of further innovations.

Broadband internet

Any high-speed internet access that is always on excluding mobile connectivity (Stenberg, 2014). Several types of transmission technologies are included in this terminology: Digital Subscriber Lines (DSL), Fibre, Wireless, and Satellite.

Self-efficacy

Self-efficacy refers to the belief in one's ability to perform a task proficiently. In the context of this thesis, it more specifically refers to the degree to which the entrepreneur believes the use of broadband, and the increased access to information associated with it, will be beneficial to their future entrepreneurial endeavours (Dwivedi, 2005).

1.6 Theoretical foundations

This study made use of several theories grounded in digital entrepreneurship, psychology, and innovation. The theory of GPT's states that certain revolutionary technologies are responsible for the direct and indirect creation of many new technologies (Aragón, Miranda, Oliva, & Miranda, 2016). In the case of this thesis,

broadband internet was considered to be the general-purpose technology, due to its ability to enhance innovation, enable the development of new technologies, new products and services, improved business models and to increase the overall competitiveness and flexibility of the economy (Vickery, 2007). GPT's are further defined as low frequency but highly disruptive technological shocks, able to generate long-term positive effects within an economy (Jovanovic & Rousseau, 2005). General consensus concerning GPT's effects on economic growth has been that they lead to an improvement in aggregate productivity within an economy, mainly through the improvement of labour productivity (Ristuccia, 2014). This study attempted to identify whether this increase in labour productivity could translate into entrepreneurial competence and intent.

The theory of planned behaviour (TPB) suggests that the usage of a technology by a person has been driven by their behavioural intentions which include attitudes, subjective norms and perceived behavioural control (Manzoor, 2014). TPB has been used by many scholars in an attempt to study and understand the adoption by consumers of ICT's such as broadband (Aboelmaged, 2010).

The diffusion of innovation theory has been used to assist in the understanding of the pattern of adoption in predicting the success or failure of new technologies. Diffusion of innovation can be defined as a theory, originating from the field of communication, that attempts to explain how a new technology spreads through society over time (Rogers, 1995). The theory suggests that there are several stages at which an innovation is diffused. The six steps critical to innovation diffusion include the stage of awareness, a phase of interest, a phase of evaluation, a trial phase, an adoption phase and finally the retreat phase respectively (Al Dafa'ai & Al Sa'aidi, 2017).

Social learning theory suggests that psychological procedures of any format serve as a way to create and strengthen expectations of a person's effectiveness (Bandura & Adams, 1977). The authors further state that perceived self-efficacy can influence the choice of tasks, how much effort will be expended and how long the person will persist in the face of adversity. The stronger the person's perceived self-efficacy, the more likely they are to persist in a task due to enhanced coping efforts. Adding to the theory

concerning self-efficacy, the social cognitive theory suggests that high levels of self-efficacy are required to overcome adversities often faced by technological entrepreneurs (Balkin, Baron, & Markman, 2002).

The Investment theory of creativity was based on the premise that creativity has six distinct but interrelated resources, namely; knowledge, intellectual abilities, motivation, styles of thinking, personality and the environment (Sternberg, 2006). The author further suggests that the creative individual invests in an unpopular idea and persists until the idea gains popularity. The theory seeks to understand the foundations of creativity cohesively and suggests that it may seem rare amongst people due to the large resource convergence required to generate it (Sternberg & Lubart, 1991).

1.7 Contribution of study

This study could assist researchers in understanding the effect mobile and fixed broadband use has on entrepreneurial competency and intentions within the province of Gauteng. It builds on the recent research conducted by (Rohman et al., 2012) where the relationship between broadband speed and economic growth of 34 countries was assessed by the Organisation for Economic Co-operation and Development (OECD). Rather than focusing on investigating the effect of broadband speed, this thesis focused on broadband type (fixed or mobile). The geographical focus of this study was the province of Gauteng.

This study sought to assist in identifying whether the type of broadband adopted was significantly related to the rate of entrepreneurial competency and intentions and whether the promotion of one type of broadband over the other could enhance the government's ability to harness the fourth industrial revolution for its strategic medium to long-term goals. This study is important because as it attempted to assist researchers in identifying a potential tool for stimulating entrepreneurial growth in Gauteng. It also aids in drawing the attention of policymakers to a potential stumbling block in achieving their medium to long-term entrepreneurial growth targets. This research could be replicated in other provinces as well as developing nations, assisting them in unlocking entrepreneurial growth.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This section reviews the literature pertaining to broadband as a GPT, the theory of planned behaviour, diffusion innovation theory as well as entrepreneurial competency and entrepreneurial intention. The hypotheses were subsequently developed according to findings in the literature. Finally, the conceptual framework will be developed.

Entrepreneurial activity in South Africa has been stagnating in recent years, since the end of the global financial crisis of 2008 (Herrington, Singer, & Menipaz, 2018). International studies have shown that broadband development has a positive correlation to the intensity of e-commerce activities within developed economies. Few studies have been conducted within emerging economies however, and even fewer have attempted to draw a link between the type of broadband usage and entrepreneurial competency. It was for this reason that a large portion of the literature review has been constructed from literature concerning developed economies.

Prior research suggests a positive link between broadband development and economic growth (Atif, Endres, & Macdonald, 2012). Broadband infrastructure has been widely regarded by scholars as a General Purpose Technology (GPT) with great potential for stimulating economic growth (Bertschek et al., 2013). The existing theory also suggests that GPT's are often accompanied by a rise in the process of creative destruction (Jovanovic & Rousseau, 2005); which in turn implies a stimulation in entrepreneurial activity.

2.2 Background Discussion

2.2.1 General Purpose Technologies

The ability of a technology to be applied to multiple sectors in a generalised fashion was first referred to by Smith (1776). Centuries later, after multiple GPT's had been developed, the term 'General Purpose' entered the academic realm (David, 1990).

Bresnahan and Trajtenberg (1995), have been credited with formalising the ideas surrounding GPT's by suggesting that for a key technology to be considered a GPT, it must be characterised by the potential for pervasive use in a range of sectors. Researchers refer to these ground-breaking technological changes as GPT's and include innovations such as the steam engine, electricity, and the computer. According to Aragón et al. (2016), literature concerning GPT's has been highly fragmented and contains multiple conflicting ideas. They further suggest that this occurs through a phenomenon called 'innovational complementarities' which states that innovations in GPT's can increase innovations within sectors downstream. As a GPT evolves, it spreads throughout the economy creating generalised productivity gains. Broadband technology, especially when combined with computers, is considered a GPT which facilitates and encourages access to information and ideas within an economy (Czernich, Falck, Kretschmer, & Weismann, 2011).

The concept of continuous creation of innovations has been of particular importance when examining GPT literature. As stated by Jovanovic and Rousseau (2005), a GPT describes a new method of production or invention that can have a protracted aggregate impact. As the initial impact on aggregate production is limited due to the low adoption rates of the new technology, it is critical for the technology to remain relevant to society for a sustained period of time to influence aggregate production. Trajtenberg & Rosenberg, (2004) coined the term 'general applicability' when considering whether a technology could be considered a GPT. They further stated that it is vital for the technology to perform some generic functions that can be adopted by multiple sectors within the economy.

In summation of the theory concerning GPT's, three characteristics have been generally accepted by academics: firstly, the technology must have general applicability, secondly, it must have technological dynamism and thirdly it must be innovation spawning (Cantner & Vannuccini, 2012).

2.2.2 Endogenous Growth Theory

Endogenous Growth Theory (EGT) suggests that economic growth is a result of internal rather than external forces in a country (Romer, 1994). According to EGT, endogenous factors include human capital, innovation, and knowledge. Subsequently, investment in these factors will contribute significantly to the economic growth of an economy. There has been consensus within the literature suggesting that broadband development leads to an enhancement in innovation and human capital development. As stated by Cantner & Vannuccini (2012), broadband internet has resulted in rapid innovation and contributed to one of the greatest periods of economic growth in history. The literature concerning EGT goes further to suggest that investment in broadband infrastructure should enhance economic growth by facilitating the development of innovative processes (Atif et al., 2012). This ties back to the research conducted in this study as it attempts to identify whether broadband can have differing effects on the entrepreneurial competencies of self-efficacy, creative problem-solving and networking ability. Along with knowledge being a key factor in EGT, it serves too as a critical component of creative problem solving (Sternberg et al., 1991). In prior literature, self-efficacy has been shown to have a positive relationship with entrepreneurial activity and it has been suggested that it too is critical to most human functioning within a work environment (Balkin et al., 2002). Extant literature suggests that self-efficacy is an important component of human capital and thus EGT as well.

2.2.3 Broadband internet

Several international studies have shown empirical evidence of a positive relationship between broadband speeds and economic growth. The study conducted by Rohman and Bohlin (2012) showed that the estimated coefficient of broadband speed was positive when considering economic growth. Increasing the broadband speed by a factor of two will contribute 0.3% GDP growth when compared to the growth of the base year. This study used quarterly balanced panel data based on 34 OECD countries, excluding South Africa.

According to Atif et al. (2012), broadband has had a positive effect on economic growth. The results of their study suggest that a 10% growth rate of broadband penetration will increase economic growth per employee by 0.035 percentage points. This study used the annual panel data of 34 OECD nations over a period of twelve years, from 1998 to 2012. Interestingly, and in confirmation of Rohman and Bohlin (2012), broadband penetration also has a positive effect on economic growth. This study has suggested that broadband internet has been a critical input for economic growth and development.

According to the article by Grimes, Ren and Stevens (2009), the article provides critical insights into the effects of broadband at a firm-specific level. The authors acknowledge that there has been a limited number of studies quantifying the benefits firms gain from broadband access and that most of the research has been conducted at a national (rather than provincial) level. It was interesting to note the reason given by Grimes et al. (2009) for the lack of research concerning the quantifiable benefits accruing from broadband access. The article states that despite the large amount of research concerning factors affecting the adoption and diffusion of ICT's, there has been limited research concerning the impact on the productivity of a shift from one kind of internet access to another.

The study conducted by Ngoasong (2017) was qualitative in nature and differs from the norm concerning this topic, which has been mostly conducted using quantitative methods. An important finding of this study was the positive impact that ICT's had on creating new opportunities for entrepreneurial activities within emerging markets. This thesis focused on a specific component of ICT's, namely; broadband. It was interesting to note from this study that ICT's can appear to stimulate entrepreneurial activity. The above study was important to this thesis as it was one of a limited number of studies that relate ICT's to entrepreneurial activity within an emerging economy. A key observation made by Ngoasong's study was the limited body of international research concerning digital entrepreneurship in developing economies. This observation encouraged this thesis to bridge this gap in the research. This thesis built on from the above study, adapting several variables and methods.

A study conducted by Alderete (2017) examined whether mobile broadband could be an enabling factor for entrepreneurship in developing and developed countries. A panel data analysis was conducted for 58 countries which concluded that mobile broadband does have a positive influence on entrepreneurial activity. Although this paper helps provide a link between ICT and entrepreneurship, Alderete (2017) suggested that this is an area where more research is needed.

The critical lack of empirical evidence concerning broadband internet development in South Africa poses significant constraints on innovation (Muckaden et al., 2014). This study was one of a very limited number which included the topic of broadband within the context of South Africa. The study goes deeper than this thesis in terms of measuring broadband performance, which includes broadband speed and latencies.

New ventures are an integral component of the solution to many of South Africa's developmental issues (Olawale & Garwe, 2010). It was based on this premise that this thesis was developed. According to the study, new ventures in South Africa have an abnormally high failure rate. Their study provides a greater overview of the problems facing SMEs in general, which was critical to understand before pursuing this thesis. The reader must understand the whole context of entrepreneurship before looking at one specific component, which in the case of this thesis was broadband usage and entrepreneurial competencies. A key finding of the study conducted by Olawale et al. (2010) was that a lack of information technology (IT) was identified as an obstacle by entrepreneurs. This finding supported the research question of this thesis as broadband technology falls into the remit of information technology. Another interesting finding by the study was the importance of IT on the sales function of new ventures. Entrepreneurs identified IT as crucial to achieve sales. This thesis intends to build on this finding by focusing attention on one component of information technology (broadband development) rather than the entire field of IT.

GPT's were an important theory considered in this thesis. As previously mentioned, they are likely to result in a prolonged economic impact on society. According to Jovanovic & Rousseau, (2005), electricity and IT are identified as the two most important GPT's of the modern era. A major postulate of this study was the innovation

attributed to the field of IT. The study identified that the number of patents and trademarks issued for IT dominates the number for electricity. This finding was important for this thesis as we attempted to identify the relationship between broadband (a component of IT) and entrepreneurial competencies (a component of entrepreneurship). Another interesting finding identified by the study was the dynamic nature of IT and its continuous price decline. In South Africa, the prices of fixed broadband and mobile broadband differ. This thesis intended to build on the research of the above study by looking at IT's impact on productivity and innovation among entrepreneurs.

2.2.4 Broadband adoption

Studies on broadband adoption have been conducted on both a micro and macro level in an attempt to understand patterns of acceptance and deployment throughout the developed world (Mugeni, Wanyembi, & Wafula, 2012). Extant literature suggests that very few studies have been conducted in emerging economies concerning broadband deployment (Dwivedi & Papazafeiropoulou, 2007). One such study conducted by Dwivedi, Selamat and Lal, (2008) suggested that three constructs are of particular importance when considering broadband adoption within an emerging economy, namely; social influence, perceived usefulness and perceived ease of use.

2.3 Competencies in the context of entrepreneurship

Studies conducted in a range of disciplines suggest that proficiency within specific competencies has been associated with increased productivity (Hayton & Kelley, 2006). This implies that higher performers exhibit certain observable behaviours more consistently in comparison to average performers. Developing further insights into competencies was important for the field of entrepreneurship as it can assist in leading to the advancement of entrepreneurial education as well as the improvement of entrepreneurship in practice (Morris et al., 2013). Hayton and Kelley (2006) suggested that the study of competencies can be problematic due to the lack of universal definitions for competencies. The authors further stated that competence

assessments are usually based on individuals, whereas the definition of the concept of competency attempts to also include context.

A study conducted by Bird (1995) suggested that competency can be used to represent a baseline standard for the planning and execution of a new venture and a higher standard for achieving and maintaining growth. There has been little consensus in the field of entrepreneurship regarding the importance of particular competencies over others (Morris et al., 2013). The authors further suggest that the greatest emphasis has been placed on competencies concerning functional business and general management skills with little insight on entrepreneurial skills.

Research conducted within the field of entrepreneurial competencies suggest that competency rather than intention be used as there is empirical evidence suggesting that intention does not always lead to individuals starting businesses (Botha et al., 2019). The study found that there was no empirically significant relationship between entrepreneurial activity and recurring entrepreneurial intention attitudes. Apart from contributing to entrepreneurial-intention literature, the study identified specific entrepreneurial competencies future researchers could focus on. These competencies include creative problem solving, opportunity recognition and value creation. Anokhin, Hisrich, and Grichnik (2008) found that entrepreneurs with greater skills or competencies, such as communication or networking skills, were more likely to start multiple ventures. The study further suggested that there was a significant difference between entrepreneurs from emerging nations and developed nations, however, there are certain competencies that are similar among serial entrepreneurs from each type of nation. The literature concerning personality theory suggests that looking at competencies rather than traditional personality traits has been far more advantageous for determining an individual's likelihood for success (Boyatzis, 2008). Competencies such as opportunity recognition, networking ability and risk-taking propensity can make the entrepreneur more adaptable to changing environments and technological changes (Kellermanns, Eddleston, Barnett, & Pearson, 2008).

The dependent variables chosen for this study were Entrepreneurial self-efficacy (ESE), Creative problem-solving ability (CPS), Networking ability (NA) and Entrepreneurial intentions (EI).

ESE was selected as a dependent variable as prior literature suggests that self-efficacy for a certain behaviour can lead an individual to persist through adverse situations to the point of experimentation and knowledge acquisition (Bandura, 1997). In a study conducted by LaRose, DeMaagd, Ei Chew, Tsai, Steinfield, Wildman and Bauer (2012), it was identified that self-efficacy was a significant predictor of broadband intentions. The literature has not yet identified whether a link between entrepreneurial self-efficacy and broadband usage exists. In other words, can an individual use broadband to acquire knowledge to improve their confidence in succeeding in an entrepreneurial venture? Due to the lack of evidence supporting this question, a proposition will be formed in place of a hypothesis.

Proposition 1: There is a positive relationship between primary mobile broadband usage and entrepreneurial self-efficacy.

CPS was an important construct to evaluate when considering broadband usage amongst individuals as there has been somewhat of a conflicting idea that creative problem solving would be enhanced by the usage of broadband, when empirical evidence seems to suggest otherwise. In a study conducted by Firth and Mellor (2005), the study identified that if self-directed learning was not encouraged in conjunction with broadband use, it may limit imagination, creativity and curiosity rather than enhance it. It was therefore important to identify whether this was indeed the case amongst individuals within Gauteng when studying the effects of broadband usage.

Hypothesis 2: There is a positive relationship between primary mobile broadband usage and creative problem-solving ability.

Prior literature suggests that the ability to manage network relationships has long been recognised as an important factor in a firm's ability to innovate and create competitive advantages (Mu, Thomas, Peng, & Di Benedetto, 2017). Networking has been found to enhance the performance and viability of teams and was thus an important

component of new venture success and new product development (Balkundi & Harrison, 2006). As an entrepreneur progresses past the initial stages of a new venture, further developing technological and commercial innovations, networking ability becomes a critical factor in their success (Yun & Park, 2016). Networking ability can give the entrepreneur access to resources necessary for the sustained success of the venture. It was for this reason that networking was selected as a variable for this study.

Hypothesis 3: There is a positive relationship between primary mobile broadband usage and networking ability.

Individuals with entrepreneurial intent can be separated from individuals who are likely inclined to pursue entrepreneurial ventures (Urban, 2012), indicating the importance of entrepreneurial intent within the field of entrepreneurship. Prior literature suggests that inadequate communication infrastructure (mobile broadband and digital networks) within an environment can harm entrepreneurial intentions (Feldman, 2014; Isenberg, 2010). It was therefore important to understand the effects of broadband on entrepreneurial intentions.

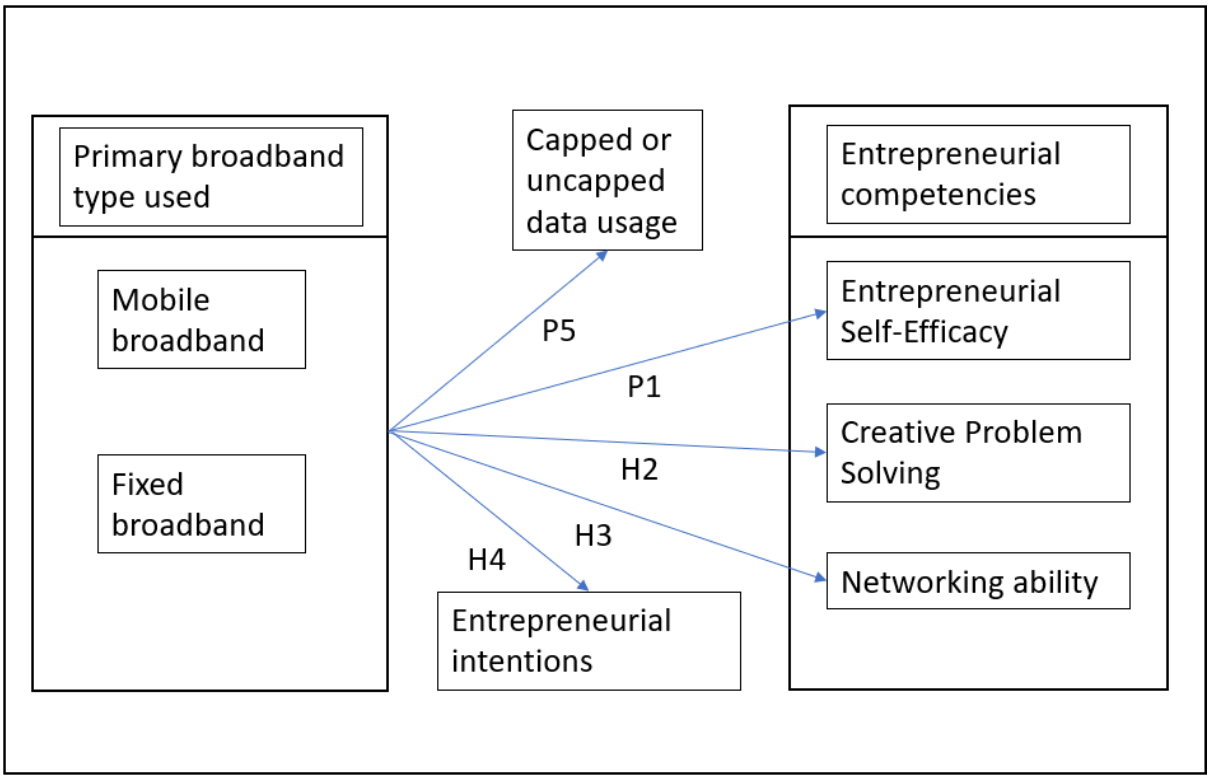
Hypothesis 4: There is a positive relationship between primary mobile broadband usage and entrepreneurial intentions.

The philosophical roots underpinning this thesis were based on empirical evidence concerning GPT's and their positive impacts on economic growth. The advancement of digitisation within an emerging economy creates new opportunities for entrepreneurs to exploit (Ngoasong, 2017). GPT's can fundamentally change the functioning of economic and social structures within a society. Broadband has been commonly viewed as an essential component of a globally competitive economy, and, when combined with ICT's, can determine where and how economic activity is organised (OECD, 2008). Due to the multitude of factors influencing the reader's decision to choose one type of broadband service (cost, availability, and reliability) it was also important to examine whether one type has a significant advantage over the other.

The moderating influence of data usage on mobile and fixed broadband has not been sufficiently studied in literature. The literature has however identified a link between the usage-based pricing model and the user experience, suggesting that capped usage creates uncertainties for users (Chetty, Banks, Brush, Donner, & Grinter, 2012). Due to the limited theory on this relationship, a positive relationship is proposed rather than hypothesised.

Proposition 5: Data usage has a moderating effect on the type of data used.

Figure 2-1: Study Conceptual Model



2.7 Critical unpacking of concepts

The main concept presented in this thesis was that a difference in entrepreneurial competencies exists between the users of fixed and mobile broadband internet in

Gauteng. It was out of this concept that the main variables were derived. The independent variables used in this thesis were Fixed broadband users and Mobile broadband users. As the world progresses from an industrial to an information society, broadband must become embedded within the entire socio-economic system (Baelden, Lievens, Marsigny, & Pierson, 2007). When compared to fixed broadband in developing countries, particularly low income, and rural areas, mobile broadband has a positive effect on GDP where fixed broadband has no real effect (H. G. Thompson & Garbacz, 2011). Increasing returns from mobile telecommunication adoption have also been observed when assessing productivity growth amongst both low and high-income countries (Gruber & Koutroumpis, 2014). Mobile broadband access has become more popular due to the mobility of the connection, the low set-up costs and less required maintenance relative to fixed lines (Muckaden et al., 2014). In the field of entrepreneurship, mobile broadband has also been found to positively influence entrepreneurial activity (Alderete, 2017). It was for the above-mentioned reasons that there has been a global trend to use mobile broadband as a solution for the low broadband penetration experienced in rural communities (Prieger, 2013); of which South Africa has many.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Research design

The primary instrument used in this study was an electronic, self-administered questionnaire. This approach was preferred as it provided an effective means of surveying multiple people within the chosen population, over a wide area with relative ease (Ketokivi & Hameri, 2009). The data was collected through surveys distributed electronically to people between the ages of 18-65 within the area of Gauteng. This was also advantageous as it allowed for the survey to be completed at the respondent's convenience with limited bias (Mugeni et al., 2012).

A limitation to this method was that the primary data needed to be collected and this took a long time to complete. Secondary data was not used as it would have been difficult to manipulate due to it being collected by a third party with no affiliation to this study. Secondary data poses a problem as the researcher must locate data sources which would be useful, given their research problem (Hox & Boeije, 2005). This study was conducted in a cross-sectional design method. The survey was designed using inspiration from existing surveys within the academic sphere. The time dimension of this study was cross-sectional as the survey was administered once and represented a point in time. The research was conducted in a field condition as respondents were probably in a home or work environment to have completed the surveys in a home or work environment.

3.2 Sample and sampling method

The population of interest for this research was defined as people within Gauteng between the ages of 18-65 who use social media. It was important to target respondents who use social media as it implied that they had access to either a mobile or fixed broadband connection. The population size of Gauteng is approximately 15,176,116 people (Statistical release Mid-year population estimates, 2019). The penetration rate of social media within a South African context is approximately 27%

(Budree, Fietkiewicz, & Lins, 2019). If we extrapolate the South African rate for the population of Gauteng, we get a population size of 4,097,551 people using social media in the province. Due to the viral nature of social media, it was decided to use the approximate number of people on social media in Gauteng for a sample size rather than the author's immediate network. The author asked respondents to share the survey with their own networks, thus potentially increasing the reach of the survey. The data was administered using electronic surveys alone, to simplify the data collection process. Social media profiles belonging to the author were the main tool used to distribute the electronic link with the target sample. For respondents to access the electronic survey, they needed to have an active social media profile with a primary or secondary connection to the author.

The population for this study included people living in Gauteng who use social media. The population size for this study is 4,097,551 people. The sampling frame for this study included people from this population between the ages of 18-65 who are or aspire to be an entrepreneur at some point in their life. The age of between 18-65 was chosen to represent people of a working age. Due to the entrepreneurial nature of the study, it was important to select a sample from people who have an entrepreneurial spirit, whether this has been acted upon or not. A sample size of 150 people was chosen from this population. The sample required 150 respondents to provide a meaningful sample for analysis. Due to the limited time available, a larger sample would have been impractical. A convenience sampling technique was used to gather the sample. The author used the first 150 respondents who completed the survey as the sample. Due to the nature of the electronic data collection method used, the author had no influence over the selection of the survey respondents.

The primary sample source for this study was an electronically distributed survey. The sample data was regarded as primary data as the researcher collected and processed the sample data directly. The survey was self-administered through a combination of social media platforms. The social media platforms included Linkedin, Facebook, Twitter, and WhatsApp messages. Due to the implication that respondents were requested to complete the survey voluntarily, the sample was unlikely to result in a

satisfactory representation of the population. Using Qualtrics (2019) software to capture and download the data, 183 responses were recorded. The sampling summary can be seen in Table 3-1 below. From the 183 responses, a number of them were discarded, mainly due to incomplete surveys and respondents from provinces other than Gauteng. After preparing the data for analysis, 150 workable respondents remained and were analysed.

Table 3-1 Sampling Summary

Variable	**Description**
Target population	People living in Gauteng
Sampling unit	People between 18 & 65
Population size	4,097,551
Final sample size	150
Sampling error (Confidence level)	95%

3.3 Measuring Instruments

A survey was designed as the data collection instrument for this study. A self-administered questionnaire was used to collect the data, namely; a Likert scale with seven options. The interview questions were then divided into multiple sections. Firstly, the control variables were collected. Secondly, the sections were divided according to each hypothesis (H1-H4). A total of 31 questions were asked in the survey.

Section 1 – Demographic data – 5 questions

Section 2 – Control data – 2 questions

Section 3a – Entrepreneurial Intentions – 7 questions

Section 3b – Entrepreneurial Self-efficacy– 5 questions

Section 3c – Creative Problem Solving– 5 questions

Section 3d – Networking Ability – 5 questions

A seven-point Likert scale was used, as it has been regarded as a proven scale for most researchers. As much of the research in the field of entrepreneurship has been conducted using a seven-point Likert scale, this study conformed for comparability. A seven, rather than a five-point scale, was used as Hair et al, (2007) suggest that respondents usually avoid the extreme points, thus effectively making a seven-point scale a five-point scale. Due to the larger number of options available to respondents, the strength of opinion can also be measured. A larger scale may have confused respondents, creating a situation whereby random results were selected.

The instrument has been adapted for this thesis from several studies. As shown in Table 3-2 below, the Individual Entrepreneurial Intent Scale was adapted for this study to measure Entrepreneurial Intentions (Thompson, 2009). Entrepreneurial Self-efficacy was adapted using the scale developed by Liñán, Rodríguez-Cohard, and Rueda-Cantuche (2011). Creative Problem Solving was adapted using the scale developed by Hmieleski and Corbett (2006). Networking Ability has been adapted using the scale developed by Forret and Dougherty (2001).

Table 3-2 Construct Sources

Construct	**Source**	**Cronbach's Alpha**
Entrepreneurial Self-efficacy	Liñán, Rodríguez-Cohard, & Rueda-Cantuche, 2011	0.863
Creative Problem Solving	Hmieleski & Corbett, 2006	0.861
Networking Ability	Forret & Dougherty, 2001	0.799
Entrepreneurial Intentions	Thompson, 2009	0.759

3.4 Data analysis

A descriptive analysis was conducted to be able to develop sufficient knowledge to describe the data authentically. Characteristics, distributions, spreads, and shapes of the data were analysed. An Exploratory Factor Analysis (EFA) was initially conducted to assess the number of constructs present in the scale. An EFA was also used to determine the underlying structure between a relatively large set of variables (Norris & Lecavalier, 2010). Once the factors were identified, a Cronbach's Alpha coefficient was used to test the internal consistency reliability of the remaining scale items (Gliem & Gliem, 2003). The data was then analysed using a Non-parametric Mann-Whitney U test as well as Ordinal regression analysis. The Mann-Whitney U test is a test of the null hypothesis stating that there is an equal chance of a randomly selected value from one of the populations, which will be greater than or less than a randomly selected

value from an alternative population (Mann & Whitney, 1947). An Ordinal regression was selected as it was the best-suited analysis method to analyse a dichotomous independent variable (McCullagh, 1980). Another reason for selecting a regression analysis was due to the metric characteristics of the dependent variables. The regression was used for its ability to test and explain causal theories (path analysis). In this study, the causal relationship of broadband type on entrepreneurial competencies and intentions was assessed.

3.5 Ethical considerations

This study collected data from private individuals using an electronically distributed questionnaire. As a result, certain ethical considerations needed to be observed by the researcher. This study attempted to collect data responsibly, making sure that consent was obtained by the participant before their involvement in the survey. The importance and significance of this research was clearly stated to the participant before the questionnaire could be completed and the option to withdraw from the study at any time, without consequence, was made clear. The participant's data has been and will continue to be kept confidential and only the aggregate results have been revealed. The researcher also applied for ethical clearance from the Wits Ethics Committee before administering the final questionnaire. The Wits Ethics protocol number is WBS/BA1656054/782, and the ethics clearance certificate has been included in the appendix.

CHAPTER 4 RESEARCH RESULTS

4.1 Introduction

This chapter presents and interprets the results of the analysis based on the methodology outlined in Chapter 3. An electronic questionnaire was distributed using the Qualtrics platform. The primary data collected through the Qualtrics online platform were analysed using IBM SPSS version 26 statistical software. The first section of this chapter presents the descriptive statistics of the survey respondents, the exploratory factor analysis, and the reliability analysis. The second section presents the Non-parametric analysis and Ordinal regression analysis.

4.2 Completeness of the data

The data collected from the survey was downloaded into a Microsoft Excel file for the preparation to take place. The data was automatically coded using the Qualtrics platform. A missing value analysis was conducted to assess the completeness of the data. Of the 183 respondents, twenty-five cases were recorded as incomplete. Furthermore, a total of six respondents were not residents from the province of Gauteng and were removed from the analysis. Furthermore, two respondents did not fit into the age criteria of the sample and were removed. After the missing value analysis was complete, a sample size of 150 respondents was left for further analysis.

4.3 Demographic profile of respondents

4.3.1 Gender and Race

The results from the sample characteristics revealed that there were more male respondents (56%) than female respondents (44%) within the sample. The sample was made up of mostly white respondents (91.3%) followed by a much lower number of black respondents (6.7%) and Asian respondents (0.7%). The field in the survey form specifying ‘Other’ races, made up a minor portion of the sample (1.3%). Table 4-

1 illustrates the distribution of race and gender according to the sample. Figure 4-1 and 4-2 below, illustrate the gender and race split, respectively. An interesting insight discovered in the analysis was that women scored an average of approximately 10% higher for entrepreneurial intentions, entrepreneurial self-efficacy, and networking ability, than did men.

Table 4-1 Gender and Race Cross Tabulation

			Race				
			White	Black	Asian	Other	Total
Gender	Female	Count	61	3	1	1	67
		% Within Race	44.5	30.0	100.0	50.0	44.7
	Male	Count	76	7	0	1	83
		% Within Race	55.5	70.0	0.0	50.0	55.3
Total		Count	137	10	1	2	150
		% Within Race	100%	100%	100%	100%	100%

Figure 4-1 Pie Chart Describing Difference in Gender of Survey Participants

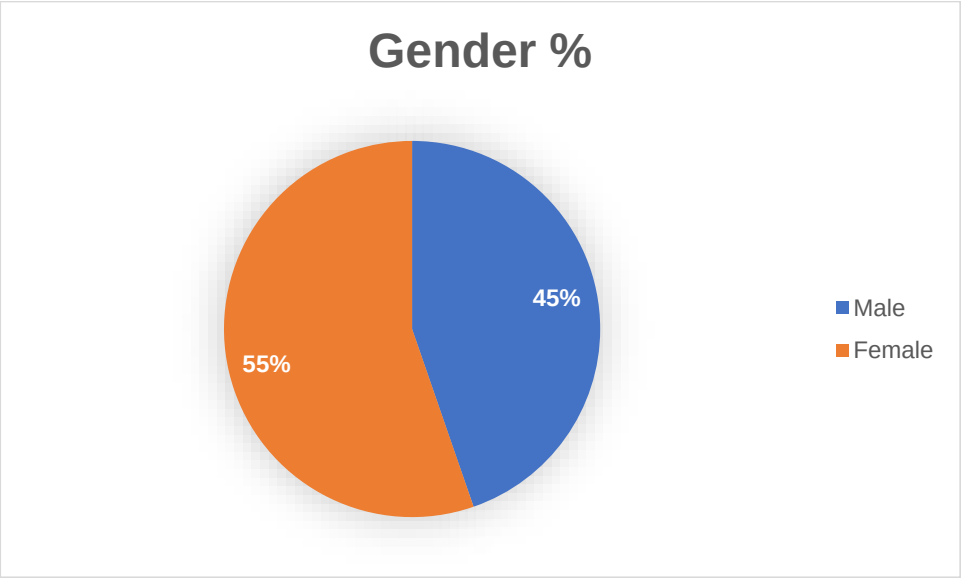
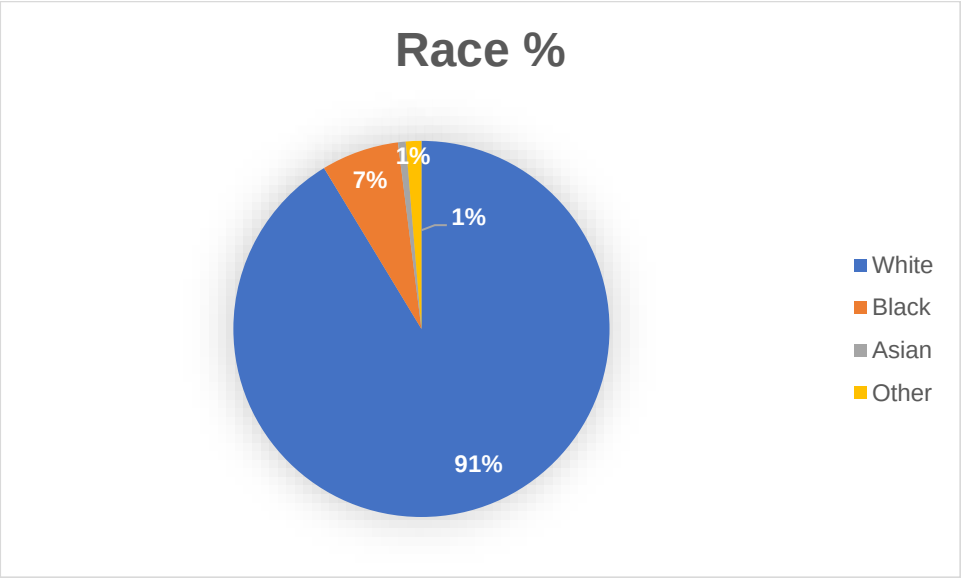


Figure 4-2 Pie Chart Describing Difference in Race of Survey Participants



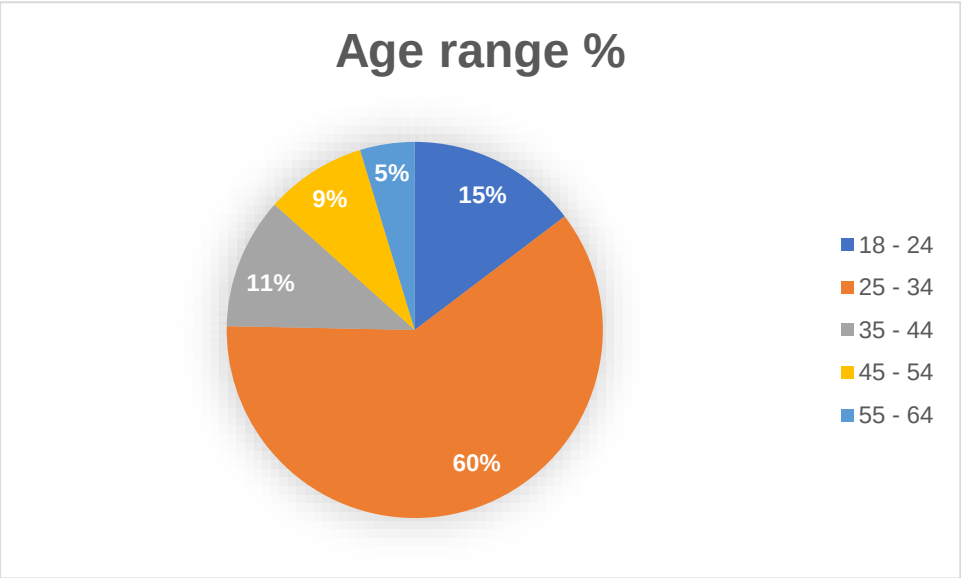
4.3.2 Age group

The majority of the respondents were in the age group of 25-34 (60.7%), followed by the age group of 18-24 (14.7%), the age group of 35-44 (11.3%), the age group of 45-54 (8.7%) and lastly the age group of 55-64 (4.7%). As illustrated in Table 4-2 below, there was an overwhelming number of people within the age group of 25-34. Figure 4-3 illustrates the distribution of ages in a pie chart.

Table 4-2 Age Group

Age range	Frequency	Percent	Cumulative Percent
18 - 24	22	14.7	14.7
25 - 34	91	60.7	75.3
35 - 44	17	11.3	86.7
45 - 54	13	8.7	95.3
55 - 64	7	4.7	100.0
Total	150	100	

Figure 4-3 Pie Chart of the Age of respondents



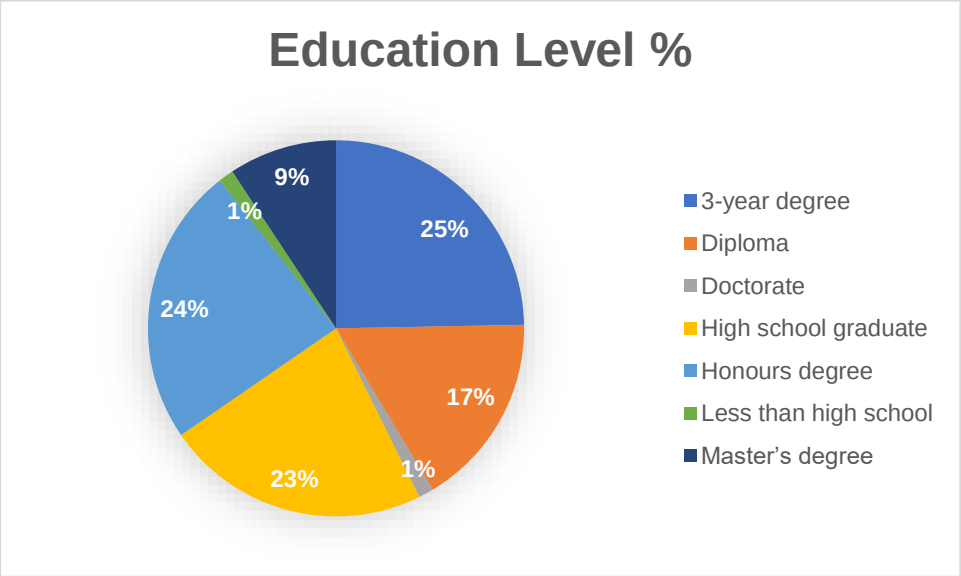
4.3.3 Education Level

Table 4-3 illustrates that the highest percentage of respondents had a 3-year degree (24.7%), followed closely by an Honours degree (24%), a high-school certificate (22.7%), a Diploma (16.7%), a Master's degree (9.3%), a Doctorate (1.3%) and less than high-school (1.3%). Figure 4-4 below, illustrates a pie chart of the education Level distribution. The majority of respondents had a tertiary education implying that they were highly educated. This was likely due to the distribution of the survey as a large amount of the data was collected online using a professional network, namely; Linkedin. The Linkedin platform is mainly used by professionals and was likely to appeal to more educated members of society.

Table 4-3 Education Level

	Frequency	Percent	Cumulative Percent
3-year degree	37	24.7	24.7
Diploma	25	16.7	41.3
Doctorate	2	1.3	42.7
High school graduate	34	22.7	65.3
Honours degree	36	24.0	89.3
Less than high school	2	1.3	90.7
Master's degree	14	9.3	100.0
Total	150	100.0	

Figure 4-4 Pie Chart detailing the different levels of Education of respondents



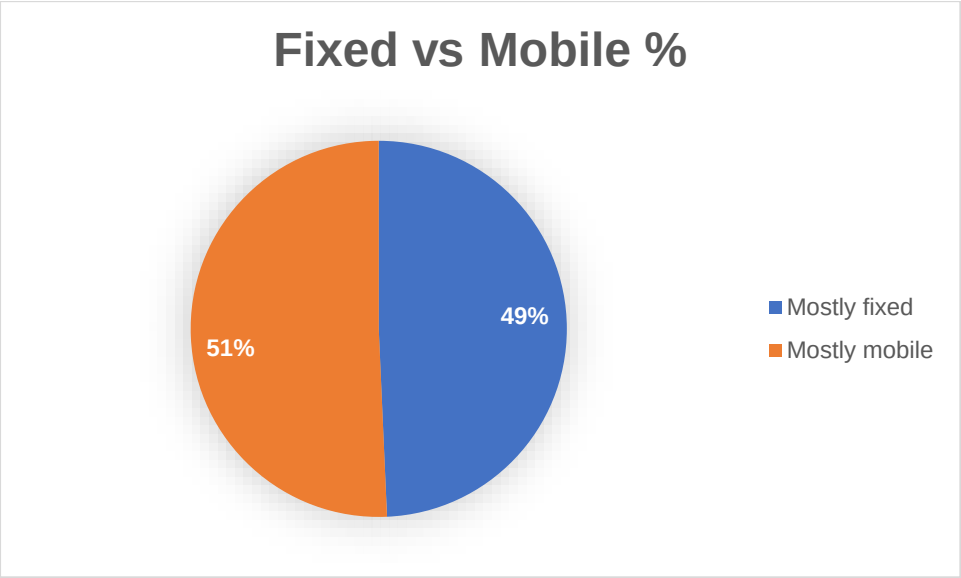
4.3.4 Mobile or Fixed Broadband

The respondents were very evenly distributed between their use of mobile and fixed broadband. Table 4-4 illustrates that slightly more respondents use mobile data (50.7%) than fixed data (49.3%). Figure 4-5 below, illustrates a pie chart of the distribution.

Table 4-4 Mobile and Fixed broadband use

	Frequency	Percent	Cumulative Percent
Mostly fixed	74.0	49.3	49.3
Mostly mobile	76.0	50.7	100
Total	150	100	

Figure 4-5 Pie Chart detailing Broadband Type used by respondents



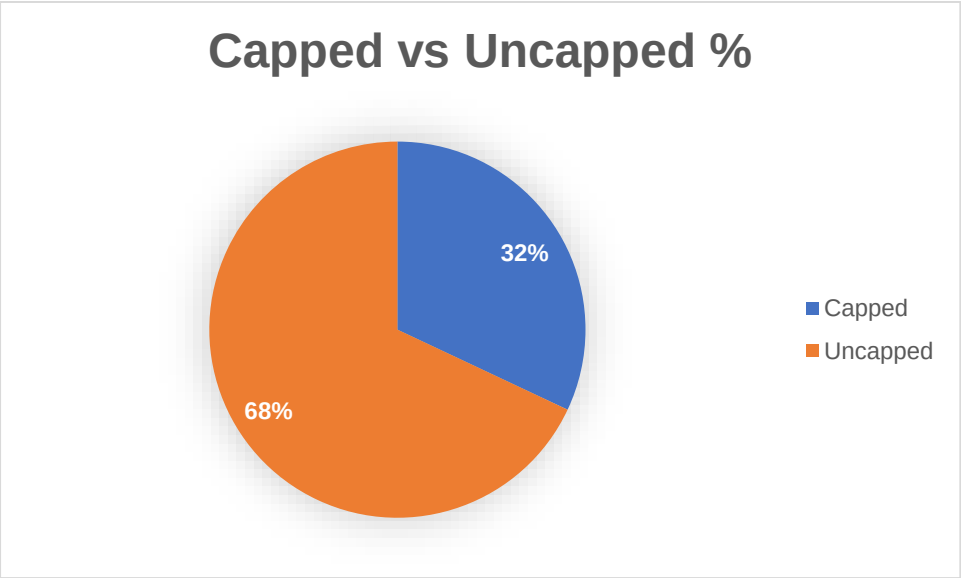
4.3.5 Capped or Uncapped broadband use

There was a large difference in the limit of broadband between the respondents, unlike the more even distribution of fixed and mobile users. According to Table 4-5, 69% of respondents have access to unlimited broadband, whereas 31% of respondents have limited amounts of broadband at their disposal. Figure 4-6 illustrates the percentage distribution between capped and uncapped broadband users.

Table 4-5 Cross Tabulation Mobile and Fixed with Capped and Uncapped Broadband Use

	Capped	Uncapped	Total
Mostly fixed	4 (8%)	70 (69%)	74 (49%)
Mostly mobile	44 (92%)	32 (31%)	76 (51%)
Total	48	102	150

Figure 4-6 Pie Chart of detailing Broadband Cap of respondents



4.4 Sampling Adequacy and Sphericity

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was used to determine the appropriateness of the factor analysis used in this research. It was used to indicate the proportion of variance in variables that may have been caused by underlying factors. Values approaching 1.0 indicate that the factor analysis would be useful whereas values less than 0.5 indicate that a factor analysis would not be useful. According to prior research, a KMO score above 0.9 is considered marvelous, above 0.8 meritorious, above 0.7 as middling, above 0.6 as mediocre, above 0.5 as miserable and below 0.5 as unacceptable (Cerny & Kaiser, 1977).

As shown in Table 4-6 below, the KMO was 0.85, indicating a meritorious but short of marvelous, sample size.

Bartlett's Test of Sphericity was used to test if the correlation matrix was an identity matrix which would suggest that the variables were unrelated and thus unsuitable for structure detection. A significance value of less than 0.05 indicates that a factor analysis will be useful. Bartlett's Test of Sphericity indicated a significant value ($p<0.05$), meaning that there was a significant correlation between at least two of the items on the instrument, thus there was merit in performing a factor analysis.

Table 4-6 Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity

KMO		0.850
Bartlett's Test of Sphericity	Approximate Chi-Square	1712.152
	Degrees of freedom	231
	Significance	.000

An inter-item correlation was performed to identify items that should be excluded from the analysis. Items with a correlation of less than 0.3 or greater than 0.9 with all other items were excluded from the analysis. As can be seen in Figure 4-7, no items needed to be excluded.

Figure 4-7 inter-item correlation

	Correlations (Pearson)																					
	EI_1	EI_2	EI_3	EI_4	EI_5	EI_6	EI_7	ESE_1	ESE_2	ESE_3	ESE_4	ESE_5	CPS_1	CPS_2	CPS_3	CPS_4	CPS_5	NA_1	NA_2	NA_3	NA_4	NA_5
EI_1	1																					
EI_2	0.269**	1																				
EI_3	0.252**	0.475**	1																			
EI_4	0.299**	0.150	0.462**	1																		
EI_5	0.162*	0.476**	0.612**	0.360**	1																	
EI_6	0.487**	0.189*	0.172*	0.480**	0.267**	1																
EI_7	0.366**	0.275**	0.370**	0.556**	0.451**	0.528**	1															
ESE_1	0.213**	0.189*	0.257**	0.364**	0.234**	0.138	0.448*	1														
ESE_2	0.353**	0.126	0.185*	0.290**	0.267**	0.229**	0.457**	0.633**	1													
ESE_3	0.319**	0.121	0.223**	0.288**	0.229**	0.254**	0.426**	0.584**	0.706**	1												
ESE_4	0.321**	0.176*	0.179*	0.221**	0.196*	0.147	0.247**	0.542**	0.472**	0.564**	1											
ESE_5	0.230**	0.070	0.189*	0.267**	0.229**	0.244**	0.446**	0.532**	0.615**	0.629**	0.506**	1										
CPS_1	0.360**	0.282**	0.161*	0.214**	0.160	0.258**	0.294**	0.301**	0.258**	0.349**	0.302**	0.264**	1									
CPS_2	0.326**	0.332**	0.232**	0.261	0.151	0.238**	0.282**	0.341**	0.247**	0.403**	0.414**	0.300**	0.616**	1								
CPS_3	0.506**	0.256**	0.234**	0.313**	0.188*	0.319**	0.356**	0.301**	0.307**	0.387**	0.404**	0.287**	0.453**	0.527**	1							
CPS_4	0.547**	0.260**	0.322**	0.393**	0.283**	0.331**	0.369**	0.387**	0.406**	0.501**	0.493**	0.330**	0.505**	0.566**	0.633**	1						
CPS_5	0.490**	0.363**	0.124	0.202*	0.082	0.281**	0.271**	0.402**	0.367**	0.468**	0.473**	0.274**	0.482**	0.571**	0.666**	0.666**	1					
NA_1	0.147	0.209*	0.385**	0.335**	0.387**	0.291**	0.354**	0.356**	0.375**	0.386**	0.343**	0.363**	0.263**	0.279**	0.437**	0.437**	0.427**	1				
NA_2	0.250**	0.138	0.317**	0.208*	0.233**	0.164*	0.323**	0.270**	0.276**	0.212**	0.282**	0.324**	0.095	0.238**	0.237**	0.237**	0.151	0.511**	1			
NA_3	0.250**	0.166*	0.383**	0.387**	0.215**	0.252**	0.358**	0.442**	0.389**	0.398**	0.379**	0.456**	0.228**	0.351**	0.372**	0.372**	0.287**	0.638**	0.620**	1		
NA_4	0.138	0.358**	0.405**	0.281**	0.431**	0.169*	0.185*	0.190*	0.219**	0.124	0.105	0.112	0.029	0.056	0.213**	0.213**	0.149	0.489**	0.324**	0.391**	1	
NA_5	0.176*	0.326*	0.337**	0.120	0.193*	0.146	0.089	0.154	0.100	0.185*	0.179*	0.059	0.128	0.165*	0.189*	0.189*	0.216**	0.294**	0.281**	0.267**	0.492**	1

** Correlation is significant at the 0.01 level (2-tailed).

** Correlation is significant at the 0.05 level (2-tailed).

4.5 Exploratory Factor Analysis

As suggested by the KMO and Bartlett's Test of Sphericity conducted above, an EFA would contribute significantly to the integrity of the constructs within this data analysis. An EFA was therefore performed on the survey to determine the underlying structure and the number of factors present within the survey data. The goal of the factor analysis was to model the interrelationships between the items. SPSS version 26 software was used to conduct the EFA. The analysis was conducted to test the relationship between the factors and their observed variables.

4.5.1 Principal Component Analysis

A Principal Component Analysis based on the Kaiser criterion was initially conducted to identify the number of factors/components present within the research instrument used. According to the analysis, the sampling adequacy was very good.

Table 4-7 below, reveals that five components showed an eigenvalue greater than one, indicating that the research instrument should include five factors. A convergence between the Scree Plot and Kaiser Criterion eigenvalue of greater than one was observed. The five factors extracted could cumulatively explain 66.351% of the variance present in the survey.

Table 4-7 Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.829	35.588	35.588	7.829	35.588	35.588
2	2.272	10.329	45.917	2.272	10.329	45.917

3	1.827	8.302	54.219	1.827	8.302	54.219
4	1.458	6.628	60.847	1.458	6.628	60.847
5	1.211	5.503	66.351	1.211	5.503	66.351
6	.937	4.258	70.609			
7	.750	3.408	74.017			
8	.699	3.177	77.193			
9	.606	2.753	79.946			
10	.574	2.607	82.554			
11	.512	2.325	84.879			
12	.468	2.127	87.006			
13	.430	1.955	88.961			
14	.391	1.777	90.738			
15	.354	1.611	92.349			
16	.307	1.394	93.743			
17	.284	1.293	95.036			
18	.276	1.256	96.292			
19	.263	1.193	97.485			
20	.221	1.004	98.489			
21	.193	.876	99.365			
22	.140	.635	100.000			

Extraction Method: Principal Component Analysis.

The EFA, without any rotation, was run again using the five extracted factors identified from the Kaiser criterion used in the Principal Component Analysis (PCA). A lack of order in the component analysis was observed and thus no reliable information concerning the factor loadings could be determined at this stage.

As a result, the PCA was run again using a Varimax rotation. The matrix was used to determine items that loaded poorly (less than 0.4) or items that loaded under more than one factor. Items that loaded poorly or under more than one factor were eliminated from the analysis. The Rotated Component Matrix revealed four items that loaded under more than one component and they were subsequently excluded from the analysis (EI_1, ESE_4, NA_4, and NA_5). The PCA was run again with the updated set of items. In the updated Rotated Component Matrix, EI_7 loaded under more than one factor and was removed from the analysis. The removal of EI_7 from the analysis meant that factor 5 only included two items that did not meet the threshold necessary for a factor to be included in the analysis. Factor 5 was subsequently removed from the analysis. As can be seen in Table 4-8 below, all other factor loadings were above the acceptable lower-bound limit of 0.5 and were kept for analysis.

Table 4-8 Rotated Component Matrix

	Component			
	1	2	3	4
CPS_5	0.824			
CPS_2	0.778			
CPS_3	0.743			
CPS_1	0.735			
CPS_4	0.728			
ESE_2		0.854		
ESE_3		0.802		
ESE_5		0.775		
ESE_1		0.739		
NA_2			0.847	
NA_3			0.798	
NA_1			0.693	
EO_5				0.841
EO_3				0.792
EO_2				0.746

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.
a. Rotation converged in 6 iterations.

4.6 Reliability of Measurement Scale Results

Table 4-9 illustrates the results from the scale reliability test administered on the factors/components identified in the EFA. The number of questions each construct consisted of the Cronbach alpha for each construct and the Cronbach alpha of the construct if a question was removed, were all recorded. Five constructs were assessed for reliability using Cronbach's Alpha. The results reveal that each construct had a good Cronbach alpha score (>0.7), indicating a good level of internal reliability. As mentioned in Chapter 3, a high Cronbach alpha score is indicative of a reliable measurement scale. As can be seen from Table 4-9 below, none of the scales were adjusted as all Cronbach alpha scores were higher before adjustment. As none of the

scales were adjusted, the hypotheses were not changed. As indicated in Table 3.2, the scales have been adapted from prior entrepreneurial research. The scales are intended to measure the same variables measured in the previous studies and therefore required little modification. The scales therefore appear to be reliable enough to draw satisfactory conclusions.

Table 4-9 Construct Reliability Results Summary

High-Level Factors	Constructs	Code	No. of Items	α before adjustment	Items deleted	α after adjustment
Independent Variable	Broadband Type	BT	1	NA	0	NA
Moderating Variable	Broadband Limit	BL	1	NA	0	NA
	Entrepreneurial Intention	EI	3	0.759	0	0.759
Entrepreneurial Competencies	Entrepreneurial Self-efficacy	ESE	4	0.863	0	0.863
	Creative Problem Solving	CPS	5	0.861	0	0.861
	Networking Ability	NA	3	0.799	0	0.799

The Corrected Item correlation was assessed next to determine the correlation between each item and the total score. A value of less than three would require the item to be removed to improve the reliability of the scale. Items that caused a material decrease in total correlation were removed. Items should also have a similar Cronbach's alpha value when added, to remain on the scale. Each construct was discussed below in more detail in terms of the reliability analysis.

4.6.1 Entrepreneurial Intention

The inter-item correlation was assessed for the EI scale as can be seen in Table 4-10 below. Table 4-11 below, shows the inter-item correlations were all >0.3, suggesting that all items in the scale correlated with their scales. The scales thus revealed convergent validity.

Table 4-10 Item Total Statistics (EI)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Alpha
EI_2	5.97	7.267	0.530	0.281	0.758	0.759 (3 Items)
EI_3	5.01	4.644	0.643	0.418	0.622	
EI_5	5.35	5.022	0.645	0.419	0.612	

Table 4-11 Inter-Item Correlation Matrix (EI)

	EI_2	EI_3	EI_5
EI_2	1.000		
EI_3	0.612	1.000	
EI_5	0.476	0.475	1.000

4.6.2 Entrepreneurial Self-Efficacy

Entrepreneurial Self-Efficacy (ESE) used a single measurement scale. The detailed results in Table 4-12 below illustrate that this scale was good. The four items measured by this scale received a Cronbach's alpha value of 0.863. As mentioned in Chapter 3, scales with item numbers less than ten are susceptible to lower Cronbach alpha scores. There was no scenario where the removal of an item would have increased

the alpha score, and, as such, none of the items were removed. The Corrected item-total Correlation was above the value of 0.3 for all five items, and, as such, the scale was suitably reliable and consistent. The inter-item correlations shown in Table 4-13 were all greater than 0.3, suggesting convergent validity.

Table 4-12 Item Total Statistics (ESE)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Alpha
ESE_1	8.00	12.913	0.669	0.453	0.844	0.863
ESE_2	8.58	11.789	0.766	0.596	0.802	
ESE_3	8.60	13.651	0.750	0.575	0.812	
ESE_5	8.54	14.129	0.676	0.468	0.839	

Table 4-13 Inter-Item Correlation Matrix (ESE)

	ESE_1	ESE_2	ESE_3	ESE_5
ESE_1	1			
ESE_2	.633**	1		
ESE_3	.584**	.706**	1	
ESE_5	.532**	.615**	.629**	1
**. Correlation is significant at the 0.01 level (2-tailed).				

4.6.3 Creative Problem-Solving

Creative Problem Solving (CPS) made use of a single measurement scale. As shown in Table 4-14 below, the scale was good with a Cronbach alpha value greater than 0.7 ($\alpha = 0.861$). The alpha score could not be improved through the removal of an item and subsequently no items were removed. The Corrected item-total Correlation was above the value of 0.3 for all five items, and, as such, the scale was suitably reliable

and consistent. The inter-item correlations shown in Table 4-15 were all greater than 0.3, suggesting convergent validity.

Table 4-14 Item Total Statistics (CPS)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Alpha
CPS_1	9.25	12.499	0.599	0.423	0.851	0.861 (5 Items)
CPS_2	9.34	12.830	0.687	0.505	0.838	
CPS_3	9.06	11.251	0.705	0.522	0.825	
CPS_4	8.66	9.541	0.732	0.546	0.825	
CPS_5	8.75	10.670	0.742	0.570	0.815	

Table 4-15 Inter-Item Correlation Matrix (CPS)

	CPS_1	CPS_2	CPS_3	CPS_4	CPS_5
CPS_1	1				
CPS_2	.616**	1			
CPS_3	.453**	.527**	1		
CPS_4	.505**	.566**	.633**	1	
CPS_5	.482**	.571**	.666**	.666**	1
**. Correlation is significant at the 0.01 level (2-tailed).					

4.6.4 Networking Ability

Networking ability (NA) also made use of a single measurement scale. According to the detailed results in Table 4-16 below, the scale was good. The three items measured by the scale have a Cronbach alpha value of greater than 0.70 (α = 0.799). The alpha value could have been slightly improved by the removal of the fifth item. The Corrected item-total Correlation was above the value of 0.3 for all three items indicating that the scale was suitably reliable and consistent. As shown in Table 4-17 below, the inter-item correlations were all greater than 0.3, suggesting convergent validity.

Table 4-16 Item Total Statistics (NA)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Alpha
NA_1	6.49	11.124	0.634	0.428	0.763	0.799
NA_2	5.52	7.808	0.632	0.407	0.760	
NA_3	6.04	8.186	0.717	0.523	0.644	

Table 4-17 Inter-Item Correlation Matrix (NA)

	NA_1	NA_2	NA_3	NA_4	NA_5
NA_1	1				
NA_2	.511**	1			
NA_3	.638**	.620**	1		

**. Correlation is significant at the 0.01 level (2-tailed).

4.7 Nonparametric Test with Ordinal regression

Due to the lack of correlation between the independent variables and the dependent variables, a Mann-Whitney U test was performed. A lack of correlation disqualified the moderator variable from being used, as it would not have an effect on the independent variable. As there were no significant correlations present in the data, an ordinal regression analysis would not have provided a meaningful result on its own and was therefore combined with a Mann-Whitney U test. The Mann Whitney U test was chosen due to the non-parametric nature of the data and the ordinal nature of the dependent variables. A Mann-Whitney U test instead of an independent sample T-test was chosen due to the data being ordinal in nature which was not sufficiently informative to allow an Independent sample T-test to be performed. The data was also not normally distributed which violates an assumption of the Independent sample T-test. An Ordinal regression analysis was chosen due to the categorical nature of the dependent variables in the data. In this study, the independent variable was a categorical dichotomous variable in line with the requirements of an ordinal regression model. The results of the Mann-Whitney U test and the ordinal regression were presented for each hypothesis below.

Table 4-18 below, shows the results of the Mann-Whitney U test. As can be seen from the table, there was no statistically significant difference in the type of broadband people use and the distribution of results from the dependent variables (ESE, CPS, NA & EO).

Table 4-18 Hypothesis Test Summary

	Null Hypothesis	Test	Sig	Decision
1	The distribution of ESE is the same across categories of BT_1.	Independent-Samples Mann-Whitney U Test	0.738	Retain the null hypothesis.
2	The distribution of CPS is the same across categories of BT_1.	Independent-Samples Mann-Whitney U Test	0.819	Retain the null hypothesis.
3	The distribution of NA is the same across categories of BT_1.	Independent-Samples Mann-Whitney U Test	0.737	Retain the null hypothesis.
4	The distribution of EI is the same across categories of BT_1.	Independent-Samples Mann-Whitney U Test	0.856	Retain the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

4.7.1 Proposition 1

Hypothesis 1: There is a positive relationship between primary mobile broadband usage and entrepreneurial self-efficacy in the province of Gauteng.

Mann-Whitney U test

Entrepreneurial Self-efficacy was tested against Broadband type. As shown in Figure 4-8 below, there was a right-skewed distribution for both types of broadband use. According to the model fitting information, the model did not attain a statistically significant result (p-value = 0.738, Table 4-19). Therefore, no significant relationship between the Type of Broadband people use and Entrepreneurial Self-efficacy was identified.

Figure 4-8 Histogram of ESE & BT_1

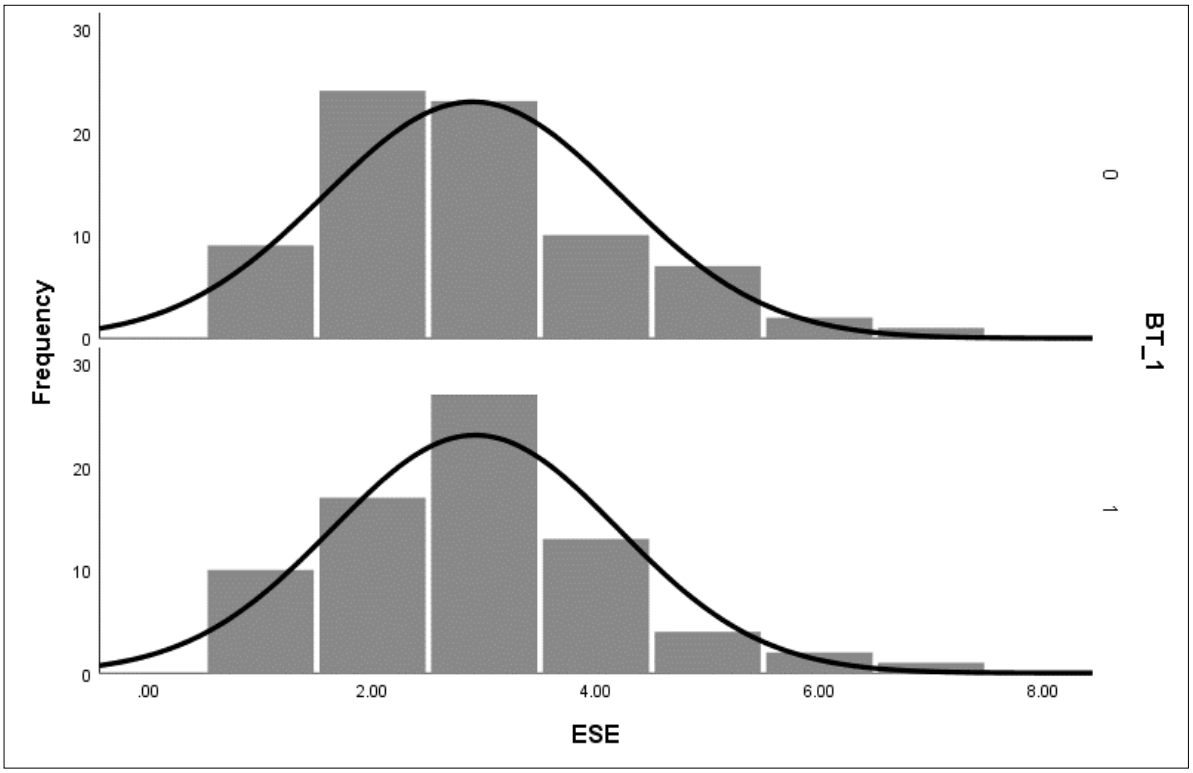


Table 4-19 Mann-Whitney U Test Summary (ESE)

Total N	150
Mann-Whitney U	2898
Wilcoxon W	5673
Test Statistic	2898
Standard Error	257.443

Standardised Test Statistic	0.334
Asymptotic Sig. (2-sided test)	0.738

Ordinal Regression

Entrepreneurial Self-efficacy was regressed against Broadband type. According to the model fitting information, the model did not attain a statistically significant result, indicating no relationship between the two variables (p-value = 0.737, Table 4-20). The Goodness-of-Fit test containing the Deviance and Pearson chi-square tests indicate if the model was a good fit for the data. The Goodness-of-Fit test revealed that the model was a good fit for the data (Pearson p-value = 0.755; Deviance p-value = 753). The test of parallel lines failed to reject the null hypothesis that the lines were parallel. This indicated that the relationship between the independent variables and the individual logits were similar for all of the logits.

Table 4-20 Ordinal Regression Parameter Estimates (ESE)

							95% Confidence Interval	
		Estimate	Std Error	Wald	df	Sig	Lower Bound	Upper Bound
Threshold	[ESE = 1.00]	-1.884	0.283	44.331	1	0.000	-2.439	-1.329
	[ESE = 2.00]	-0.357	0.220	2.640	1	0.104	-0.788	0.074
	[ESE = 3.00]	1.062	0.236	20.279	1	0.000	0.600	1.524
	[ESE = 4.00]	2.107	0.297	50.272	1	0.000	1.525	2.690
	[ESE = 5.00]	3.228	0.442	53.211	1	0.000	2.360	4.095
	[ESE = 6.00]	4.354	0.727	35.831	1	0.000	2.928	5.779
Location	BT_1	0.098	0.292	0.113	1	0.737	-0.475	0.671
Link function: Logit.								

4.7.2 Hypothesis 2

Hypothesis 2: There is a positive relationship between primary mobile broadband usage and creative problem-solving ability in the province of Gauteng.

Mann-Whitney U test

Creative Problem-solving ability was tested against Broadband type. As shown in Figure 4-9 below, there was a right-skewed distribution for both types of broadband use. According to the model fitting information, the model did not attain a statistically significant result (p-value = 0.819, Table 4-21). Therefore, no significant relationship between the Type of Broadband people use and Creative Problem-solving was identified.

Figure 4-9 Histogram of CPS & BT_1

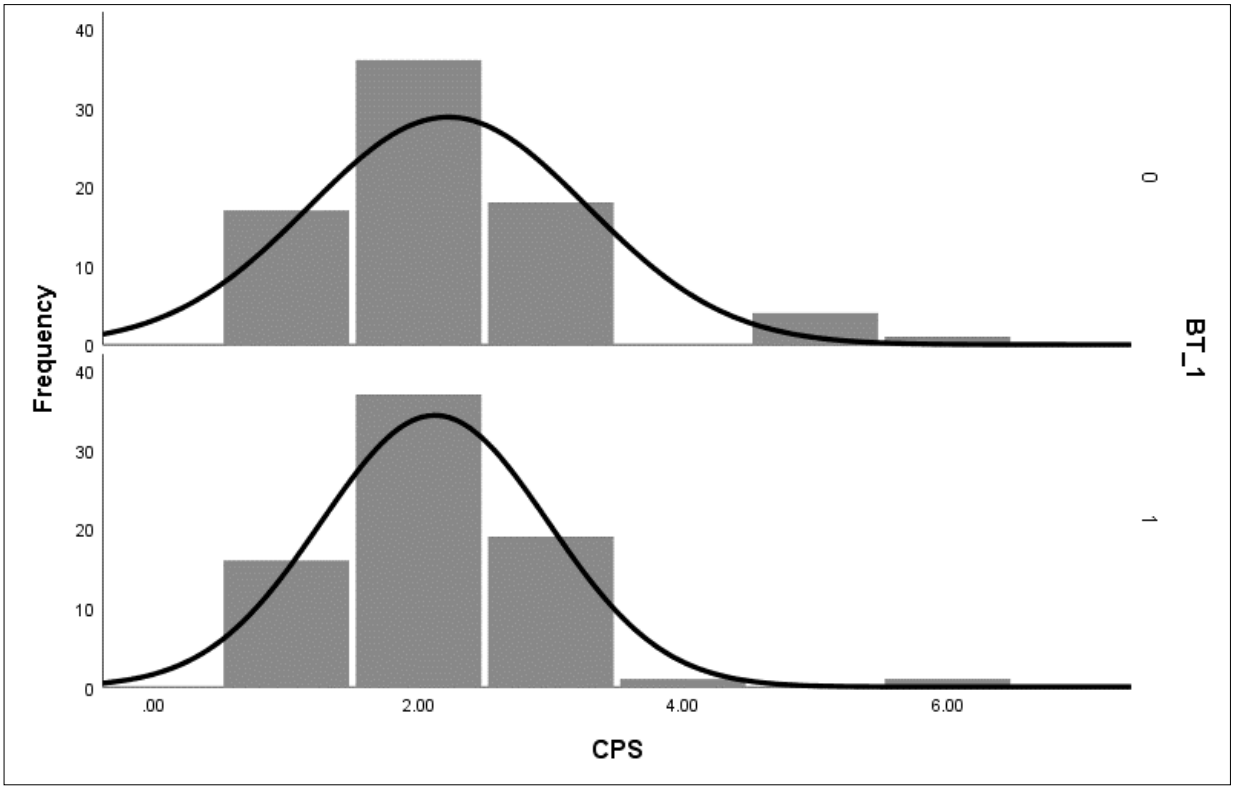


Table 4-21 Mann-Whitney U Test Summary (CPS)

Total N	150
Mann-Whitney U	2755.5
Wilcoxon W	5530.5
Test Statistic	2755.5
Standard Error	246.571
Standardised Test Statistic	-0.229
Asymptotic Sig. (2-sided test)	0.819

Ordinal Regression

Creative Problem-solving was regressed against Broadband Type. According to the model fitting information, the model did not attain a statistically significant result, indicating that no relationship was present between the two variables (p-value = 0.818, Table 4-22). The Goodness-of-Fit test containing the Deviance and Pearson chi-square tests indicate if the model was a good fit for the data. The Goodness-of-Fit test revealed that the model was a good fit for the data (Pearson p-value = 0.288; Deviance p-value = 0.140). The test of parallel lines failed to reject the null hypothesis that the lines were parallel. This indicated that the relationship between the independent variables and the individual logits were similar for all of the logits.

Table 4-22 Ordinal Regression Parameter Estimates (CPS)

		Estimate	Std Error	Wald	df	Sig	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[CPS = 1.00]	-1.301	0.249	27.209	1	0.000	-1.790	-0.812
	[CPS = 2.00]	0.844	0.233	13.110	1	0.000	0.387	1.301
	[CPS = 3.00]	2.982	0.414	51.888	1	0.000	2.171	3.794
	[CPS = 4.00]	3.143	0.442	50.634	1	0.000	2.278	4.009
	[CPS = 5.00]	4.270	0.727	34.511	1	0.000	2.845	5.695
Location	BT_1	-0.070	0.305	0.053	1	0.818	-0.668	0.528
Link function: Logit.								

4.7.3 Hypothesis 3

Hypothesis 3: There is a positive relationship between primary mobile broadband usage and networking ability.

Mann-Whitney U test

Networking ability was tested against Broadband type. As shown in Figure 4-10 below, there was a right-skewed distribution for both types of broadband use. According to the model fitting information, the model did not attain a statistically significant result (p-value = 0.737, Table 4-23). Therefore, no significant relationship between the Type of Broadband people use and Networking ability has been identified.

Figure 4-10 Histogram of NA & BT_1

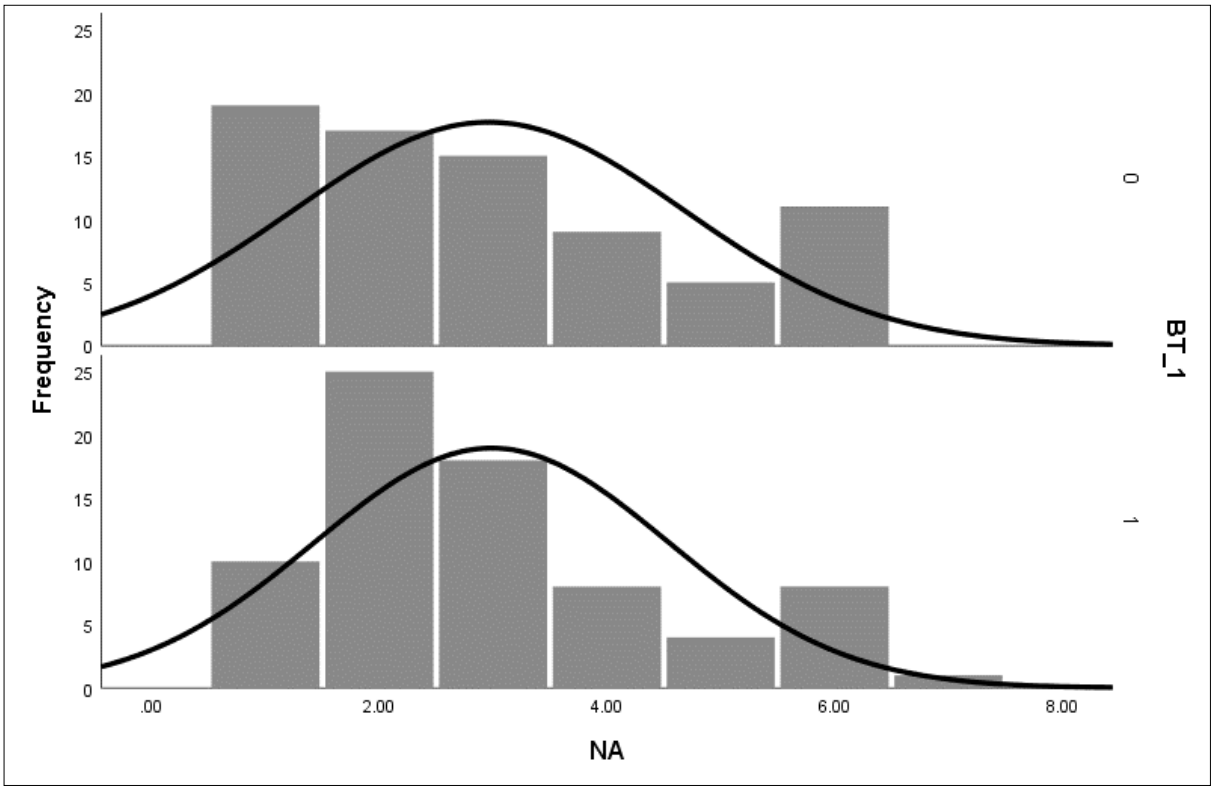


Table 4-23 Mann-Whitney U Test Summary (NA)

Total N	150
Mann-Whitney U	2899.5
Wilcoxon W	5674.5
Test Statistic	2899.5
Standard Error	260.175

Standardised Test Statistic	0.336
Asymptotic Sig (2-sided test)	0.737

Ordinal Regression

Networking ability as a dependent variable

Entrepreneurial Self-efficacy was regressed against Broadband type. According to the model fitting information, the model did not attain a statistically significant result, indicating no relationship between the two variables (p-value = 0.735, Table 4-24). The Goodness-of-Fit test containing the Deviance and Pearson chi-square tests was used to indicate whether the model was a good fit for the data. The Goodness-of-Fit test revealed that the model was a good fit for the data (Pearson p-value = 0.297; Deviance p-value = 0.257). The test of parallel lines failed to reject the null hypothesis that the lines were parallel. This indicates that the relationship between the independent variables and the individual logits were similar for all of the logits.

Table 4-24 Ordinal Regression Parameter Estimates (NA)

							95% Confidence Interval	
		Estimate	Std Error	Wald	df	Sig	Lower Bound	Upper Bound
Threshold	[NA = 1.00]	-1.378	0.249	30.507	1	0.000	-1.867	-0.889
	[NA = 2.00]	-0.055	0.217	0.063	1	0.802	-0.480	0.371
	[NA = 3.00]	0.867	0.229	14.364	1	0.000	0.419	1.315
	[NA = 4.00]	1.479	0.253	34.153	1	0.000	0.983	1.975
	[NA = 5.00]	1.922	0.281	46.665	1	0.000	1.370	2.473
	[NA = 6.00]	5.053	1.014	24.835	1	0.000	3.066	7.041
Location	BT_1	0.098	0.289	0.115	1	0.735	-0.469	0.665
Link function: Logit.								

4.7.4 Hypothesis 4

Hypothesis 4: There is a positive relationship between primary mobile broadband usage and entrepreneurial intentions.

Mann-Whitney U test

Entrepreneurial Intention was tested against Broadband type. As shown in Figure 4-11 below, there was a right-skewed distribution for both types of broadband use. According to the model fitting information, the model did not attain a statistically significant result (p-value = 0.856, Table 4-25). Therefore, no significant relationship between the Type of Broadband people use and Entrepreneurial Intention was identified.

Figure 4-11 Histogram of EI & BT_1

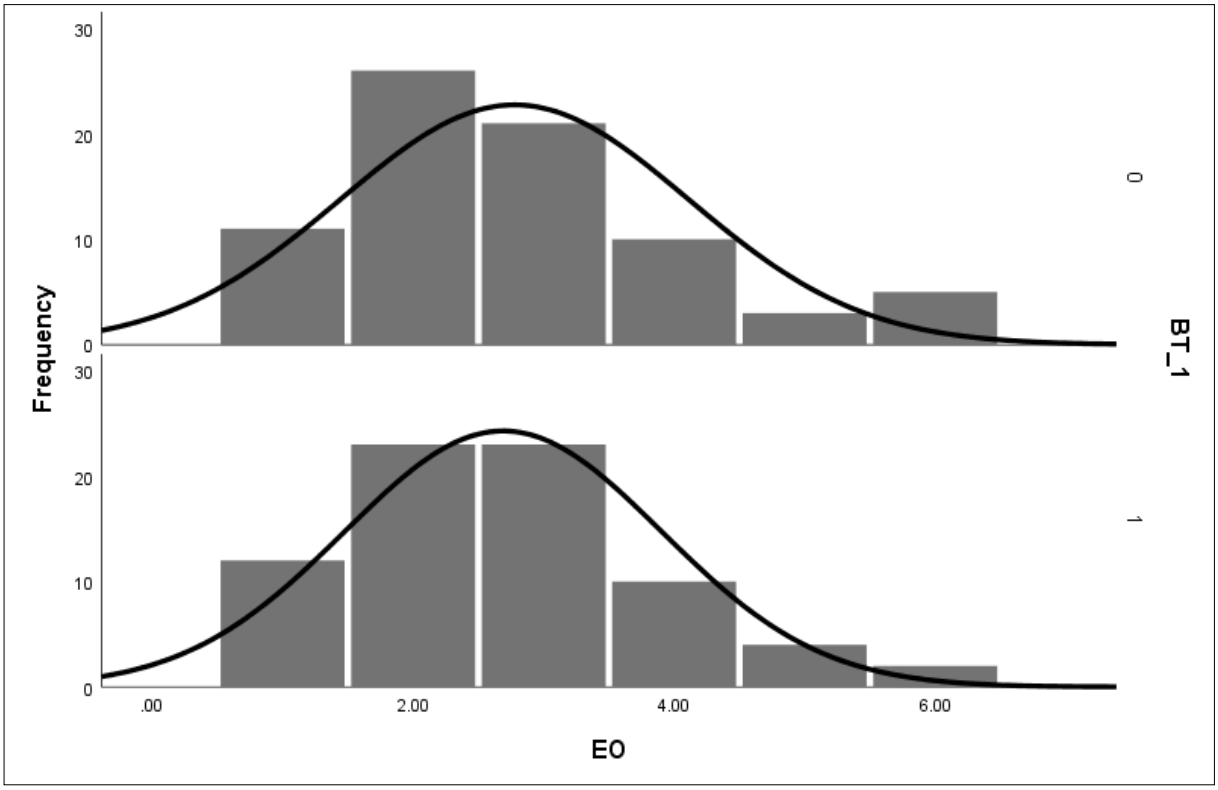


Table 4-25 Mann-Whitney U Test Summary (EI)

Total N	150
Mann-Whitney U	2765.5
Wilcoxon W	5540.5
Test Statistic	2765.5
Standard Error	257.063
Standardised Test Statistic	-0.181
Asymptotic Sig. (2-sided test)	0.856

Ordinal Regression

Entrepreneurial Intention was regressed against Broadband type. According to the model fitting information, the model did not attain a statistically significant result, indicating no relationship between the two variables (p-value = 0.856, Table 4-26). The Goodness-of-Fit test containing the Deviance and Pearson chi-square tests indicate if the model was a good fit for the data. The Goodness-of-Fit test revealed that the model was a good fit for the data (Pearson p-value = 0.793; Deviance p-value = 0.785). The test of parallel lines failed to reject the null hypothesis that the lines were parallel. This indicates that the relationship between the independent variables and the individual logits were similar for all of the logits.

Table 4-26 Ordinal Regression Parameter Estimates (EI)

							95% Confidence Interval	
		Estimate	Std Error	Wald	df	Sig	Lower Bound	Upper Bound
Threshold	[EI = 1.00]	-1.735	0.270	41.376	1	0.000	-2.264	-1.206
	[EI = 2.00]	-0.106	0.218	0.238	1	0.626	-0.534	0.321
	[EI = 3.00]	1.201	0.242	24.660	1	0.000	0.727	1.674
	[EI = 4.00]	2.247	0.315	51.015	1	0.000	1.630	2.864
	[EI = 5.00]	2.991	0.412	52.624	1	0.000	2.183	3.799
Location	BT_1	-0.053	0.293	0.033	1	0.856	-0.627	0.521
Link function: Logit.								

4.8 Exploratory Analysis

Further to the data analysis conducted above, an exploratory analysis was conducted to identify if any significant relationships were identified from the data collected. The results of this analysis could help researchers identify future areas of study. In the exploratory analysis, the moderating variable (BT_2) was used as a predictor variable in place of Broadband type (BT_1).

Table 4-27 Hypothesis Test Summary (BT_2 as the independent variable)

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of CPS is the same across categories of BT_2.	Independent-Samples Mann-Whitney U Test	0.779	Retain the null hypothesis.
2	The distribution of ESE is the same across categories of BT_2.	Independent-Samples Mann-Whitney U Test	0.142	Retain the null hypothesis.
3	The distribution of NA is the same across categories of BT_2.	Independent-Samples Mann-Whitney U Test	0.114	Retain the null hypothesis.
4	The distribution of EI is the same across categories of BT_2.	Independent-Samples Mann-Whitney U Test	0.047	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

According to Table 4-27 above, the results were similar to the effect which the independent variable BT_1 had on the dependent variables (CPS, ESE, NA and EI). The variable EI however shows that there was a significant relationship between the amount of broadband people have access to and their entrepreneurial intentions.

Entrepreneurial Intention was tested against Broadband type. As shown in Figure 4-12 below, there was a non-normal distribution for both types of broadband use. According to the model fitting information, the model attained a statistically significant result (p-value = 0.047, Table 4-28). Therefore, a significant relationship between the amount of Broadband people have access to and Entrepreneurial Intention was identified.

Figure 4-12 Histogram of EI & BT_2

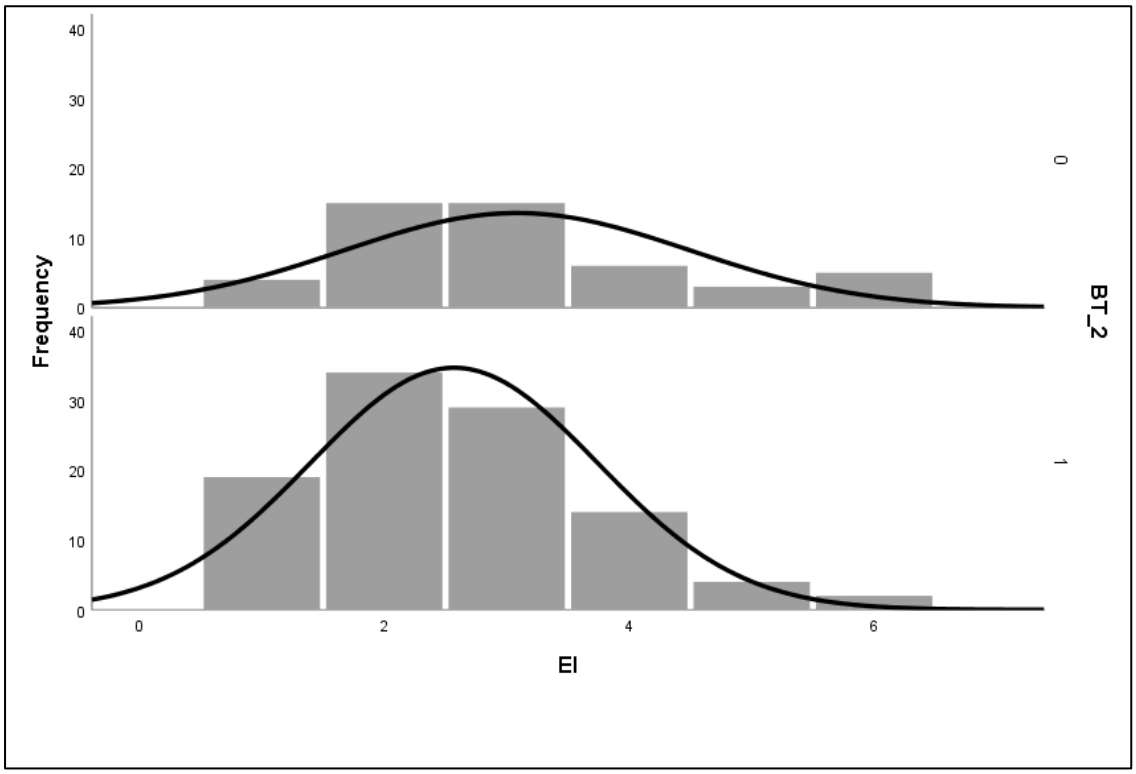


Table 4-28 Mann-Whitney U Test Summary

Total N	150
Mann-Whitney U	1972.5
Wilcoxon W	7225.5
Test Statistic	1972.5
Standard Error	239.849

Standardised Test Statistic	-1.983
Asymptotic Sig. (2-sided test)	0.047

4.9 Conclusion

This chapter provided an analysis of the data collected from the survey questions administered by an electronic survey. Of the 183 respondents from the electronically administered survey, only 150 were usable for the analysis. The respondents were people between the ages of 18-65 who resided in the province of Gauteng.

Initially, the demographic characteristics of the respondents were analysed. The results revealed that the respondents were overwhelmingly white (91.3%) and mostly male (56%). The majority of respondents were between the ages of 25-34 (60.7%). The education level of the respondents was more evenly distributed with most respondents having some form of tertiary education (76%). An almost even split was identified between users of mobile and fixed broadband (50.7% and 49.3% respectively), with the majority of those having uncapped broadband as opposed to capped broadband (68% and 32% respectively).

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy provided a solid justification for the usefulness of a factor analysis. The KMO returned a meritorious result suggesting that the factor analysis would be useful in determining the appropriate factors to analyse. The Bartlett's Test of Sphericity also returned a significant value, further suggesting that there was merit in performing a factor analysis.

The PCA initially revealed five factors present in the research instrument. A PCA without rotation was initially conducted, which did not provide clear order in the results. The PCA was thus conducted again using a Varimax rotation. Initially, four items were identified as invalid due to multiple loadings. The PCA was run again using the updated

set of items. One item loaded under multiple factors and was eliminated. This resulted in factor 5 having less than the required three items to remain a factor. Factor 5 was subsequently dropped, leaving four factors remaining.

Having identified the four factors from the PCA, reliability tests of the scales were conducted. All of the scales achieved the minimum acceptable Cronbach's alpha value and were identified as reliable. The Corrected Item correlation was then assessed to determine the correlation between each item and the total score. All of the items achieved a satisfactory result and were therefore retained.

After conducting the EFA, a Nonparametric Test with an Ordinal regression was conducted. The Mann-Whitney U Test was chosen for the Nonparametric test. None of the factors attained a significant result, leading to the conclusion that all hypotheses should be rejected. This was also the case for the ordinal regression for all of the factors.

An exploratory analysis was finally conducted using broadband access as an independent variable in place of broadband type. Broadband access was initially used as a moderating variable in the study. The findings were of note as a significant result was attained for entrepreneurial intentions. The results suggest that uncapped broadband access can positively impact entrepreneurial intentions among people.

Table 4-29 Summary of hypothesis/proposition outcomes

Hypothesis/Proposition	**Reject/Fail to Reject**
Proposition 1	Reject Proposition 1
Hypothesis 2	Reject Hypothesis 2
Hypothesis 3	Reject Hypothesis 3
Hypothesis 4	Reject Hypothesis 4
Proposition 5	Reject Proposition 5

CHAPTER 5 DISCUSSION OF RESULTS

This study examined the relationship between broadband type and entrepreneurial competencies and intentions among people within Gauteng. The study further attempted to identify whether limiting the amount of broadband has a moderating effect on the type of broadband used.

This chapter discusses the four proposed hypotheses analysed in the previous chapter. Proceeding from the discussion of the hypotheses, this chapter then discusses the study's practical and theoretical contributions, as well as the implications, limitations, unexpected observations, and recommendations for future research, before concluding the study.

5.1 Profile of respondents

The sample characteristics presented in Chapter 4 reveal a majority of white, male respondents; followed by white female respondents. South Africa is characterised by a higher proportion of men who are entrepreneurially active compared to women (Meyer, 2019). The higher proportion of men compared to woman observed in the sample was therefore consistent with previous findings. It was a well-educated sample with approximately 76% of respondents having tertiary education. According to the GEM report of 2016, a general trend of entrepreneurs becoming more educated has been emerging. Gauteng is considered to be one of the more developed provinces in South Africa with multiple universities. This, coupled with the trend of increasingly educated entrepreneurs, was a possible reason for such an educated sample.

An almost 50/50 distribution was apparent in the type of broadband people used. This was a notable observation as prior literature suggests that the majority of people in Africa favour mobile broadband, whereas fixed broadband has been generally reserved for the urban elites (Stork, Calandro, & Gamage, 2014). It was also interesting to note that the majority of respondents had uncapped access to broadband which is a more expensive option when compared to capped broadband. Capped broadband comes with three main challenges when compared to uncapped

broadband: uncertainty concerning monthly charges, mysterious processes and multiple users (Chetty et al., 2012). The relatively high frequency of uncapped broadband users may be a result of a high number of respondents who represent an urban elite in Gauteng and can, therefore, afford to mitigate against the drawbacks of capped broadband.

5.2 Discussion of Findings

Chapter 4 was structured around the effect of Broadband type on entrepreneurial competencies, including Entrepreneurial Self-efficacy, Creative Problem-solving ability, and Networking ability, followed by the effect of broadband type on entrepreneurial intentions. The discussion of the hypothesis in Chapter 5 follows the same structure.

5.2.1 Demographics of respondents

According to the survey, women gave themselves a higher score on average than men in entrepreneurial intention, entrepreneurial self-efficacy and networking ability, when the literature suggests that women often perceive themselves more modestly in the field of entrepreneurship than men do (Henry, Treanor, Sweida, & Reichard, 2013). The sample collected for this study was made up of 44.7% female participants and 55.3% male participants. A study conducted in Gauteng concerning the influence of gender and age on social entrepreneurship intentions recorded a sample consisting of 41% males and 58% females (E. Chipeta, Surujlal, & Koloba, 2020). The respondents were mostly white and male suggesting that there was some bias in the distribution of the survey. Gauteng is a diverse province with people from many different racial groups living there, so the reader would have expected a more diverse sample. A study conducted among university students within the province of Gauteng achieved a sample distribution of 77.2% black, 11.6% white, 6.1% Indian and 3.1% colored (E. M. Chipeta, 2015). One possible explanation for this could be the use of social media as a distribution method, as it likely reflects the demographics of the author’s network rather than the demographics of the province.

5.2.2 Broadband type and Entrepreneurial Self-efficacy

Proposition 1: There is a positive relationship between primary mobile broadband usage and entrepreneurial self-efficacy in the province of Gauteng.

The hypothesis states that using mobile broadband rather than fixed broadband is positively associated with entrepreneurial self-efficacy. The Mann-Whitney U test and the Ordinal regression were unable to identify a significant relationship between the type of broadband used and Entrepreneurial Self-Efficacy. According to the findings, a significant relationship was not confirmed. Based on the prior literature concerning mobile broadband's advantages over fixed broadband, it was expected that mobile broadband would lead to a superior impact on entrepreneurial self-efficacy than its fixed counterpart (Muckaden et al., 2014).

The findings in this study were therefore unable to support the hypothesis. It appears that the type of broadband used does not have an effect on entrepreneurial self-efficacy within the province of Gauteng. Thus, if policymakers intend to enhance the entrepreneurial self-efficacy of citizens, the type of broadband investment is largely irrelevant.

5.2.3 Broadband type and Creative Problem-solving ability

Hypothesis 2: There is a positive relationship between primary mobile broadband usage and creative problem-solving ability in the province of Gauteng.

The above hypothesis states that mobile broadband rather than fixed broadband has a positive effect on the creative problem-solving ability of people within Gauteng. The findings of the study suggest that there was no significant relationship between the type of broadband people use and their creative problem-solving ability. Due to the increased and more frequent access to broadband which mobile broadband provides, rather than its fixed counterpart, it was expected that this would translate into enhanced creative problem-solving abilities among people in Gauteng.

The findings of the study were unable to support this hypothesis and it was evident that creative problem-solving ability was not enhanced by mobile broadband usage within the province of Gauteng. Policymakers should, therefore, look elsewhere if they aim to enhance the creative problem-solving abilities of their citizens.

5.2.4 Broadband type and Networking ability

Hypothesis 3: There is a positive relationship between primary mobile broadband usage and networking ability.

This hypothesis states that mobile broadband has a positive effect on the networking ability of individuals when compared to fixed broadband. Due to the flexibility of use provided by mobile broadband when compared to fixed broadband, it was thought that mobile broadband would be significantly more advantageous. Access to broadband has become critical for people in rural communities to participate in the digital economy and overcome the problems associated with social isolation (Townsend, Sathiaseelan, Fairhurst, & Wallace, 2013). The availability of mobile broadband as opposed to fixed broadband, specifically in rural communities, was also thought to be an enhancing factor in the networking ability of individuals. The Mann-Whitney U test and the Ordinal regression were unable to identify a significant relationship between the type of broadband used and networking ability.

The findings were unable to support this hypothesis and the author could not say in this case that mobile broadband can enhance the networking ability of individuals.

5.2.5 Broadband type and Entrepreneurial Intentions

Hypothesis 4: There is a positive relationship between primary mobile broadband usage and entrepreneurial intentions.

The above hypothesis states that mobile broadband would have a positive effect on the entrepreneurial intentions of individuals. According to the study there was no significant relationship between the type of broadband people use and their

entrepreneurial intentions. One of several constraints to the development of entrepreneurship identified amongst people in Nigeria was a lack of a knowledge-based economy (Oviawe, 2010). Due to the ability of mobile broadband to bring ICT benefits to a greater number of entrepreneurs (Alderete, 2017), it was thought that mobile broadband would play a significant role in encouraging entrepreneurship. According to the study, this was not the case. The Mann-Whitney U test and the Ordinal regression were unable to identify a significant relationship between the type of broadband used and entrepreneurial intentions. According to the findings, a significant relationship was not confirmed. The findings of this study were therefore unable to support this hypothesis.

5.2.6 Moderating effects of capped and uncapped usage on Broadband type

Proposition 5: Data usage has a moderating effect on the type of data used.

The study was unable to identify a moderating effect of capped or uncapped access on the relationship between broadband type and entrepreneurial self-efficacy, creative problem-solving ability, networking ability and entrepreneurial intentions. It was thus concluded from this study that the type of broadband used was not impacted by the broadband cap when measuring the relationship between fixed or mobile broadband, entrepreneurial competencies, and entrepreneurial intentions.

5.2.7 Exploratory Analysis

An exploratory analysis was conducted on the data collected to identify any significant findings not covered in the scope of the research questions. As there was little research available in this field within a South African context, an exploratory analysis was useful in aiding future researchers to identify potential areas of research.

The first exploratory analysis was conducted using the moderator variable as an independent variable itself. The broadband cap was thus used in place of broadband type and regressed against entrepreneurial self-efficacy, creative problem-solving ability, networking ability and entrepreneurial intentions. No significant relationship

was identified between entrepreneurial self-efficacy, creative problem-solving ability, and networking ability; however, a measurable result was identified between the broadband cap and entrepreneurial intentions. From the sample, it appeared that respondents with uncapped broadband access were more likely to achieve a higher score for entrepreneurial intentions. This was noteworthy as it implied that unlimited access to the internet can encourage people to pursue entrepreneurial ventures. Unlimited access to the internet can assist people with researching potential ideas or ventures to pursue. Prior literature suggests that a positive relationship exists between broadband speed and economic growth (Rohman & Bohlin, 2012). There is little evidence however, identifying a link between how an internet cap is related to economic growth. This may suggest that the quality of broadband, including both speed and limit may be important factors in determining economic growth. This would pose an interesting research question for future research. Existing literature has also identified a positive link between ICT in general and entrepreneurial activity within an economy (Ngoasong, 2017). Perhaps a more granular understanding of what components of ICT drive this increase in entrepreneurial activity would be of use to policy makers going forward. It appears from this exploratory analysis that an internet cap may be hindering efforts to stimulate the economy.

5.2.8 Conclusion

The study identified no significant relationship between the type of broadband used by people in Gauteng and their entrepreneurial competencies and intentions. The exploratory analysis was able to provide a very marked result. This suggests that there may be a more important measure when it comes to broadband and entrepreneurial competencies and intentions. Broadband type was likely not the appropriate measure, rather the amount of broadband used. The cap placed on users of broadband may limit information access. This limit may lead to people placing a quota on the amount of research they can conduct. If starting a business is not a priority in people’s lives, they may not wish to use their broadband quota on researching this topic. This could mean that only people with a strong desire to start a business end up performing the research and subsequently starting the business.

CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

In addition to contributing to theory, this study also makes practical contributions that may be used by multiple stakeholders in decision-making concerning the field of entrepreneurship in Gauteng. There appeared to be no difference in entrepreneurial competencies or entrepreneurial intentions within the area of Gauteng when the type of broadband used was considered. The author could, therefore, suggest that when Gauteng policymakers decide on the type of broadband to invest in, the potential impact on entrepreneurial competencies and entrepreneurial intentions should not be a factor. Rather, the amount of broadband people have access to, should be considered. Placing a cap on broadband may also inadvertently place a cap on the entrepreneurial intentions of people, inhibiting them from starting a new venture. This is a potential area of research going forward, either in a specific province in South Africa or the country as a whole. The reader should however bear in mind the demographic composition of the area being studied. Special attention should be paid to the sampling technique used to gain a representative view of the population.

It is also important to take account of new developments and trends of broadband connectivity within the African context. While the developed world continues to debate the merits of fixed versus mobile broadband, Africa appears to have adopted mobile broadband on a large scale (Stork et al., 2014). It appears that fixed broadband will only reach urban elites within the next few decades and may, therefore, be less of a priority than mobile broadband when considering further research. Prior literature also suggests that mobile broadband has a higher throughput than fixed broadband in South Africa, further limiting the demand for fixed broadband (Muckaden et al., 2014).

Rather than providing a general overview of the type of broadband's effects on entrepreneurial competencies and intentions among the general population of Gauteng, it would be pertinent to assess the effects of the type of broadband used within specific sectors such as high-tech industries. A study conducted to assess the entrepreneurial intensities created by broadband availability in Germany was able to

identify a positive relationship within specific high-tech industries, but not when all sectors were considered (Heger, Veith, & Rinawi, 2011).

Due to the limited amount of studies conducted concerning broadband usage in South Africa, there are still many areas requiring research. This study focused on three main entrepreneurial competencies, however, there are many more. It will become increasingly important to understand the relationship between broadband and entrepreneurship as we enter the Fourth Industrial Revolution and attempt to stay competitive in the global marketplace.

6.2 Limitations of study

The primary limitation of this study was the one-sided race demographics of the respondents. White respondents made up 91.3% of the survey which limited the comparisons that could be drawn across various race groups. It is also possible that due to the distribution method of the survey, the respondents were likely from the same or a similar social class to the author. In retrospect, a social classifier should have been incorporated into the research instrument so that social status could have been accounted for and analysed.

6.3 Suggestions for further research

This study represents one of a few concerning the impact of broadband on entrepreneurial competencies within South Africa. As such there is much room for expansion upon this study. As highlighted in the introduction, more research needs to be done on this topic to be able to understand better, the drivers of entrepreneurship within South Africa. The Fourth Industrial Revolution will likely have far-reaching consequences on the way South Africans run businesses and broadband will likely be a key enabler of this change.

The exploratory analysis conducted in this study identified a statistically significant result when broadband was capped. This could be a good starting point for future research as it may be more pertinent to test, rather than testing whether the broadband

connection is fixed or mobile. Entrepreneurial competencies other than the ones utilised in this study could also be explored in further research. This research could be done with relative ease using the template of this study. Further researchers should also attempt to replicate a study such as this, taking account of the limitations, in other provinces within South Africa. South Africa is a very diverse country and there are many differences in demographics between the nine provinces. This could lead to significant differences in research results between the said provinces.

Due to the limitations of sampling experienced in this study, a different sampling approach may yield a more diverse result. A quota sample may be a more suitable sampling approach as a predetermined demographic spread can be used. A more diverse sample may also help to improve the diversity of the findings. A study using quotas like this may have more relevance to politicians as they attempt to redress historical disadvantages experienced in South Africa.

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APPENDIX

A1 - Research Instrument

Dear Sir/Madam

I am a student at Wits Business School enrolled for a Master of Management Degree in Entrepreneurship and New Venture Creation. I would like to request you to share your views on how important broadband internet is to your entrepreneurial competencies. This will assist me in my master's research project entitled: *The Effect of Fixed and Mobile Broadband on Entrepreneurial Competencies and Intentions Among Individuals Within Gauteng.* The objective of this research is to identify whether fixed or mobile broadband internet usage has any effect on entrepreneurial competencies or intentions within Gauteng. Identifying this relationship will assist policymakers in understanding the advantages of investing in one type of broadband infrastructure over another, in terms of stimulating entrepreneurship. If you agree to participate in this research, you can click on the link below which will take you to the online questionnaire:

The questionnaire should take you 5 - 10 minutes to complete. Responses will be completely anonymous; your name or your company's name will not appear anywhere on the survey. Only aggregate data from the survey will be disclosed. If you are willing to complete the survey, it would be appreciated if you could complete it no later than 31 October 2019. If you do not wish to participate, simply discard the questionnaire.

Should you have any concerns or questions, please feel free to contact me at 1656054@students.wits.ac.za.

We are interested in understanding the relationship between the following constructs: entrepreneurial self-efficacy, creative problem-solving ability, networking ability and entrepreneurial intentions and fixed/mobile broadband usage within Gauteng. You will be presented with information relevant to the four scales and asked to answer some questions about it.

Please be assured that your responses will be kept completely confidential. The study should take you approximately 5-10 minutes to complete. Your participation in this research is voluntary. You may withdraw at any point during the study, for any reason, and without any prejudice.

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to

terminate your participation in the study at any time and for any reason. Your participation in this research is voluntary.

- ○ I consent, begin the study
- ○ I do not consent, I do not wish to participate

Q2 Are you an individual who is or aspires to be an entrepreneur in the future?

If yes then you can continue with the survey

- ○ Yes
- ○ No

Construct	**Question**
1: Demographics	What is your gender?
	What is your age?
	What is your race?
	What is your level of education?
	Province of residence?
2: Control Questions	Do you mostly use fixed or mobile broadband services?
	Do you have a capped or uncapped data allowance?
The next questions are 7-point Likert scales with Strongly Disagree=1 and Strongly Agree=7. Indicate the degree to which you agree or disagree with the following statements.	
3a: Entrepreneurial Intention	I intend to set up a business in the future
	I plan my future carefully
	I read business news publications
	I search for business start-up opportunities
	I spend time learning about financial planning
	I am saving money to start a business

	I spend time learning about starting a firm
3b: Self-efficacy	To start a firm and keep it working would be easy for me
	I am prepared to start a viable firm
	I can control the creation process of a new firm
	If I tried to start a firm, I would have a high probability of succeeding
	I know the necessary practical details to start a firm
3c: Creative Problem Solving	I am creative when asked to work with limited resources
	I demonstrate originality in my work
	I identify opportunities for new services/products
	I take risks in terms of producing new ideas in completing projects
	I serve as a good role model for creativity
2d: Networking Ability	I keep in touch with business contacts
	I give out business cards
	I send messages or emails to keep in touch with business contacts
	I go to lunch with people outside of my company
	I attend workshops and professional seminars

A2 - Consistency Matrix

The effect of fixed and mobile broadband on entrepreneurial competencies and intentions among individuals within Gauteng							
Sub-problem/Aims	**Literature Review**	**Hypotheses or Propositions**	**Research questions**	**Variables(Independent & Dependent)**	**Source of data**	**Type of data**	**Analysis**
What is the relationship between fixed/mobile broadband and entrepreneurial self-efficacy in Gauteng	**(Dwivedi, 2005)**	**There is a positive relationship between primary mobile broadband usage and entrepreneurial self-efficacy.**	**What effect does fixed, and mobile broadband have on entrepreneurial self-efficacy among people in Gauteng?**	**IV1= Broadband type** **DV1= Entrepreneurial Self-efficacy**	**2c: Questionnaire questions** **2a: Questionnaire questions**	**Ordinal data**	**Correlation and multiple regression analysis**
What is the relationship between fixed/mobile broadband and creative problem-solving in Gauteng	**(Botha, Carruthers, & Venter, 2019)**	**There is a positive relationship between primary mobile broadband usage and creative problem-solving ability.**	**What effect does fixed, and mobile broadband have on creative problem-solving ability among people in Gauteng?**	**IV1= Broadband type** **DV2 = Creative Problem-solving**	**2b: Questionnaire questions** **2a: Questionnaire questions**	**Ordinal data**	**Correlation and multiple regression analysis**
What is the relationship between fixed/mobile broadband and networking ability in Gauteng	**(Kellermanns, Eddleston, Barnett, & Pearson, 2008)**	**There is a positive relationship between primary mobile broadband usage and networking ability.**	**What effect does fixed, and mobile broadband have on networking ability among people in Gauteng?**	**IV1= Broadband type** **DV3 = Networking Ability**	**2e: Questionnaire questions** **2a: Questionnaire questions**	**Ordinal data**	**Correlation and multiple regression analysis**
What is the relationship between fixed/mobile broadband and entrepreneurial intentions in Gauteng	**(Ngoasong, 2017)**	**There is a positive relationship between primary mobile broadband usage and entrepreneurial intentions.**	**What effect does fixed, and mobile broadband have on entrepreneurial intentions among people in Gauteng?**	**IV1= Broadband type** **DV4= Entrepreneurial Intentions**	**2d: Questionnaire questions** **2a: Questionnaire questions**	**Ordinal data**	**Correlation and multiple regression analysis**

A3 - Ethics Clearance Certificate

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School

Wits Business Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/BA1656054/782

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below)

This certificate is only valid if accompanied by formal permission from the relevant stakeholder(s).

Project title	The effect of fixed and mobile broadband usage on entrepreneurial competencies and intentions among individuals within Gauteng
Investigator / Researcher	Mr Brett Hudson
Nature of Project	MM (Entrepr & New Venture Creation)
Decision of the Committee	Approved unconditionally
Issue Date of Certificate	2019/11/19
Expiry date	Date of submission of the project report
Chairperson	Prof Anthony Stacey ☎ +27 11 717 3587 📱 +27 82 880 4531 ✉ anthony.stacey@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature _____ Date: _____

A4 - Statistical data

Factor Analysis 1

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.850
Bartlett's Test of Sphericity	Approx. Chi-Square	1712.152
	df	231
	Sig	.000

Communalities	Initial	Extraction
EO_1	1.000	.569
EO_2	1.000	.710
EO_3	1.000	.669
EO_4	1.000	.620
EO_5	1.000	.719
EO_6	1.000	.683
EO_7	1.000	.720
ESE_1	1.000	.680
ESE_2	1.000	.708
ESE_3	1.000	.730
ESE_4	1.000	.603
ESE_5	1.000	.687

CPS_1	1.000	.558
CPS_2	1.000	.616
CPS_3	1.000	.676
CPS_4	1.000	.688
CPS_5	1.000	.754
NA_1	1.000	.679
NA_2	1.000	.648
NA_3	1.000	.740
NA_4	1.000	.639
NA_5	1.000	.501

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.829	35.588	35.588	7.829	35.588	35.588
2	2.272	10.329	45.917	2.272	10.329	45.917
3	1.827	8.302	54.219	1.827	8.302	54.219
4	1.458	6.628	60.847	1.458	6.628	60.847
5	1.211	5.503	66.351	1.211	5.503	66.351
6	.937	4.258	70.609			

7	.750	3.408	74.017			
8	.699	3.177	77.193			
9	.606	2.753	79.946			
10	.574	2.607	82.554			
11	.512	2.325	84.879			
12	.468	2.127	87.006			
13	.430	1.955	88.961			
14	.391	1.777	90.738			
15	.354	1.611	92.349			
16	.307	1.394	93.743			
17	.284	1.293	95.036			
18	.276	1.256	96.292			
19	.263	1.193	97.485			
20	.221	1.004	98.489			
21	.193	.876	99.365			
22	.140	.635	100.000			
Extraction Method: Principal Component Analysis.						

Component Matrix

	Component				
	1	2	3	4	5
EO_1	.593	-.136	.336	-.172	-.237
EO_2	.442	.345	.423	.039	.464
EO_3	.529	.565	.078	-.092	.235
EO_4	.568	.218	-.035	-.471	-.165
EO_5	.494	.531	.012	-.263	.352
EO_6	.497	.065	.185	-.521	-.357
EO_7	.651	.106	-.128	-.516	-.041
ESE_1	.655	-.172	-.388	.025	.263
ESE_2	.658	-.207	-.446	-.073	.166
ESE_3	.700	-.314	-.320	-.002	.199
ESE_4	.631	-.304	-.184	.214	.179
ESE_5	.615	-.217	-.502	-.061	.076
CPS_1	.547	-.321	.374	-.007	.124
CPS_2	.620	-.300	.340	.136	.089
CPS_3	.683	-.208	.319	.109	-.228
CPS_4	.746	-.225	.281	.027	-.031
CPS_5	.668	-.365	.364	.205	.012
NA_1	.688	.243	-.082	.221	-.301
NA_2	.502	.293	-.263	.321	-.372
NA_3	.669	.183	-.268	.264	-.343
NA_4	.428	.625	.006	.256	-.014

NA_5	.358	.412	.148	.417	.084

Extraction Method: Principal Component Analysis.

5 components extracted.

Factor Analysis 2

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.850
Bartlett's Test of Sphericity	Approx. Chi-Square	1712.152
	df	231
	Sig	.000

Communalities		
	Initial	Extraction
EO_1	1.000	.569
EO_2	1.000	.710
EO_3	1.000	.669
EO_4	1.000	.620
EO_5	1.000	.719
EO_6	1.000	.683
EO_7	1.000	.720
ESE_1	1.000	.680

ESE_2	1.000	.708
ESE_3	1.000	.730
ESE_4	1.000	.603
ESE_5	1.000	.687
CPS_1	1.000	.558
CPS_2	1.000	.616
CPS_3	1.000	.676
CPS_4	1.000	.688
CPS_5	1.000	.754
NA_1	1.000	.679
NA_2	1.000	.648
NA_3	1.000	.740
NA_4	1.000	.639
NA_5	1.000	.501

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.829	35.588	35.588	7.829	35.588	35.588
2	2.272	10.329	45.917	2.272	10.329	45.917

3	1.827	8.302	54.219	1.827	8.302	54.219
4	1.458	6.628	60.847	1.458	6.628	60.847
5	1.211	5.503	66.351	1.211	5.503	66.351
6	.937	4.258	70.609			
7	.750	3.408	74.017			
8	.699	3.177	77.193			
9	.606	2.753	79.946			
10	.574	2.607	82.554			
11	.512	2.325	84.879			
12	.468	2.127	87.006			
13	.430	1.955	88.961			
14	.391	1.777	90.738			
15	.354	1.611	92.349			
16	.307	1.394	93.743			
17	.284	1.293	95.036			
18	.276	1.256	96.292			
19	.263	1.193	97.485			
20	.221	1.004	98.489			
21	.193	.876	99.365			
22	.140	.635	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix

	Component				
	1	2	3	4	5
CPS_4	.746				
ESE_3	.700				
NA_1	.688				
CPS_3	.683				
NA_3	.669				
CPS_5	.668				
ESE_2	.658		-.446		
ESE_1	.655				
EO_7	.651			-.516	
ESE_4	.631				
CPS_2	.620				
ESE_5	.615		-.502		
EO_1	.593				
EO_4	.568			-.471	
CPS_1	.547				
NA_2	.502				
NA_4	.428	.625			
EO_3	.529	.565			
EO_5	.494	.531			
EO_6	.497			-.521	
NA_5		.412		.417	

EO_2	.442		.423		.464

Extraction Method: Principal Component Analysis.

5 components extracted.

Factor Analysis 3

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.850
Bartlett's Test of Sphericity	Approx. Chi-Square	1712.152
	df	231
	Sig	.000

Communalities		
	Initial	Extraction
EO_1	1.000	.569
EO_2	1.000	.710
EO_3	1.000	.669
EO_4	1.000	.620
EO_5	1.000	.719
EO_6	1.000	.683
EO_7	1.000	.720

ESE_1	1.000	.680
ESE_2	1.000	.708
ESE_3	1.000	.730
ESE_4	1.000	.603
ESE_5	1.000	.687
CPS_1	1.000	.558
CPS_2	1.000	.616
CPS_3	1.000	.676
CPS_4	1.000	.688
CPS_5	1.000	.754
NA_1	1.000	.679
NA_2	1.000	.648
NA_3	1.000	.740
NA_4	1.000	.639
NA_5	1.000	.501

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.829	35.588	35.588	7.829	35.588	35.588
2	2.272	10.329	45.917	2.272	10.329	45.917
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4	1.458	6.628	60.847	1.458	6.628	60.847
5	1.211	5.503	66.351	1.211	5.503	66.351
6	.937	4.258	70.609			
7	.750	3.408	74.017			
8	.699	3.177	77.193			
9	.606	2.753	79.946			
10	.574	2.607	82.554			
11	.512	2.325	84.879			
12	.468	2.127	87.006			
13	.430	1.955	88.961			
14	.391	1.777	90.738			
15	.354	1.611	92.349			
16	.307	1.394	93.743			
17	.284	1.293	95.036			
18	.276	1.256	96.292			
19	.263	1.193	97.485			
20	.221	1.004	98.489			

21	.193	.876	99.365			
22	.140	.635	100.000			

Component Matrix

	Component				
	1	2	3	4	5
CPS_4	.746				
ESE_3	.700				
NA_1	.688				
CPS_3	.683				
NA_3	.669				
CPS_5	.668				
ESE_2	.658		-.446		
ESE_1	.655				
EO_7	.651			-.516	
ESE_4	.631				
CPS_2	.620				
ESE_5	.615		-.502		
EO_1	.593				
EO_4	.568			-.471	
CPS_1	.547				
NA_2	.502				

NA_4	.428	.625			
EO_3	.529	.565			
EO_5	.494	.531			
EO_6	.497			-.521	
NA_5		.412		.417	
EO_2	.442		.423		.464

Extraction Method: Principal Component Analysis.

5 components extracted.

Rotated Component Matrix

	Component				
	1	2	3	4	5
CPS_5	.824				
CPS_2	.735				
CPS_3	.719				
CPS_4	.715				
CPS_1	.697				
EO_1	.592				.439
ESE_2		.789			
ESE_5		.774			
ESE_3		.771			
ESE_1		.769			
ESE_4	.413	.626			

NA_2			.767		
NA_3			.741		
NA_1			.684		
NA_4			.575	.553	
EO_2				.765	
EO_5				.741	
EO_3				.719	
NA_5			.455	.480	
EO_6					.768
EO_4					.697
EO_7					.695

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

Rotation converged in 8 iterations.

Component Transformation Matrix					
Component	1	2	3	4	5
1	.563	.535	.396	.324	.367
2	-.470	-.340	.419	.678	.166
3	.651	-.681	-.227	.245	.023
4	.191	-.026	.533	-.008	-.824
5	-.034	.366	-.576	.612	-.398

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

Factor Analysis 4

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.857
Bartlett's Test of Sphericity	Approx. Chi-Square	1370.015
	df	153
	Sig	.000

Communalities

	Initial	Extraction
EO_2	1.000	.725
EO_3	1.000	.745
EO_4	1.000	.676
EO_5	1.000	.751
EO_6	1.000	.754
EO_7	1.000	.711
ESE_1	1.000	.670
ESE_2	1.000	.778
ESE_3	1.000	.761
ESE_5	1.000	.680
CPS_1	1.000	.586
CPS_2	1.000	.659
CPS_3	1.000	.690
CPS_4	1.000	.680
CPS_5	1.000	.755
NA_1	1.000	.664
NA_2	1.000	.744
NA_3	1.000	.784

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.859	38.106	38.106	6.859	38.106	38.106
2	1.865	10.361	48.467	1.865	10.361	48.467
3	1.702	9.454	57.921	1.702	9.454	57.921
4	1.274	7.077	64.998	1.274	7.077	64.998
5	1.112	6.178	71.175	1.112	6.178	71.175
6	.704	3.910	75.085			
7	.687	3.819	78.904			
8	.573	3.182	82.086			
9	.499	2.773	84.859			
10	.455	2.528	87.387			
11	.378	2.097	89.485			
12	.341	1.894	91.379			
13	.312	1.735	93.114			
14	.304	1.688	94.802			
15	.282	1.567	96.369			
16	.264	1.468	97.836			
17	.226	1.253	99.090			
18	.164	.910	100.000			

Component Matrix

	Component				
	1	2	3	4	5
CPS_4	.739				
ESE_3	.708				
CPS_3	.681				
EO_7	.680				
NA_1	.674			-.411	
NA_3	.672			-.489	
ESE_1	.666				
ESE_2	.664		-.495		
CPS_5	.658	-.519			
CPS_2	.633	-.407			
ESE_5	.632		-.508		
EO_4	.584				
CPS_1	.562	-.420			
EO_5	.497	.567			
EO_3	.525	.552			
EO_2	.425		.562		.440
NA_2	.502			-.605	
EO_6	.497				-.609

Extraction Method: Principal Component Analysis.

5 components extracted.

Rotated Component Matrix					
	Component				
	1	2	3	4	5
CPS_5	.829				
CPS_2	.772				
CPS_3	.726				
CPS_1	.726				
CPS_4	.713				
ESE_2		.842			
ESE_3		.787			
ESE_5		.761			
ESE_1		.750			
NA_2			.841		
NA_3			.794		
NA_1			.689		
EO_5				.794	
EO_3				.775	
EO_2				.769	
EO_6					.830
EO_4					.735
EO_7		.402			.657

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

Rotation converged in 6 iterations.

Component Transformation Matrix					
Component	1	2	3	4	5
1	.560	.528	.408	.322	.371
2	-.686	-.084	.312	.571	.316
3	.456	-.701	-.202	.501	.098
4	-.093	.335	-.815	.137	.442
5	-.008	.333	-.175	.549	-.747

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

Factor Analysis 5

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.844
Bartlett's Test of Sphericity	Approx. Chi-Square	1256.427
	df	136
	Sig	.000

Communalities

	Initial	Extraction
EO_2	1.000	.736
EO_3	1.000	.753
EO_4	1.000	.728
EO_5	1.000	.756
EO_6	1.000	.746
ESE_1	1.000	.668
ESE_2	1.000	.781
ESE_3	1.000	.769
ESE_5	1.000	.679
CPS_1	1.000	.587
CPS_2	1.000	.663
CPS_3	1.000	.690
CPS_4	1.000	.686
CPS_5	1.000	.752
NA_1	1.000	.660
NA_2	1.000	.766
NA_3	1.000	.783

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.437	37.866	37.866	6.437	37.866	37.866
2	1.809	10.641	48.507	1.809	10.641	48.507
3	1.700	10.000	58.507	1.700	10.000	58.507
4	1.208	7.103	65.610	1.208	7.103	65.610
5	1.048	6.163	71.773	1.048	6.163	71.773
6	.703	4.138	75.910			
7	.665	3.911	79.822			
8	.562	3.304	83.126			
9	.492	2.891	86.017			
10	.414	2.435	88.451			
11	.372	2.188	90.639			
12	.340	1.999	92.638			
13	.305	1.791	94.429			
14	.282	1.659	96.088			
15	.274	1.610	97.698			
16	.227	1.337	99.036			
17	.164	.964	100.000			

Component Matrix

	Component				
	1	2	3	4	5
CPS_4	.754				
ESE_3	.712				
CPS_3	.694				
NA_1	.684				
NA_3	.681			-.447	
CPS_5	.679	-.468			
ESE_1	.664				
ESE_2	.661		-.490		
CPS_2	.651				
ESE_5	.627		-.507		
CPS_1	.572				
EO_4	.561				.549
EO_3	.519	.612			
EO_5	.479	.591			
EO_2	.425		.543		
NA_2	.502			-.569	
EO_6	.471				.698

Extraction Method: Principal Component Analysis.

5 components extracted.

Rotated Component Matrix

	Component				
	1	2	3	4	5
CPS_5	.827				
CPS_2	.775				
CPS_1	.731				
CPS_3	.727				
CPS_4	.704				
ESE_2		.848			
ESE_3		.795			
ESE_5		.766			
ESE_1		.750			
NA_2			.856		
NA_3			.790		
NA_1			.679		
EO_5				.806	
EO_3				.783	
EO_2				.765	
EO_6					.822
EO_4					.756

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

Rotation converged in 6 iterations.

Component Transformation Matrix					
Component	1	2	3	4	5
1	.588	.534	.420	.322	.298
2	-.614	-.133	.386	.640	.216
3	.501	-.688	-.246	.451	.104
4	-.133	.459	-.775	.403	.097
5	-.089	-.112	-.118	-.349	.919

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

Factor Analysis 6

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.843
Bartlett's Test of Sphericity	Approx. Chi-Square	1137.515
	df	105
	Sig	.000

Communalities

	Initial	Extraction
EO_2	1.000	.682
EO_3	1.000	.740
EO_5	1.000	.770
ESE_1	1.000	.646
ESE_2	1.000	.784
ESE_3	1.000	.772
ESE_5	1.000	.684
CPS_1	1.000	.587
CPS_2	1.000	.659
CPS_3	1.000	.688
CPS_4	1.000	.679
CPS_5	1.000	.744
NA_1	1.000	.666
NA_2	1.000	.746
NA_3	1.000	.780

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.988	39.917	39.917	5.988	39.917	39.917
2	1.754	11.690	51.607	1.754	11.690	51.607
3	1.683	11.221	62.828	1.683	11.221	62.828
4	1.202	8.017	70.845	1.202	8.017	70.845
5	.696	4.643	75.488			
6	.604	4.026	79.514			
7	.493	3.289	82.803			
8	.477	3.178	85.981			
9	.414	2.759	88.740			
10	.370	2.464	91.203			
11	.339	2.261	93.465			
12	.305	2.030	95.495			
13	.278	1.851	97.345			
14	.234	1.558	98.904			
15	.164	1.096	100.000			

Component Matrix[a]

	Component			
	1	2	3	4
CPS_4	.753			
ESE_3	.726			
CPS_3	.697			
CPS_5	.697	-.471		
NA_1	.684			
NA_3	.680			-.435
ESE_1	.675			
ESE_2	.672		-.483	
CPS_2	.663			
ESE_5	.636		-.495	
CPS_1	.581	-.426		
EO_3	.499	.558		
EO_5	.458	.552		
EO_2	.429		.612	
NA_2	.510	.434		-.535

Extraction Method: Principal Component Analysis.

4 components extracted.

Rotated Component Matrix

	Component			
	1	2	3	4
CPS_5	.824			
CPS_2	.778			
CPS_3	.743			
CPS_1	.735			
CPS_4	.728			
ESE_2		.854		
ESE_3		.802		
ESE_5		.775		
ESE_1		.739		
NA_2			.847	
NA_3			.798	
NA_1			.693	
EO_5				.841
EO_3				.792
EO_2				.746

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

Rotation converged in 6 iterations.

Component Transformation Matrix				
Component	1	2	3	4
1	.620	.560	.440	.329
2	-.660	.015	.482	.576
3	.401	-.683	-.140	.594
4	-.136	.469	-.745	.455

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

Reliability Tests

Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded	0	.0
	Total	150	100.0

Listwise deletion based on all variables in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.861	5

Item Statistics

	Mean	Std. Deviation	N
CPS_1	2.01	.905	150
CPS_2	1.93	.761	150
CPS_3	2.21	1.025	150
CPS_4	2.61	1.305	150
CPS_5	2.51	1.091	150

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CPS_1	9.25	12.499	.599	.851
CPS_2	9.34	12.830	.687	.838
CPS_3	9.06	11.251	.705	.825
CPS_4	8.66	9.541	.732	.825
CPS_5	8.75	10.670	.742	.815

Reliability

Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded	0	.0
	Total	150	100.0

Listwise deletion based on all variables
in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.863	4

Item Statistics			
	Mean	Std. Deviation	N
ESE_1	3.24	1.491	150
ESE_2	2.66	1.545	150
ESE_3	2.64	1.271	150
ESE_5	2.70	1.284	150

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ESE_1	8.00	12.913	.669	.844
ESE_2	8.58	11.789	.766	.802
ESE_3	8.60	13.651	.750	.812
ESE_5	8.54	14.129	.676	.839

Reliability

Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded	0	.0
	Total	150	100.0

Listwise deletion based on all variables
in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.799	3

Item Statistics

	Mean	Std. Deviation	N
NA_1	2.53	1.324	150
NA_2	3.51	1.948	150
NA_3	2.99	1.757	150

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
NA_1	6.49	11.124	.634	.763
NA_2	5.52	7.808	.632	.760
NA_3	6.04	8.186	.717	.644

Reliability

Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded	0	.0
	Total	150	100.0

Listwise deletion based on all variables
in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.759	3

Item Statistics			
	Mean	Std. Deviation	N
EO_5	2.81	1.453	150
EO_3	3.15	1.549	150
EO_2	2.20	1.043	150

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EO_5	5.35	5.022	.645	.612
EO_3	5.01	4.644	.643	.622
EO_2	5.97	7.267	.530	.758

Reliability

Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded	0	.0
	Total	150	100.0

Listwise deletion based on all variables
in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.759	3

Item Statistics			
	Mean	Std. Deviation	N
EO_5	2.81	1.453	150
EO_3	3.15	1.549	150
EO_2	2.20	1.043	150

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EO_5	5.35	5.022	.645	.612
EO_3	5.01	4.644	.643	.622
EO_2	5.97	7.267	.530	.758

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
8.17	11.334	3.367	3

Reliability

Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded[a]	0	.0
	Total	150	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.759	.766	3

Item Statistics			
	Mean	Std. Deviation	N
EO_5	2.81	1.453	150
EO_3	3.15	1.549	150
EO_2	2.20	1.043	150

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance
Inter-Item Correlations	.521	.475	.612	.137	1.287	.005

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
EO_5	5.35	5.022	.645	.419	.612
EO_3	5.01	4.644	.643	.418	.622
EO_2	5.97	7.267	.530	.281	.758

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
8.17	11.334	3.367	3

Reliability

Scale: ALL VARIABLE

Case Processing Summary			
		N	%
Cases	Valid	150	100.0
	Excluded[a]	0	.0
	Total	150	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.759	.766	3

Item Statistics			
	Mean	Std. Deviation	N
EO_5	2.81	1.453	150
EO_3	3.15	1.549	150
EO_2	2.20	1.043	150

Inter-Item Correlation Matrix

	EO_5	EO_3	EO_2
EO_5	1.000	.612	.476
EO_3	.612	1.000	.475
EO_2	.476	.475	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance
Inter-Item Correlations	.521	.475	.612	.137	1.287	.005

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
EO_5	5.35	5.022	.645	.419	.612
EO_3	5.01	4.644	.643	.418	.622
EO_2	5.97	7.267	.530	.281	.758

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
8.17	11.334	3.367	3

PLUM - Ordinal Regression

Case Processing Summary			
		N	Marginal Percentage
CPS	1.00	33	22.0%
	2.00	73	48.7%
	3.00	37	24.7%
	4.00	1	0.7%
	5.00	4	2.7%
	6.00	2	1.3%
BT_1	0	76	50.7%
	1	74	49.3%
Valid		150	100.0%
Missing		0	
Total		150	

Model Fitting Information				
Model	-2 Log Likelihood	Chi-Square	df	Sig
Intercept Only	33.636			
Final	33.583	.053	1	.818

Link function: Logit.

Goodness-of-Fit			
	Chi-Square	df	Sig
Pearson	4.997	4	.288
Deviance	6.923	4	.140

Link function: Logit.

Pseudo R-Square	
Cox and Snell	.000
Nagelkerke	.000
McFadden	.000

Link function: Logit.

Parameter Estimates							
							95% Confidence Interval
		Estimate	Std Error	Wald	df	Sig	Lower Bound
Threshold	[CPS = 1.00]	-1.231	.249	24.395	1	.000	-1.719
	[CPS = 2.00]	.914	.238	14.761	1	.000	.448
	[CPS = 3.00]	3.052	.418	53.308	1	.000	2.233
	[CPS = 4.00]	3.214	.446	52.012	1	.000	2.340
	[CPS = 5.00]	4.340	.729	35.419	1	.000	2.911
Location	[BT_1=0]	.070	.305	.053	1	.818	-.528
	[BT_1=1]	0[a]	.	.	0	.	.

Test of Parallel Lines[a]				
Model	-2 Log Likelihood	Chi-Square	df	Sig
Null Hypothesis	33.583			
General	26.660	6.923	4	.140

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.[a]

a. Link function: Logit.

PLUM - Ordinal Regression

Case Processing Summary

		N	Marginal Percentage
ESE	1.00	19	12.7%
	2.00	41	27.3%
	3.00	50	33.3%
	4.00	23	15.3%
	5.00	11	7.3%
	6.00	4	2.7%
	7.00	2	1.3%
BT_1	0	76	50.7%
	1	74	49.3%
Valid		150	100.0%
Missing		0	
Total		150	

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig
Intercept Only	43.362			
Final	43.249	.113	1	.737

Link function: Logit.

Goodness-of-Fit			
	Chi-Square	df	Sig.
Pearson	2.642	5	.755
Deviance	2.656	5	.753

Link function: Logit.

Pseudo R-Square	
Cox and Snell	.001
Nagelkerke	.001
McFadden	.000

Link function: Logit.

Parameter Estimates							
							95% Confidence Interval
		Estimate	Std Error	Wald	df	Sig	Lower Bound
Threshold	[ESE = 1.00]	-1.982	.289	47.125	1	.000	-2.548
	[ESE = 2.00]	-.455	.224	4.143	1	.042	-.894
	[ESE = 3.00]	.964	.235	16.783	1	.000	.503

	[ESE = 4.00]	2.009	.295	46.285	1	.000	1.430
	[ESE = 5.00]	3.130	.441	50.417	1	.000	2.266
	[ESE = 6.00]	4.256	.726	34.342	1	.000	2.832
Location	[BT_1=0]	-.098	.292	.113	1	.737	-.671
	[BT_1=1]	0[a]	.	.	0	.	.

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig
Null Hypothesis	43.249			
General	40.594	2.656	5	.753

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.[a]

a. Link function: Logit.

PLUM - Ordinal Regression

Case Processing Summary

		N	Marginal Percentage
NA	1.00	29	19.3%
	2.00	42	28.0%
	3.00	33	22.0%
	4.00	17	11.3%
	5.00	9	6.0%

	6.00	19	12.7%
	7.00	1	0.7%
BT_1	0	76	50.7%
	1	74	49.3%
Valid		150	100.0%
Missing		0	
Total		150	

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig
Intercept Only	47.251			
Final	47.136	.114	1	.735

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	6.095	5	.297
Deviance	6.537	5	.257

Link function: Logit.

Pseudo R-Square	
Cox and Snell	.001
Nagelkerke	.001
McFadden	.000

Link function: Logit.

Parameter Estimates

		Estimate	Std Error	Wald	df	Sig	95% Confidence Interval
							Lower Bound
Threshold	[NA = 1.00]	-1.476	.255	33.493	1	.000	-1.976
	[NA = 2.00]	-.152	.220	.482	1	.488	-.583
	[NA = 3.00]	.769	.229	11.302	1	.001	.321
	[NA = 4.00]	1.381	.252	30.067	1	.000	.887
	[NA = 5.00]	1.824	.280	42.530	1	.000	1.276
	[NA = 6.00]	4.955	1.013	23.919	1	.000	2.969
Location	[BT_1=0]	-.098	.289	.115	1	.735	-.665
	[BT_1=1]	0[a]	.	.	0	.	.

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig

Null Hypothesis	47.136			
General	40.599	6.537	5	.257

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.[a]

a. Link function: Logit.

PLUM - Ordinal Regression

Case Processing Summary

		N	Marginal Percentage
EO	1.00	23	15.3%
	2.00	49	32.7%
	3.00	44	29.3%
	4.00	20	13.3%
	5.00	7	4.7%
	6.00	7	4.7%
BT_1	0	76	50.7%
	1	74	49.3%
Valid		150	100.0%
Missing		0	
Total		150	

Model Fitting Information				
Model	-2 Log Likelihood	Chi-Square	df	Sig
Intercept Only	38.656			
Final	38.623	.033	1	.856

Link function: Logit.

Goodness-of-Fit			
	Chi-Square	df	Sig
Pearson	1.688	4	.793
Deviance	1.730	4	.785

Link function: Logit.

Pseudo R-Square	
Cox and Snell	.000
Nagelkerke	.000
McFadden	.000

Link function: Logit.

Parameter Estimates							
							95% Confidence Interval
		Estimate	Std Error	Wald	df	Sig	Lower Bound
Threshold	[EO = 1.00]	-1.682	.270	38.853	1	.000	-2.211
	[EO = 2.00]	-.053	.221	.058	1	.809	-.486
	[EO = 3.00]	1.254	.246	25.990	1	.000	.772
	[EO = 4.00]	2.300	.318	52.175	1	.000	1.676
	[EO = 5.00]	3.044	.415	53.699	1	.000	2.230
Location	[BT_1=0]	.053	.293	.033	1	.856	-.521
	[BT_1=1]	0[a]	.	.	0	.	.

Test of Parallel Lines[a]				
Model	-2 Log Likelihood	Chi-Square	df	Sig
Null Hypothesis	38.623			
General	36.893	1.730	4	.785

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.[a]

a. Link function: Logit.